GLENCOE
MATHEMATICS

North Carolina Algebra 1 End-of-Course (EOC) Test

Practice and Sample Test Workbook

Includes:

- North Carolina Course of Study Content Standards Covered on the Algebra 1 EOC Test
- Diagnostic Test
- Practice for Each Content Standard
- Full-Size Sample Test
- Student Recording Chart

Test-Taking Tips

- Go to bed early the night before the test. You will think more clearly after a good night's rest.

- Read each problem carefully and think about ways to solve the problem before you try to answer the question.

- Relax. Most people get nervous when taking a test. It's natural. Just do your best.

- Answer questions you are sure about first. If you do not know the answer to a question, skip it and go back to that question later.

- Think positively. Some problems may seem hard to you, but you may be able to figure out what to do if you read each question carefully.

- If no figure is provided, draw one. If one is furnished, mark it up to help you solve the problem.

- When you have finished each problem, reread it to make sure your answer is reasonable.

- Become familiar with a variety of formulas and when they should be used.

- Make sure that the number of the question on the answer sheet matches the number of the question on which you are working in your test booklet.

Glencoe

The McGraw·Hill Companies

Contents

Test Practice

Standards Practice

Test Practice

Overview

The material in this booklet is designed to help you prepare for the North Carolina Algebra 1 End-of-Course Test (EOC).

It contains:

- a Student Recording Chart,
- the competency goals tested on the EOC,
- a Diagnostic Test,
- practice for each competency goal, and
- two Sample Tests.

How to Use the Booklet

Diagnostic Test This test will help you identify any weaknesses you may have as you prepare to take the EOC. Once you've taken the test and it's been graded, complete the Student Recording Chart that is found on page iv. Mark an × in the square for each question that you answered *incorrectly*.

Practice If you missed one or two of the questions for a particular competency goal, you could probably use some extra practice with that goal. The Student Recording Chart lists practice pages for each competency goal. Complete the appropriate practice pages. If you are unsure about how to do some of the problems, you may want to refer to your mathematics book.

Sample Test After you have completed your practice worksheet(s), take the Sample Tests on pages 61 to 100.

Name _____

Student Recording Chart

Directions Mark an × by each question from the Diagnostic Test that you answered *incorrectly*. If there are one or two ×s marked for a competency goal, write *Yes* in the *Need Practice?* box. Then complete the practice pages for that competency goal.

Strand	Number Sense, Numeration, and Numerical Operations			Spatial Sense, Measurement, and Geometry	
Goal	1.01	1.02	1.03	2.01	2.02
Test Questions	2 ☐ 22 ☐ 31 ☐ 40 ☐	6 ☐ 15 ☐ 20 ☐ 27 ☐	4 ☐ 16 ☐ 24 ☐ 36 ☐	9 ☐ 25 ☐ 29 ☐ 39 ☐	3 ☐ 21 ☐ 33 ☐ 37 ☐
Need Practice?					
Practice Pages	21–22	23–24	25–26	27–28	29–30

Strand	Patterns, Relationships, and Functions				
Goal	3.01	3.02	3.03	3.04	3.05
Test Questions	5 ☐ 10 ☐ 19 ☐ 23 ☐	7 ☐ 11 ☐ 26 ☐ 34 ☐	17 ☐ 18 ☐ 28 ☐	1 ☐ 12 ☐ 32 ☐ 35 ☐	8 ☐ 13 ☐ 14 ☐ 30 ☐
Need Practice?					
Practice Pages	31–32	33–34	35–36	37–38	39–40

Strand	Patterns, Relationships, and Functions (continued)				
Goal	3.06	3.07	3.08	3.09	3.10
Test Questions	62 ☐ 68 ☐ 69 ☐ 73 ☐	54 ☐ 59 ☐ 67 ☐ 71 ☐	38 ☐ 41 ☐ 42 ☐ 43 ☐ 48 ☐	50 ☐ 51 ☐ 52 ☐ 53 ☐	63 ☐ 64 ☐ 65 ☐ 66 ☐
Need Practice?					
Practice Pages	41–42	43–44	45–46	47–48	49–50

| Strand	Patterns, Relationships, and Functions (continued)		Data, Probability, and Statistics		
Goal	3.11	3.12	4.01	4.02	4.03
Test Questions	60 ☐ 61 ☐ 70 ☐ 74 ☐	55 ☐ 56 ☐ 57 ☐ 58 ☐	44 ☐ 45 ☐ 46 ☐ 47 ☐	49 ☐ 77 ☐ 79 ☐ 80 ☐	72 ☐ 75 ☐ 76 ☐ 78 ☐
Need Practice?					
Practice Pages	51–52	53–54	55–56	57–58	59–60

Competency Goals Tested on the EOC

COMPETENCY GOAL 1: Number Sense, Numeration, and Numerical Operations
The learner will perform operations with real numbers and polynomials to solve problems.

1.01	Operate with real numbers to solve a variety of problems.
a.	Apply the laws of exponents to perform operations on expressions with integral exponents.
	b. Evaluate absolute value expressions.
	c. Evaluate radical expressions.
	d. Evaluate algebraic expressions.
1.02	Operate with polynomials.
	a. Add, subtract, and multiply polynomials.
	b. Divide polynomials by monomial divisors.
1.03	Factor polynomials.
	a. Find the greatest common factor of a polynomial.
	b. Factor quadratic expressions.

COMPETENCY GOAL 2: Spatial Sense, Measurement, and Geometry
The learner will solve problems in a geometric context.

2.01	Use formulas and algebraic expressions (from science, geometry, statistics, etc.) to solve problems.
2.02	Describe, extend, and express algebraically a wide variety of geometric patterns.

COMPETENCY GOAL 3: Patterns, Relationships, and Functions
The learner will graph and use relations and functions to solve problems.

3.01	Translate word phrases and sentences into expressions and equations and vice versa.
3.02	Identify properties and relationships of data in tables, graphs, and equations.
3.03	Define and distinguish between relations and functions, dependent and independent variables, domain and range.
3.04	Graph and interpret in the context of the problem, relations and functions on the coordinate plane. Include linear equations and inequalities, quadratics, and exponentials.
3.05	Determine and use slopes of linear relationships to solve problems.
	a. Find the slope of a line given the graph of the line, an equation of the line, or two points on the line.
	b. Describe the slope of the line in the context of a problem situation.
3.06	Write the equation of and graph linear relationships given the following information:
	a. Slope and y-intercept
	b. Slope and one point on the line
	c. Two points on the line

|	
3.07	Investigate and determine the effects of changes in slope and intercepts on the graph and equation of a line.
	a. Change only slope.
	b. Change only the x- or y-intercept.
	c. Change the slope and an intercept.
3.08	Use linear equations or inequalities to solve problems. Solve by:
	a. Graphing.
	b. Using properties of equality; justify steps used.
3.09	Use systems of linear equations or inequalities in two variables to solve problems. Determine the solution by:
	a. Graphing.
	b. Substitution.
	c. Elimination.
3.10	Graph quadratic functions.
	a. Locate the intercepts and the vertex.
	b. Recognize the x-intercepts of the function as the solutions of the equation.
3.11	Use quadratic equations to solve problems. Solve by:
	a. Factoring.
	b. Locating points on the graph.
3.12	Use formulas and graphs to solve problems involving exponential functions. Solve a problem by:
	a. Locating points on the graph.
	b. Evaluating an exponential expression.
COMPETENCY GOAL 4: Data, Probability, and Statistics **The learner will collect and interpret data to solve problems.**	
4.01	Use matrices to display and interpret data.
4.02	Recognize and identify linear and non-linear data.
4.03	Create and use linear models based on real data.
	a. Graph the data.
	b. Write a linear equation which models a set of real data.
	c. Describe the slope and intercepts in the context of the data.
d.	Check the model for goodness-of-fit and use the model to make predictions.

Diagnostic Test
Test Practice
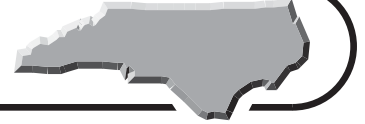
Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

1 Sue knows that the cost c of the gasoline she uses in mowing people's lawns can be described by $c \leq \ell w k$, where ℓ and w are the outside dimensions of the property and k is a constant that expresses gasoline usage and cost per gallon. Which of the following graphs shows this relation on a street with lawns that are all the same length but different widths? **3.04**
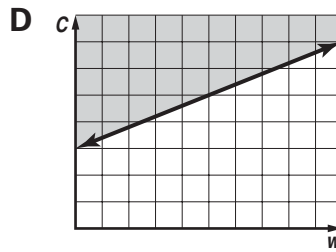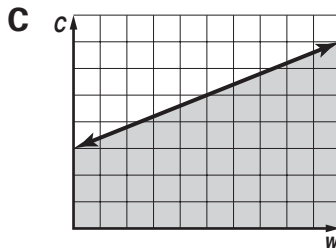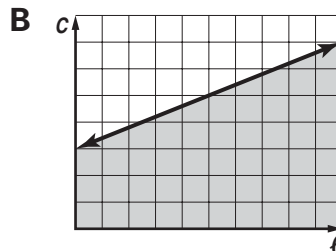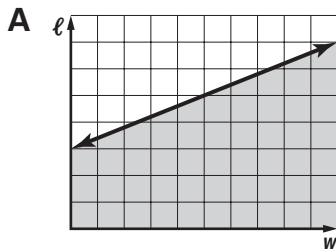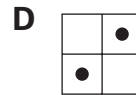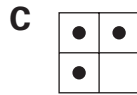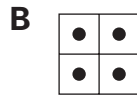
1 _____

A

B

C

D

2 Simplify 4^3. **1.01**

2 _____

   A 1.25   **B** 12   **C** 16   **D** 64

3 What is the next pattern in this sequence? **2.02**

3 _____

A   **B**   **C**   **D**
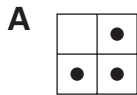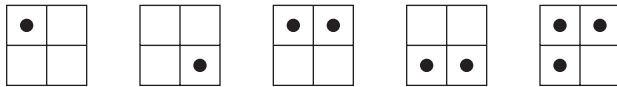
4 Find the greatest common factor of $12x^2 + 18x - 36$. **1.03**

4 _____

   A 36   **B** 6   **C** 3   **D** 2

5 The amount of flour f needed for n batches of cookies is the product of n and three cups of flour per batch. Which equation describes this? **3.01**

5 _____

   A $f = 3n$ **B** $fn = 3$ **C** $f = \frac{3}{n}$ **D** $f = \frac{n}{3}$

Go on

Diagnostic Test (continued)
Test Practice

Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

6 Expand $(x - 5)(5 - x)$. **1.02**
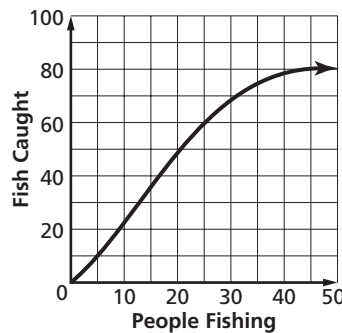
A $x^2 - 10x - 25$ **B** 0

C $-x^2 + 10x - 25$ **D** $-x^2 - 10x - 25$

6 _____

The graph shows the number of fish caught along a stretch of the Neuse River as a function of the number of people fishing there on a particular day. Use the graph to answer Questions 7 and 8.

7 If more and more people come to fish on a particular day, what happens to the total number of fish that are caught that day? **3.02**

A It increases linearly, because most people always catch two fish.

B It increases up to the point where almost all of the fish that could be caught that day are caught.

C The total increases to a maximum value, then it decreases.

D The total stays the same, regardless of the number of people fishing.

7 _____

8 As the number of people fishing along this part of the river becomes very large, what value does the slope of the line approach? **3.05**

A 100   **B** 1   **C** 0   **D** -1

8 _____

9 The concentration of any solution is equal to the amount of dissolved material divided by the total volume of the solution. Tangi dissolves 4 grams of sodium nitrate in 100 milliliters of water. There are 1,000 milliliters in one liter. What is the concentration of her solution in grams per liter? **2.01**

A 40 g/L   **B** 100 g/L   **C** 400 g/L   **D** 4,000 mg/L

9 _____

10 Randy is loading bales of hay from a field that belongs to his neighbor, Mrs. Williams. Before he began, she offered him his choice of either 5 cents per bale b that he loaded or 7 dollars for every hour h that he worked. He has done this work before, and he knows how fast he can load hay bales. He asked her to pay him by the bale. Which inequality expresses what he knew in making his choice? **3.01**
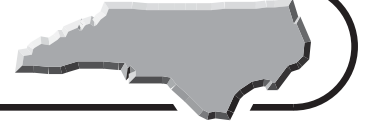
A $5b < 7h$ **B** $5b > 7h$ **C** $0.05b < 7h$ **D** $0.05b > 7h$

10 _____

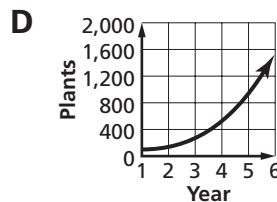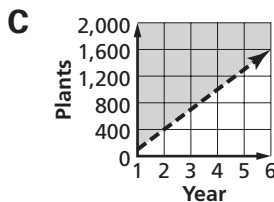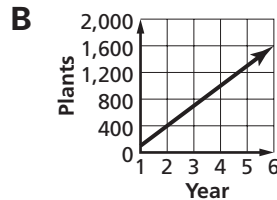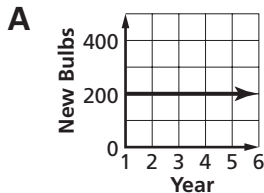*Go on*

Diagnostic Test (continued)
Test Practice

Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

Ramon adds daffodils to his yard by planting new daffodil bulbs and by splitting larger bulbs in half. The table shows Ramon's daffodil planting and his results. Use these data to answer Questions 11 to 14.

Year	Plants in Spring	Bulbs Added in Fall	Plants Added by Splitting	Plants Lost during Winter
1	100	200	110	10
2	400	200	140	40
3	700	200	170	70
4	1,000	200	200	100
5	1,300	200	230	130
6	1,600	200	260	160

11 How many of Ramon's daffodil plants die every winter? **3.02**   11 _____

    A a random number
    B all that he adds by splitting larger bulbs
    C 10 per cent of that Spring's plants
    D most of the new bulbs

12 Which of these graphs shows the increase in Ramon's daffodils? **3.04**   12 _____

    A   **B**

    C   **D**

13 If we define the line that describes daffodil numbers in Ramon's yard by the ordered pairs (1, 100) and (6, 1600), what is the slope of the line? **3.05**   13 _____

    A 5   **B** 6
    C 100   **D** 300

14 What does the slope of the line describing daffodil numbers show? **3.05**   14 _____

    A the cost of the new plants each year
    B the number of additional daffodil plants in his yard each year
    C the number of bulbs divided each year
    D the total number of daffodils in the yard

Go on

Diagnostic Test (continued)
Test Practice

Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

15 Simplify $(2x^2 + 9x + 5) + (9x^2 + 2x - 5)$. **1.02**

    A $-7x^2 + 7x - 10$

    B $11x^2 + 11x$

    C $18x^2 + 18x - 25$

    D $18x^4 + 18x^2 - 25$

15 _____

16 Factor $2x^2 + 10x$ completely. **1.03**

    A $2, 5, x$

    B $2x^2\left(1 + \frac{5}{x}\right)$

    C $2(x^2 + 5x)$

    D $2x(x + 5)$

16 _____

Tess has a large raspberry patch at her farm near Snow Camp. She can easily pick ten quarts of berries an hour. Use this information to answer Questions 17 and 18.

17 What is the domain of the function $q = 10t$ for the quantity q of raspberries Tess picks during the time t that she spends picking? **3.03**

    A 10 qt

    B 10 qt/hr

    C $10t$

    D 0 to the total time she could spend picking berries

17 _____

18 What is the range of the function $q = 10t$? **3.03**

    A 0 to $10t$ for $t =$ the total time she could spend picking berries

    B 0 to the total amount of time she could spend picking berries

    C 10 qt

    D 10 qt/hr

18 _____

19 Marco notices that the number of sousaphone players s in the marching bands that he sees is roughly 2 more than the square root of the number of trumpet players t in each band. Which expression shows this? **3.01**

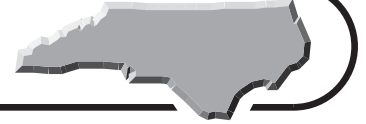   **A** $s + 2 \approx \sqrt{t}$ **B** $s \approx \sqrt{t} + 2$

    C $s \approx \sqrt{t + 2}$ **D** $s^2 + t \approx 2$

19 _____

Go on

Diagnostic Test (continued)
Test Practice

Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.
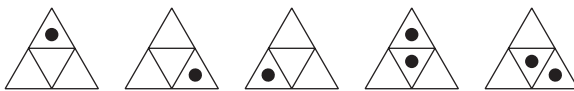
**20** Simplify $\frac{2x^2 - 6x + 4}{2}$. **1.02**   20 _____

    A $x^2 - 6x + 4$
    B $2x^2 - 6x + 2$
    C $x^2 + 3x + 2$
    D $x^2 - 3x + 2$

21 What is the next pattern in this sequence? **2.02**   21 _____

  A   **B**

  C   **D**

22 Simplify $3 + 4 \times 2 + 4$. **1.01**   22 _____
    A 15   **B** 17
    C 42   **D** 56

23 Which of these can be modeled by the equation $W = \ell whd$? **3.01**   23 _____
    A The density d of the concrete in a driveway is equal to the driveway's weight W multiplied by the length ℓ, width w, and thickness h of the driveway.
    B The length ℓ of a driveway has no relationship to how much the concrete in the driveway weighs.
    C The weight W of the concrete in a driveway can be found by multiplying the density d of the concrete by the driveway's length ℓ, width w, and thickness h.
    D This equation shows that the density of concrete must be different in different driveways, because various driveways can have different values for length ℓ, width w, and thickness h.

24 Find the greatest common factor of $13x - 5$. **1.03**   24 _____
    A 1   **B** 5
    C 13   **D** 65

Go on

Diagnostic Test (continued)
Test Practice

Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

25 If ocean waves break along the beach in Avon an average of once every 10 seconds, write and solve an equation to find the total number of waves that break along the beach each day. **2.01**

   A 1,440   **B** 8,640

   C 14,400   **D** 518,400

25 _____

26 Use the table to determine the relationship between the number of cups of raisins used in each batch of cookies and the average number of raisins in each cookie. **3.02**

Cups per Batch	2	2.5	3
Raisins per Cookie	12	15	18

   A There are 12 raisins per cookie for every cup in the batch.

   B There are between 2 and 18 cups in each cookie.

   C There are 6 raisins in every cookie if you make 2 batches.

   D There are 6 raisins per cookie for every cup in the batch.

26 _____

27 Simplify $2x(x + 3)$. **1.02**

   A $2x^2 + 6x$

   B $2x^2 + 3x$

   C $2x^2 + 6$

   D $2x^2 + 3$

27 _____

28 In the equation $y = x^2 + 10x - 3$, which are the independent and dependent variables? **3.03**

   A They are both independent variables.

   B They are both dependent variables.

   C x is dependent and y is independent.

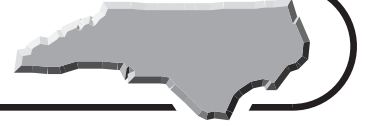   **D** y is dependent and x is independent.

28 _____

29 If Mr. Dickens plants corn in rows 3 feet apart, how many rows does he have in a field with its outermost rows 120 feet apart? **2.01**
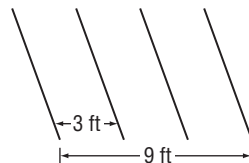
   A 360

   B 41

   C 40

   D 39

29 _____

←3 ft→

|← 9 ft →|

Go on

Diagnostic Test (continued)
Test Practice

Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

30 Dominic stops at Cheryl's orchard near the Blue Ridge Parkway. Cheryl offers to sell Dominic all the apples he wants at $C = 0.2a + 0.25$, where C is the cost in dollars and a is the number of apples. If Dominic can tell Cheryl the slope of the line of C, she tells him she'll subtract one quarter off the price of the apples. What should Dominic answer? **3.05**

  A 0.2

  B 0.25

  C 0.45

  D 3.25

30 _____

31 Solve for y if $|y| = \sqrt{4}$. **1.01**

  A -2

  B ± 2

  C 2

  D ± 16

31 _____

32 Terri is covering a square floor with square tiles that measure 1 foot on each side. The room is w feet wide. How many tiles does Terri need? **3.04**

  A w^2

  B $2w$

  C w

  D $\sqrt{w}$

32 _____

33 What is the next figure in this sequence? **2.02**

33 _____
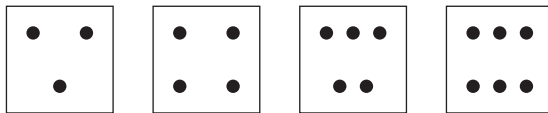
Go on

Diagnostic Test (continued)
Test Practice

Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

A pressure gauge can have an exponential scale on which the distance between each mark on the dial and the next mark corresponds to a larger increase in pressure than for the previous pair of marks. Use the table to answer Questions 34 and 35.

Mark	0	1	2	3	4	5	6	7	8	9	10
Pressure	0	10	40	90	160	250	360	490	640	810	1000

34 Which equation describes y in terms of x for these values? **3.02**

  A $x = 10y^2$

  B $x = y^3$

  C $y = x^3$

  D $y = 10x^2$

34 _____

35 If these numbers represent the gauge of a pressure tank located where you work and someone says that the gauge has gone up "only 3 marks" while you were at lunch, what should be your response? **3.04**

  A "That's okay; the pressure range is small."

  B "Three marks could be a huge increase; I'll check on it."

  C "That's okay; pressure tapers off as the marks go up."

  D "There is no need to worry; 3 marks is never very much."

35 _____

36 Factor $36 - x^2$. **1.03**

  A ± 6

  B $(6 - x)^2$

  C $(x + 6)(-x + 6)$

  D $(x + 6)(x - 6)$

36 _____

37 What is the next figure in this sequence? **2.02**

37 _____
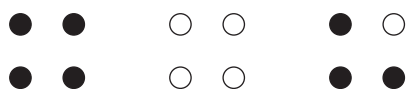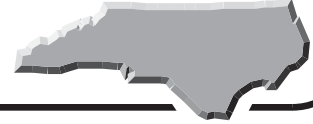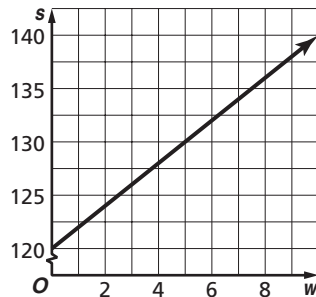
Go on

Diagnostic Test (continued)
Test Practice

Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

38 Aki's clothes dryer turns his laundry at 60 revolutions per minute. If t is the time in minutes that he runs his dryer and R is the total number of times the dryer turns with his clothes inside, what are the domain and range of $R = 60t$? **3.03**

A The domain is 0 to t. The range is 0 to $60t$.
B The range is 0 to t. The domain is 0 to $60t$.
C The range is t, and the domain is 60.
D The domain is t, but the range cannot be calculated without knowing t.

38 _____

39 Barbara watches pelicans in flight at Ocracoke Island. The number of times p each day that she sees pelicans can be expressed as $p = 8h + 15$, where h is the number of hours she spends walking on the beach. How many times does she see pelicans on a day when she spends 2 hours walking on the beach? **2.01**

A 8
B 15
C 31
D 38

39 _____

40 Simplify $\sqrt{20}$. **1.01**

A 10
B $4\sqrt{5}$
C $2\sqrt{5}$
D $5\sqrt{2}$

40 _____

Go on

Diagnostic Test (continued)
Test Practice

Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

Jovita has 120 subscribers on her mailing list. She predicts that each week, 3 subscribers will join and 1 will leave. The graph illustrates how the number of subscribers increases. Use the graph to answer Questions 41 and 42.

41 Which is the slope of the line that contains the points on the graph? **3.08**

A −20

B −2

C 2

D 120

41 _____

42 What does the slope of the line represent? **3.08**

A the increase in subscribers each week

B the initial number of subscribers

C the cost of the subscription

D the number of months Jovita has run the mailing list

42 _____

43 Which is the graph of the solution set of $y \leq \frac{3}{2}x + 2$? **3.08**

43 _____
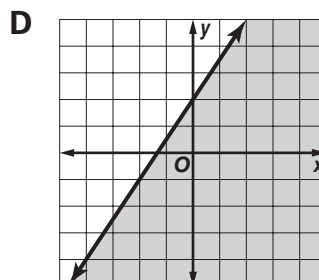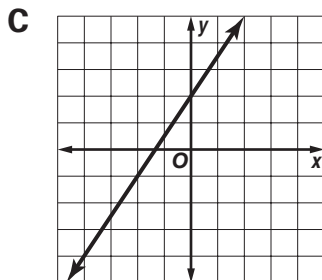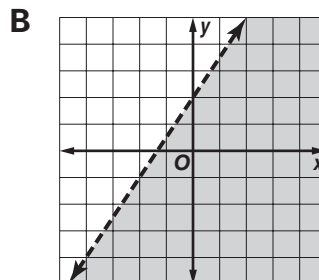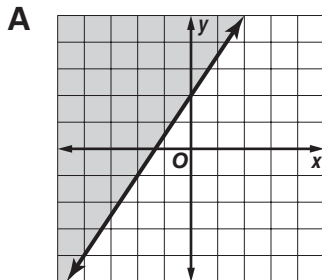
A

B

C

D

Go on

Diagnostic Test (continued)
Test Practice

Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

The number of dogs boarding in small, medium, and large kennels at Jake and Sadie's Doggie Hotel one Saturday and Sunday morning and afternoon is shown in matrices A and B below. Use the matrices to answer Questions 44 through 47.

$$A = \begin{array}{c} \\ \text{A.M.} \\ \text{P.M.} \end{array} \overset{\begin{array}{ccc} \text{Saturday} \\ \text{S} \quad \text{M} \quad \text{L} \end{array}}{\begin{bmatrix} 12 & 10 & 6 \\ 15 & 12 & 9 \end{bmatrix}} \qquad B = \begin{array}{c} \\ \text{A.M.} \\ \text{P.M.} \end{array} \overset{\begin{array}{ccc} \text{Sunday} \\ \text{S} \quad \text{M} \quad \text{L} \end{array}}{\begin{bmatrix} 15 & 10 & 8 \\ 19 & 18 & 15 \end{bmatrix}}$$

44 On Sunday afternoon, which kennels had the most dogs? **4.01**   44 _____

   A small

   B medium

   C medium and large

   D large

45 Which size kennels had the same number of dogs on Saturday morning   45 _____
and Sunday morning? **4.01**

   A small

   B medium

   C medium and large

   D large

46 If you add matrices A and B to form matrix E, what does E 46 _____
represent? **4.01**

   A the number of dogs in small kennels combined with the number of
dogs in medium kennels

   B the number of dogs boarding in the mornings combined with the
number of dogs boarding in the afternoons

   C the number of dogs in large kennels on Saturday and Sunday afternoon

   D the number of dogs in small, medium, and large kennels for both
days combined

47 Which matrix is E? **4.01**   47 _____

$$\textbf{A} \begin{array}{c} \\ \text{A.M.} \\ \text{P.M.} \end{array} \overset{\begin{array}{ccc} \text{S} \quad \text{M} \quad \text{L} \end{array}}{\begin{bmatrix} 12 & 10 & 6 \\ 15 & 12 & 9 \end{bmatrix}} \qquad \textbf{B} \begin{array}{c} \\ \text{A.M.} \\ \text{P.M.} \end{array} \overset{\begin{array}{ccc} \text{S} \quad \text{M} \quad \text{L} \end{array}}{\begin{bmatrix} 15 & 10 & 8 \\ 19 & 18 & 15 \end{bmatrix}}$$

$$\textbf{C} \begin{array}{c} \\ \text{A.M.} \\ \text{P.M.} \end{array} \overset{\begin{array}{ccc} \text{S} \quad \text{M} \quad \text{L} \end{array}}{\begin{bmatrix} 27 & 20 & 14 \\ 34 & 30 & 24 \end{bmatrix}} \qquad \textbf{D} \begin{array}{c} \\ \text{A.M.} \\ \text{P.M.} \end{array} \overset{\begin{array}{ccc} \text{S} \quad \text{M} \quad \text{L} \end{array}}{\begin{bmatrix} 3 & 10 & 2 \\ 4 & 6 & 6 \end{bmatrix}}$$

Go on

Diagnostic Test (continued)
Test Practice

Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

48 Which properties justify the statement $(3x + 7) + 2x = (3x + 2x) + 7$? **48** _____

    3.08

   I   Multiplicative Inverse Property

   II Multiplicative Identity Property

   III Commutative Property

   IV Associative Property

   A I only

   B IV only

   C III and IV

   D II, III, and IV

49 Which set of data is nonlinear? **4.02**   **49** _____

A

x	−1	0	1	2
y	9	9	9	9

B

x	−1	0	1	2
y	2	4	8	16

C

x	−1	0	1	2
y	−1	0	1	2

D

x	−1	0	1	2
y	21	22	23	24

Admission to the senior class variety show was $3.75 for students and $4.50 for adults. The senior class collected $1,680 from the sale of 400 tickets. Use this information to answer Questions 50 and 51.

50 Which system of equations can be used to find the number of adult tickets a sold and the number of student tickets s sold? **3.09**   **50** _____

  A $3.75a + 4.5s = 1,680$ **B** $3.75a + 4.5s = 1,680$

      $3.75a + 4.5s = 400(a + s)$ $a + s = 400$

  C $8.25(a + s) = 1,680$ **D** $3.75s + 4.5a = 1,680$

      $a + s = 400$ $a + s = 400$

51 How many student tickets were sold? **3.09**   **51** _____

   A 240

   B 200

   C 160

   D 120

Go on

Diagnostic Test (continued)
Test Practice

Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

52 The solution set of which system of inequalities is graphed? **3.09**

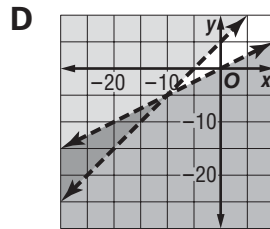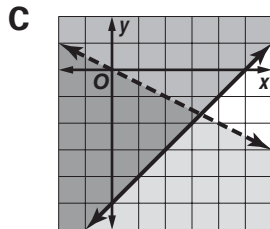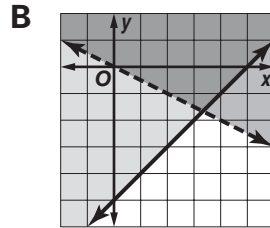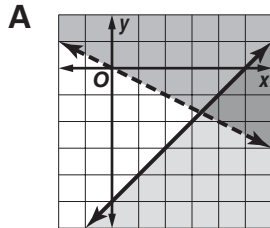**A** $y < 3x - 1$
$y < -x + 2$

B $y < 3x - 1$
$y > -x + 2$

C $y > 3x - 1$
$y < -x + 2$

D $y > 3x - 1$
$y > -x + 2$
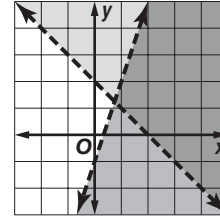
52 _____

53 Which is the graph of the solution set of the system of inequalities? **3.09**

$x - y \leq 5$
$x + 2y > 0$

53 _____

A

B

C

D

54 To the right is the graph of $y = mx - 1$. Which of these is the graph of $y = -mx - 1$? **3.07**
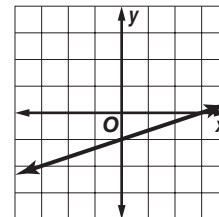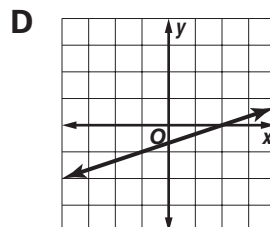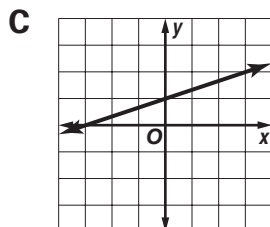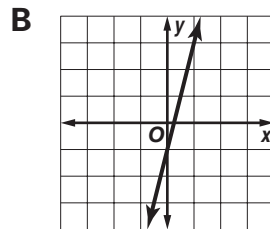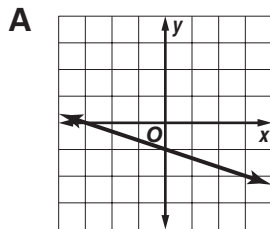
A

B

C

D

54 _____

Go on

Diagnostic Test (continued)
Test Practice _____

Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

The depreciation of Kenny's computer t years after purchase can be modeled with the equation $v(t) = 2,400(0.55)^t$. Use this information to answer Questions 55 through 58.

55 What does $v(0)$ represent? **3.12**   55 _____

    A the number of years until the value is $0

    B the year of purchase

    C the number of computers bought

    D the purchase price

56 What was the initial value of Kenny's computer? **3.12**   56 _____

    A $2,400   **B** $2,345   **C** $1,320   **D** $550

57 After how many years will the computer be worth about $100? **3.12**   57 _____

    A 4.5 yr   **B** 5.3 yr   **C** 6.2 yr   **D** 7 yr

58 Which is the graph of this function? **3.12**   58 _____
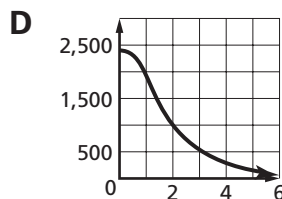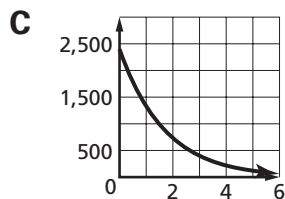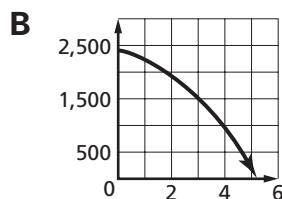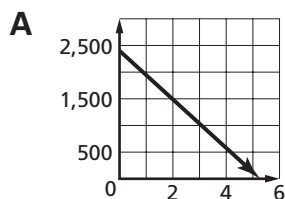
59 What equation results when the graph of $y = 4x + 1$ is changed to have   59 _____
a slope of 3? **3.07**

    A $y = 4x + 3$ **B** $3y = 4x + 1$ **C** $y = 3x + 1$ **D** $y = 7x + 1$

60 A researcher in Charlotte uses a quadratic function $Q(t)$ to model the   60 _____
quantity Q of pollen present in the air as a function of time t over a
24-hour period. Which feature of the graph of this function will give the
time at which the maximum quantity of pollen is present? **3.11**

    A the x-coordinate of the vertex   **B** the smaller x-intercept

    C the y-coordinate of the vertex   **D** the larger x-intercept
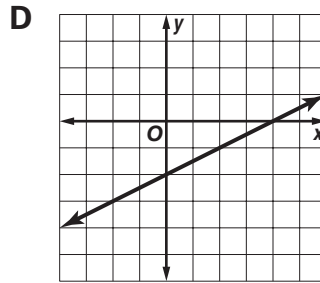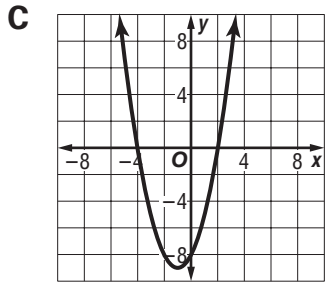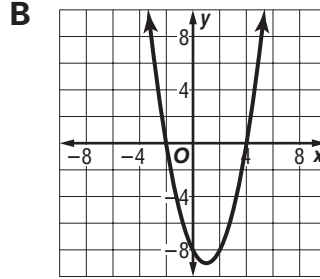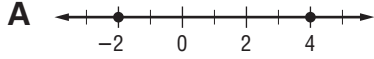
Go on

Diagnostic Test (continued)
Test Practice

Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

61 Which graph shows that solutions of $0 = x^2 - 2x - 8$ are $\{-2, 4\}$? **3.11**   **61** _____

A

B

C

D

62 Which of these is the equation of the line through $(2, 3)$ with slope $\frac{3}{2}$?   **62** _____

A $y = \frac{3}{2}x + 3$ **3.06**

B $y = \frac{3}{2}x$

C $y = \frac{3}{2}x + \frac{2}{3}$

D $y = 2x + 3$

63 Kimberly drops her keys while she is parasailing over the ocean near Wilmington. The height of the keys in feet above the water x seconds after the fall from her pocket can be modeled by the function $y = -16x^2 + 60$. How can you use the graph of the function to find Kimberly's height above the water when she loses the keys? **3.10**   **63** _____
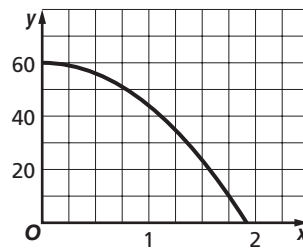
A Find the slope of the graph at the x-intercept.

B Find the value of the x-intercept.

C Find the value of x when $y = 0$.

D Find the value of the y-intercept of the graph.
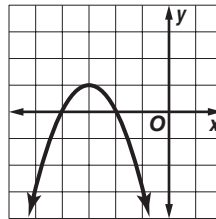
Go on

Diagnostic Test (continued)
Test Practice

Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.
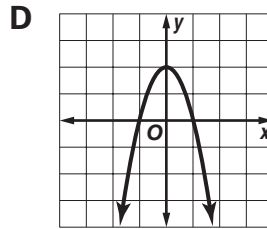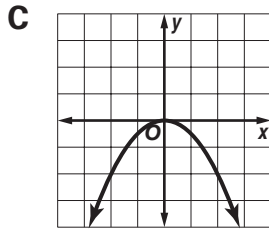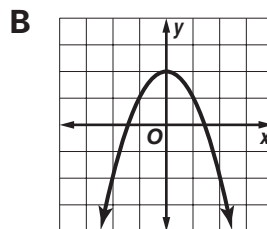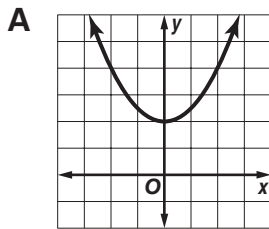
64 Which describes the solution set of the function graphed? **3.10**

  A no real roots

  B 1 real root
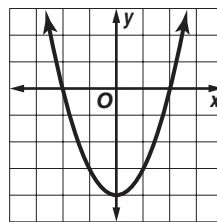
  C 2 real roots

  D empty set

64 _____

65 Which is the graph of $y = -x^2 + 2$? **3.10**

  A

  B

  C

  D

65 _____

66 Which are the correct intercepts and vertex for this graph? **3.10**

  A x-intercepts -2 and 2; y-intercept -4; vertex $(0, -4)$

  B x-intercepts -4 and 4; y-intercept 4; vertex $(0, 4)$

  C x-intercept 4; y-intercepts -2 and 2; vertex $(0, -4)$

  D x-intercepts -2 and 2; y-intercept 4; vertex $(4, 0)$

66 _____

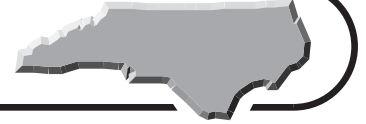**67** Which best describes the difference(s) between the graphs of $f(x) = x + 3$ and $g(x) = 2x + 4$? **3.07**

  A The graph of $f(x)$ is twice as steep as the graph of $g(x)$.

  B The graph of $f(x)$ is half as steep as the graph of $g(x)$.

  C The graph of $f(x)$ has a y-intercept of 3 while $g(x)$ has a y-intercept of 4.

  D Both B and C are true.

67 _____

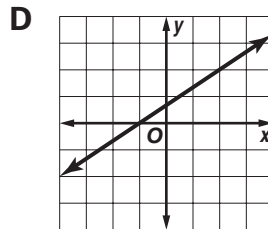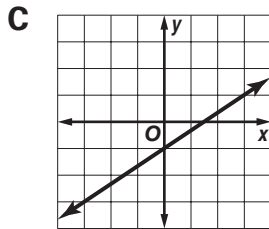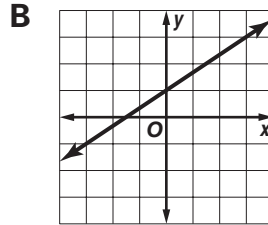*Go on*

Diagnostic Test (continued)
Test Practice

Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

68 Which of these is the graph of the line with y-intercept $(0, -1)$ and slope $\frac{2}{3}$? **3.06**

68 _____

A   **B**

C   **D**

69 Which of these is the graph of the line through $(-1, -3)$ and $(-2, -1)$? **69** _____

     3.06

A   **B**

C   **D**

70 Which of the following shows the expression $x^2 + 16x + 63$ correctly factored? **3.11**

70 _____

     A $(x + 5)(x + 21)$
     B $(x - 9)(x - 7)$
     C $(x - 8)(x + 8)$
     D $(x + 9)(x + 7)$
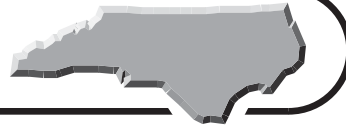
Go on
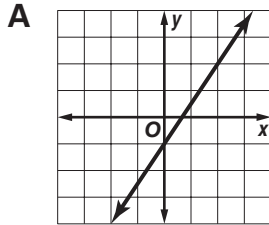
Diagnostic Test (continued)
Test Practice

Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.
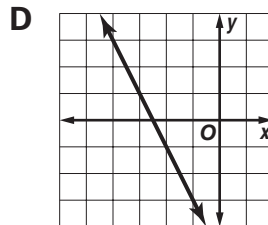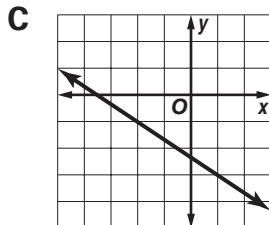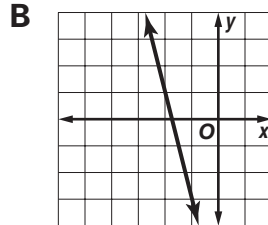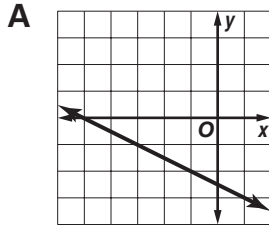
71 To the right is the graph of $y = mx + \frac{3}{2}$. Which of these is the graph of $y = mx + \frac{1}{2}$? **3.07**

71 _____

A

B

C

D
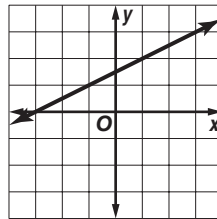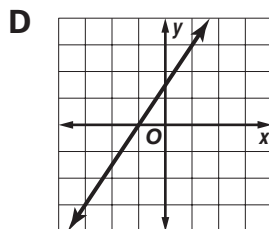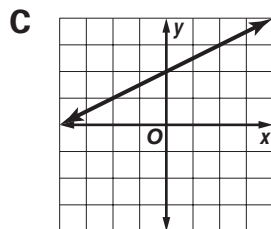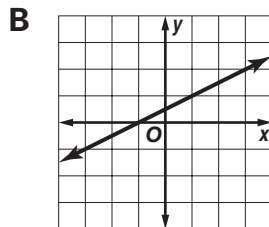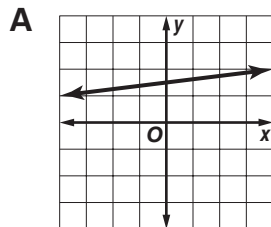
72 The graph models the amount of time it takes Ihab to prepare spinach calzones in his restaurant. Based on the graph, how much time should Ihab schedule to prepare an order of 40 spinach calzones? **4.03**
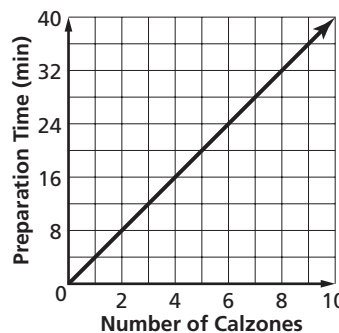
 A 40 min
 B 120 min
 C 140 min
 D 160 min

72 _____

73 Which of these is the equation of the line with y-intercept $(0, 2)$ and slope $\frac{1}{3}$? **3.06**

 A $y = \frac{1}{3}x + 2$ **B** $y = 2x + \frac{1}{3}$

 C $\frac{1}{3}y = 2x$ **D** $2y = \frac{1}{3}x$

73 _____

74 Clayton hits a volleyball into the air at time t. The equation $y = -16t^2 + 31t + 2$ can be used to model the path of the volleyball. After how much time does the ball hit the ground? **3.11**

 **A** 0.25 s   **B** 0.5 s
 C 2 s   **D** 5 s

74 _____

*Go on*

Diagnostic Test (continued)
Test Practice

*Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.*

**75** Curman's long-distance calling card charges 50 cents for each call plus 5 cents per minute. Curman makes a graph to show the total cost for a call depending on the length of a call. Which is a true statement about his graph? **4.03**

   A The y-intercept is 5.
   B The x-intercept is 50.
   C The graph has a slope of 5.
   D The graph has a slope of 50.

75 _____

76 The table shows the cost of some rib-eye steaks Secin could buy for grilling on his patio. Which is a graph of the data? **4.03**

Number of Steaks	Total Cost
2	$16
4	$32
6	$48

76 _____

A

B

C

D
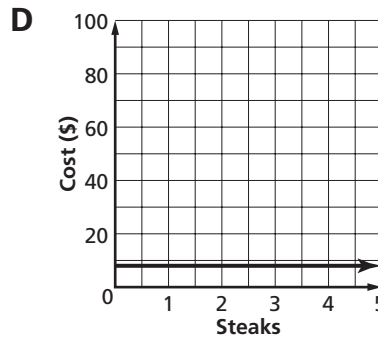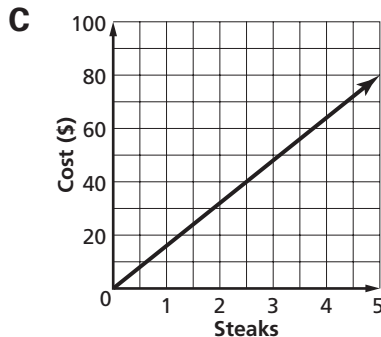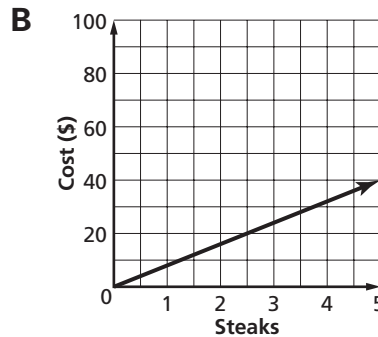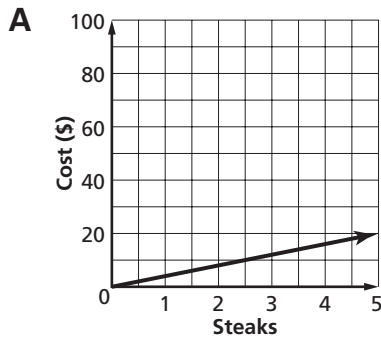
77 Which situation cannot be represented by a linear function? **4.02**

   A the number of tires needed for b bicycles
   B the mass of c cans of creamed corn that are 200 grams each
   C the distance covered walking at 4 miles per hour
   D the air temperature at a weather station over a 1-year period

77 _____

Go on

Diagnostic Test (continued)
Test Practice

Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

78 Which equation best fits the data in the table? **4.03**

x	−2	−1	0	1	2	3
y	−5	−4	−3	−2	−1	0

A $y = x - 3$
B $y = x - 1$
C $y = 2x - 1$
D $y = 3x + 1$

78 _____

79 Which set of data is linear? **4.02**

A

B

C

D

79 _____
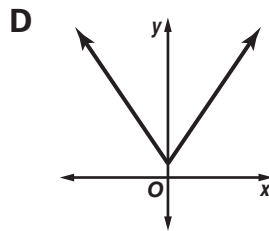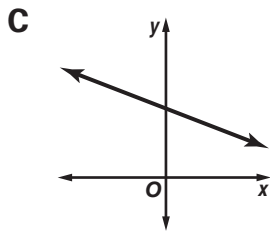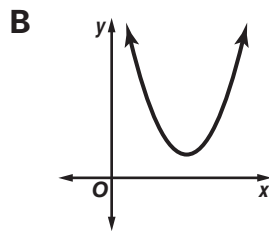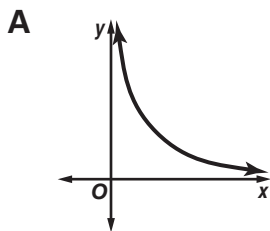
80 Which set of data is linear? **4.02**

A

x	−1	0	1	2
y	18	20	22	24

B

x	−1	0	1	2
y	1	3	7	11

C

x	−1	0	1	2
y	2	4	8	16

D

x	−1	0	1	2
y	50	45	35	25

80 _____

STOP

Standards Practice
Objective 1.01

Operate with real numbers to solve a variety of problems.

Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

1 What is the value of $2 \times 6\left(5 + \sqrt{9}\right)$?

  A 54

  B 96

  C 108

  D 168

1 _____

2 Simplify $\sqrt{2\sqrt{81}} - \sqrt{4}$.

  A 2

  B 4

  C 7

  D 16

2 _____

3 If $y = |x| + 3$, then when is y a positive number?

  A always

  B when $x > -3$

  C when $x > 3$

  D never

3 _____

4 If $y = x^2 + 2x + 3$, then what is y when $x = 5$?

  A 5

  B 18

  C 23

  D 38

4 _____

5 Simplify $\sqrt{7} + 2\sqrt{7}$.

  A $3\sqrt{7}$

  B $7\sqrt{2}$

  C 21

  D 49

5 _____

Standards Practice
Objective 1.01 (continued)

Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

6 Simplify $\sqrt{5} \times 2\sqrt{5}$.   **6** _____

   A $3\sqrt{5}$

   B 10

   C 20

   D 50

7 Antoine was explaining the equation he uses to convert Celsius   **7** _____
temperatures to Fahrenheit. The equation is $F = \frac{9}{5}C + 32$. His mother
made some calculations in her head and remarked that it was a good
thing that Durham never experiences days when the temperature has the
same numeric value in Fahrenheit and in Celsius. Why did she say that?

   A It would be 32°F outside.

   B It would be 32°C outside.

   C These temperatures could never have the same numeric value.

   D It would be -40°F (or C) outside.

8 Solve $y = \frac{2x^2 + 6x - 4}{x - 5}$ for $x = 3$.   **8** _____

   A -16

   B -10

   C 10

   D 16

9 Which of the following is greatest when $x = -5$?   **9** _____

   A $|2x| + 3$

   B $2|x + 3|$

   C $|2x + 3|$

   D $2x + |3|$

10 Over the past few years, Jim has figured out the relationship between the   **10** _____
approximate weight of figs f that his fig tree produces and the height h of
his tree. Since the tree reached a height of seven feet, the weight in pounds
of the figs he collects each year f has been $f = 6h^2 + 4h + 50$. The tree is
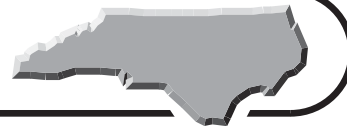now 10 feet tall. How many pounds of figs can Jim expect to pick this year?

   A 60

   B 116

   C 372

   D 690

Standards Practice
Objective 1.02

Operate with polynomials.

Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

1 Simplify $\frac{14x^2 + 35x}{7x}$.

   A $14x + 35$
   B $2x^2 + 5$
   C $2x + 5$
   D $7x$

1 _____

2 Simplify $(3x + 5) \times 5 + 3$.

   A $3x + 28$
   B $15x + 28$
   C $24x + 40$
   D $54x$

2 _____

3 Simplify $\frac{6c^3d^4 + 24c^2d^2 + 3cd + 18d}{3d}$.

   A $\frac{6c^2d^3 + 24c^2d + 3cd + 6}{3}$
   B $2c^3d^3 + 8c^2d + c + 6$
   C $18c^3d^3 + 72c^2d^3 + 9cd^2 + 54d^2$
   D $2d^4 + 8c^2 + c + 6$

3 _____

4 Simplify $(4x + 3) - (5x - 2) + 17x + 5 - x$.

   A $15x + 10$
   B $25x + 10$
   C $20x^2 + 23x - 1$
   D $15x + 6$

4 _____

5 Expand $(2x + 4)(3x - 1)$.
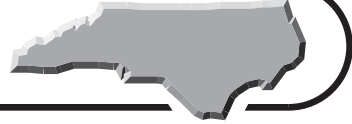
   A $6x^2 - 4$
   B $-x^2 + 14x - 4$
   C $6x^2 + 14x - 1$
   D $6x^2 + 10x - 4$

5 _____

Standards Practice
Objective 1.02 (continued)

Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

6 If $y = 3x + 5$, and $z = x^2 + 2x - 5$, what is yz?   **6** _____

  A $2x^3 + 11x^2 + 5x - 25$

  B $3x^3 + 13x^2 + 10x - 25$

  C $3x^2 + 16x^2 + 10x - 25$

  D $3x^3 + 11x^2 - 5x - 25$

7 Simplify $4(x + 3)(x - 5)$.   **7** _____

  A $4x^2 - 2x - 15$

  B $4x^2 - 17x - 15$

  C $7x - 5$

  D $4x^2 - 8x - 60$

8 Simplify $10c^2d^2 + 5c^2d - 8cd^2 + 6c + 9d + 21 - (4cd^2 + 5cd - 16d - 9)$.   **8** _____

  A $10c^2d^2 - 7cd^2 + 6$

  B $10c^2d^2 + 5c^2d - 12cd^2 - 5cd + 6c + 25d + 30$

  C $6c^2d^2 + 5c^2d - 8cd^2 + 5cd + 6c - 7d + 12$

  D $10c^2d^2 + 5c^2d - 4cd^2 - 5cd + 6c + 25d + 30$

9 If $a = 2x^2 - 4x$ and $b = 2x$, what is $\frac{a}{b}$?   **9** _____

  A $x - 4$

  B $2x^2 - 2$

  C $x - 2$

  D $x^2 - 2x$

10 Simplify $(2x + 3) - (2x - 5)$.   **10** _____

  A 8

  B -2

  C $2x - 2$

  D $4x^2 - 16x - 15$

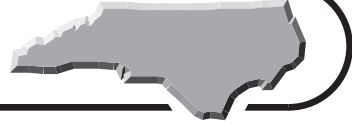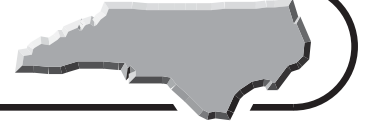# Standards Practice
Objective 1.03

Factor polynomials.

Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

1 What is the greatest common factor in $42x^5 + 28x^4 - 14x^3 + 168x^2$?

   A $7x$

   B $14x$

   C $168x^2$

   D $14x^2$

1 _____

2 Factor $10x^2 - 7x - 12$.

   A $(2x - 3)(5x - 4)$

   B $(2x - 3)(5x + 4)$

   C $(10x - 6)(x - 1)$

   D $(10x - 2)^2$

2 _____

3 Factor $16x^4 - 64x^2$ completely.

   A $4x^2(4x^2 - 16)$

   B $(4x^2 + 8)(4x^2 - 8)$

   C $16x^2(x^2 - 4)$

   D $16x^2(x + 2)(x - 2)$

3 _____

4 What is the greatest common factor in $3x^3y^2 - 6x^2y^3 - 9x^2y^2$?

   A x^3y^3

   B $9x^3y^3$

   C x^2y^2

   D $3x^2y^2$

4 _____

5 What is the greatest common factor in $99x^3y + 77x^2y - 121xy^2$?

   A $11xy$

   B 121

   C x^3

   D $121x^3y^2$

5 _____

Standards Practice
Objective 1.03 (continued)

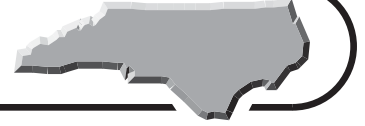*Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.*

6 Kelvin is going to wash and dry some laundry at the laundromat closest to his house near North Carolina State University. Washers cost $1.25 per load, and he is going to wash two loads. Dryers cost 75 cents per cycle of eight minutes and each dryer can hold as much laundry as two washers. No matter how many cycles it takes to dry his laundry, the money he will spend can be evenly divided by:

  A $2.00.
  B $1.00.
  C $0.25.
  D $0.10.

6 _____

7 Factor $25x^5y^3 - 40x^4y^2 + 15x^2y^2 - 5xy^2 + 55xy$.

  A $5xy(5x^4y^2 - 8x^3y + 3xy - 5y + 11)$
  B $5(5x^4y^2 - 8x^3y + 3xy - 5y + 11)$
  C $\dfrac{5x^4y^2 - 8x^3y + 3xy - 5y + 11}{5xy}$
  D $(25xy - 40xy + 15xy - 5xy + 55xy)(x^4y^2 - x^3y + y + 1)$

7 _____

8 Which binomial is a factor of $2x^2 - 5x - 3$?

  A $2x$
  B $2x - 3$
  C $2x + 1$
  D 3

8 _____

9 What is the greatest common factor in $10x^2y^2 + 10x^2 + 10y^2 + 100$?

  A 100
  B 10
  C $x^2y^2 + x^2 + y^2 + 10$
  D $10xy$

9 _____

10 Which polynomial is a factor of $3x^3 + 15x^2 - 27x$?

  A $3x^2 - 15x$
  B $x^2 + 5x - 9$
  C $9x^2 + 30x - 27$
  D $x - 5$

10 _____

Standards Practice
Objective 2.01

Use formulas and algebraic expressions (from science, geometry, statistics, etc.) to solve problems.

Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

1 The approximate time t in seconds that it takes for a pendulum to complete one swing is given by the formula $T = 2\pi\sqrt{\dfrac{\ell}{32.2}}$, where ℓ is the length of the pendulum in feet. About how long will it take for this pendulum to complete one swing? Use 3.14 for π.

1.25 ft
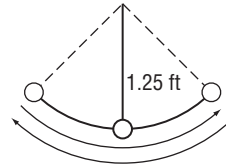
A 0.01 s   **B** 0.22 s
C 0.24 s   **D** 1.24 s

1 _____

2 Martina earns a weekly wage of $120 plus $22 per hour in tips. This relation can be expressed as $f(h) = 22h + 120$, where h is the number of hours that she works that week. If Martina earned $791 one week, how many hours did she work?

A 40 h   **B** 30.5 h
C 28.5 h   **D** 22 h

2 _____

3 The number of feet traveled by a falling object in t seconds is initially about $16t^2$. How far does a falling object fall in one tenth of a minute?

A 96 ft   **B** 160 ft
C 576 ft   **D** 1,600 ft

3 _____

4 An electrical engineer uses the formula $P = I^2R$ to calculate the power in watts from a current of I amperes in a circuit of resistance R ohms. What is the value of P for a 17-ampere current in a 3-ohm circuit?

A 867 W   **B** 153 W
C 102 W   **D** 72 W

4 _____

5 A tower under construction increased 48 inches in height each day. If the completed tower is 240 feet tall, how long did it take to build it?

A 5 days   **B** 3 weeks
C 60 days   **D** 92 days

5 _____

Standards Practice
Objective 2.01 (continued)

*Read each question and choose the best answer. Then write the
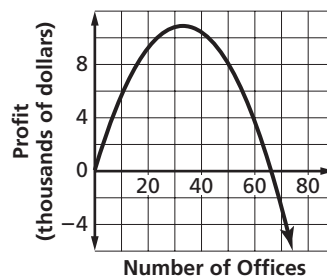letter for the answer you have chosen in the blank at the right of
each question.*

6 A bank in Asheville computes the balance B in a savings account that earns   **6** _____

3.6% annual interest by using the formula $B = p\left(1 + \frac{0.036}{n}\right)^{nt}$. In this

formula, p represents the principal amount deposited in the account,
n represents the number of times annually that interest is calculated and
paid into the account (compounded), and t represents the time in years
since the initial deposit. Bianca deposits $1,000 in this type of account,
and makes no withdrawals or further deposits. If interest is compounded
monthly, how much will Bianca's account have earned after five years?

A about $37
B about $193
C about $197
D about $7,348

7 Aidan shoots a rocket from a platform. The height of the rocket in   **7** _____
meters above the ground after t seconds can be modeled by the function
$f(t) = 4t^2 + 10t + 15$. How can you use this function to find the height
of the platform?

A Find the value of t when $f(t) = 0$.
B Find the greatest value of $f(t)$.
C Find the value of $f(t)$ when $t = 0$.
D Graph $f(t)$ and find the value of $f(t)$ where the graph crosses the
horizontal axis.

8 A development corporation wants to   **8** _____
construct an office building in Wilmington.
Their planners estimate the proposed
building's monthly profit p with the
formula $p = -10x^2 + 660x$, where x is
the number of offices in the building.
Which feature of the graph of this function
will give the number of offices that will
maximize the building's monthly profit?

Profit (thousands of dollars) vs. Number of Offices

A the x-coordinate of the vertex
B the smaller x-intercept
C the y-coordinate of the vertex
D the larger x-intercept

# Standards Practice
Objective 2.02

Describe, extend, and express algebraically a wide variety of geometric patterns.

Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

Use the following information for Questions 1 and 2.

Triangles *ABC* and *DEF* have the same shape. Each side of triangle *DEF* is twice as long as the corresponding side in triangle *ABC*. You can construct a third triangle in the sequence whose sides are twice as long as the corresponding sides of triangle *DEF*, with vertices *J*, *K*, and *L*.
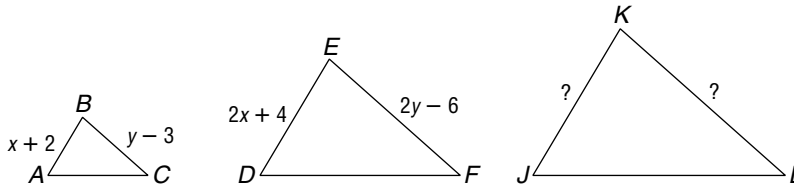
1 If the length of side $\overline{AB}$ is $x + 2$, and the length of side $\overline{DE}$ is $2x + 4$, what is the length of side $\overline{JK}$?

A $x + 2$ **B** $2x + 4$

C $3x + 6$ **D** $4x + 8$

1 _____

2 If the length of side $\overline{BC}$ is $y - 3$, and the length of side $\overline{EF}$ is $2y - 6$, what is the length of side $\overline{KL}$?

A $y^2 - 3$ **B** $4y - 12$

C $2y - 6$ **D** $y - 3$

2 _____

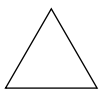### Use the four figures shown here to answer Questions 3 and 4.

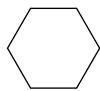**Figure 1**   **Figure 2**   **Figure 3**   **Figure 4**

3 Write an equation that represents the relationship between the figure number *f* and the number of sides *s* in the figure.

A $f = \frac{s}{2}$ **B** $f = s - 2$

C $f = s + 2$ **D** $f = 3s$

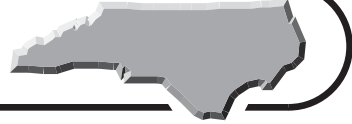3 _____

4 How many sides will there be in the next figure in the sequence?

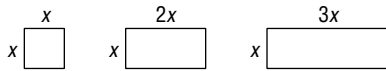**A** 5   **B** 6   **C** 7   **D** 10

4 _____

Standards Practice
Objective 2.02 (continued)

Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

Use the figure to answer Questions 5 and 6.

x □ $2x$ ▭ $3x$ ▭
x x x

5 What is the height of the next rectangle in this sequence?   **5** _____
  A x **B** $x + 2$
  C $4x$ **D** x^2

6 What is the width of the next rectangle in the sequence?   **6** _____
  A x **B** $x + 2$
  C $4x$ **D** x^2

Use the figure to answer Questions 7 and 8.

x □ $2x$ ▭ $4x$ ▭
x x x

7 What is the height of the next rectangle in this sequence?   **7** _____
 **A** x^2 **B** x
  C $2x$ **D** $8x$

8 What is the width of the next rectangle in the sequence?   **8** _____
  A x^2 **B** x
  C $2x$ **D** $8x$

9 The following shapes are subdivided into t triangles by line segments   **9** _____
that connect the center of each shape to its corners. If s is the number of
sides in each shape, what equation correctly describes t as a function of
s for these shapes, and for the shapes that follow them in this sequence?
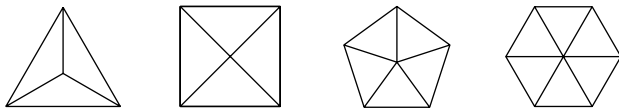
  A $s = 3$ **B** $t = 3$
  C $t = s + 3$ **D** $t = s$

Standards Practice
Objective 3.01

Translate word phrases and sentences into expressions and equations and vice versa.

Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

Write an equation for each sentence in Questions 1 to 3.

1 y is 5 times as much as x.

   A $y = 5 + x$ **B** $5 = yx$

   C $y = 5$ **D** $y = 5x$

1 _____

2 y is 3 more than the square of x.

   A $y + 3 = \sqrt{x}$ **B** $y^2 = 3$

   C $y = x^2 + 3$ **D** $x = y^2 + 3$

2 _____

3 y is the product of z and 3 more than x.

   A $y = 3zx$ **B** $yz = 3 + x$

   C $y = z(x + 3)$ **D** $y = z + 3 > x$

3 _____

4 Write an algebraic expression for the verbal expression below.

   Antonia's age a is three times as much as her son Nicky's age n.

   A $a = n + 3$ **B** $a = 3n$

   C $a = n^3$ **D** $na = 3$

4 _____

Write a sentence for each equation in Questions 5 and 6.

5 $y = 5x + 3$

   A y is 3 more than the product of 5 and x.

   B y is 3 less than the product of 5 and x.

   C y is 3 times the product of 5 and x.

   D y is the sum of 5, x, and 3.

5 _____

6 $y = 33q^2$

   A y is 3 times 3 times q times 2.

   B y is 3 times 3 times q times q.

   C y is 33 times q times 2.

   D y is 33 times q times q.

6 _____

Standards Practice
Objective 3.01 (continued)

Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

7 Rosa's height is r and Cherie's height is c. If $r = \frac{4}{5}c$, what can you tell about their heights?

7 _____

  A Rosa is taller than Cherie.

  B Rosa's height is $\frac{4}{5}$ of Cherie's height.

  C Rosa is 45 inches tall and Cherie is 54 inches tall.

  D There are 4 people named Rosa and 5 people named Cherie.

8 Mike's weekly pay p before taxes is the product of the hours he works that week h and his hourly wage w. What equation describes this?

8 _____

  A $p = hw$ **B** $p = \frac{h}{w}$

  C $p = \frac{w}{h}$ **D** $p = h + w$

9 The equation $a = \frac{F}{m}$ describes what happens when an object is accelerated by a force that pushes on it. The object's acceleration is a, the force is F, and the object's mass is m. How are they related?

9 _____

  A The acceleration of the object is equal to the force pushing on the object divided by the mass of the object.

  B The acceleration is the product of the force and the mass.

  C The force is the object's mass divided by the acceleration.

  D The acceleration of the object is the mass of the object divided by the force pushing on the object.

10 Ranjit notices that the price h of hamburger at the grocery store was twenty cents more than twice as much per pound as the price c of chicken legs. Which equation correctly compares the two prices?

10 _____

  A $h = 2(c + 20)$ **B** $20c = 2h$

  C $h + 20 = 2c$ **D** $h = 2c + 20$

11 The volume V of a sphere is calculated using $V = \frac{4}{3}\pi r^3$, where r is the radius of the sphere. Which of the following expresses this relationship in words?

11 _____

  A The 3s cancel, so the expression is $4\pi r$.

  B Volume times volume times volume is four-thirds times pi times the radius.

  C Volume is four-thirds times pi, multiplied by the cube of the radius.

  D The expression πr^3 means that the volume is always $\frac{4}{3}$.

Standards Practice
Objective 3.02

Identify properties and relationships of data in tables, graphs, and equations.

Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

Use the following table for Questions 1 and 2.

1 At what temperature is the density of water the greatest?

A 32°F

B 39.2°F

C 70°F

D 212°F

Density of Liquid Water at Various Temperatures	
Temperature (°F)	Density (relative to its maximum)
32	0.99987
39.2	1.00000
41	0.99999
70	0.99777
212	0.95838

1 _____

2 What is the relationship between the temperature of the water and its density between 32°F and 70°F?

A The density increases as the temperature rises.

B The density decreases as the temperature rises.

C Below freezing, the temperature drops as the density increases.

D There is no relationship between temperature and density.

2 _____

3 Marco adds bird seed to his cardinal feeder every morning. Last year, he recorded the amount that he added each day for the period from December through March, and he drew this graph to summarize his data. In which month did cardinals eat the most bird seed?

A December

B January

C February

D March

3 _____
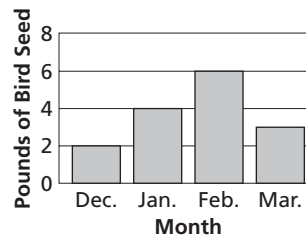
Standards Practice

Objective 3.02 (continued)

Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

4 Annie notices that the air pressure in her bicycle tires increases more and more slowly as she pumps them up to high pressure. She plots a graph of strokes of the tire pump and air pressure in the tires. Which of the following graphs matches what Annie observes about air pressure in the tires?

4 _____

A

B

C

D
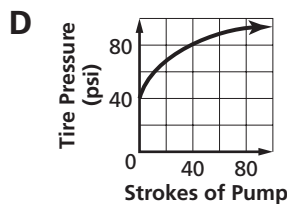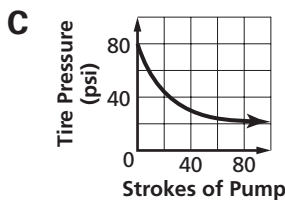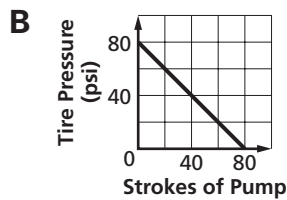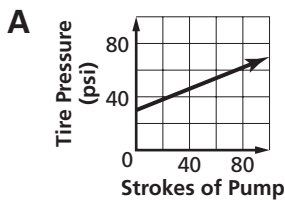
5 Intensity of illumination from a light source is $I = \dfrac{P}{r^2}$, where P is the power in watts of the light source and r is the distance from the light source. If we measure the intensity 2 feet from a lamp and again at 4 feet from the lamp, what do we expect to see?

5 _____

A The light is one fourth as bright at 4 feet as at 2 feet.
B The light is one half as bright at 4 feet as at 2 feet.
C The light is twice as bright at 4 feet as at 2 feet.
D The light is four times as bright at 4 feet as at 2 feet.

6 If you throw an object upward, its maximum height before it falls back down is given by the equation $h = \dfrac{v^2}{2g}$, where v is its initial upward speed and g is the force of gravity pulling downward. Based on this equation, which of the following is true?

6 _____

A If you throw two objects upward, and you throw one of them hard enough that it is twice as fast as the other, the faster object will go four times as high as the slower one.
B If you throw two objects upward, and one starts out twice as fast as the other, they will both rise to the same height.
C Gravity exerts a stronger pull on an object that is moving fast than on an object that is moving slowly.
D The force of gravity gets stronger as a thrown object gets farther from the ground.

Standards Practice
Objective 3.03
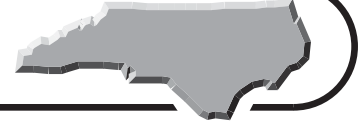
Define and distinguish between relations and functions, dependent and independent variables, domain and range.

Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

Use the following information for Questions 1, 2, and 3.

The burners on Tawon's stove have settings of Low, 2, 3, 4, 5, and High. He knows that the temperature of the water in a tea kettle rises faster when more heat is applied to it. Tawon puts water directly from the faucet into the kettle, sets the burner on Low, and measures the water temperature after 3 minutes. He pours out the water, cools the kettle under the faucet, and repeats his procedure with the burner on setting 2. He does this for every setting up to High. His experiment gives him temperature readings after three minutes of heating for each of the 6 settings. He then graphs the relationship between the burner settings S and temperature readings T.
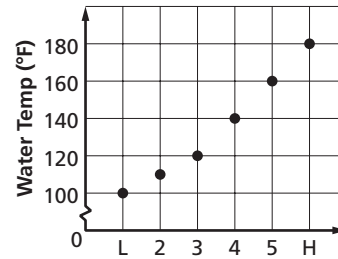
1 Is S a dependent or independent variable? Is T a dependent or independent variable?

A They are both dependent variables.
B They are both independent variables.
C S is the independent variable and T is the dependent variable.
D T is the dependent variable and S is the independent variable.

1 _____

2 What is the domain of this relation?

A Low to High   **B** 2 to 5
C 60°F to 212°F   **D** 100°F to 180°F

2 _____

3 What is the range of this relation?

A Low to High   **B** 2 to 5
C 60°F to 212°F   **D** 100°F to 180°F

3 _____

4 If Chandra is paid an hourly wage at her part-time job, which of the following is true?

A Her weekly pay is a function of the hours that she works.
B The hours that she works are a function of her weekly pay.
C Her pay is the domain of her job.
D The "range of the function" means the work that she performs.

4 _____
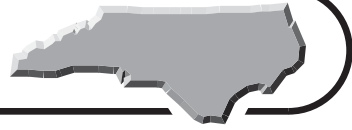
Standards Practice
Objective 3.03 (continued)

Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

5 Pat records the heights of pine trees which have been planted in rows in a test area. She lists each row number and the average height of trees in each row as a set of ordered pairs. What is this type of data set called?

A a function **B** an exponential

C a domain **D** a range

5 _____

6 Each week, Kim collects several fish from each of the tanks at the fish hatchery where he works, measures the length of each of them, and returns the fish to the tanks. He records the average length of the fish in his weekly sample on a chart for each tank. All the fish in each tank are the same age. How should he graph length as a function of age?

A Draw a graph with the number of fish on the *x*-axis and the sum of the lengths each week on the *y*-axis.

B Draw a graph with the age of the fish in the tank as the independent variable and the average length of the fish in the sample as the dependent variable.

C Draw a graph from a set of ordered pairs, with the lengths of fish from one tank as the independent variable and the lengths of the fish in another tank as the dependent variable.

D Write an ordered pair with the age of the fish this week as the independent variable and the age of the fish last week as the dependent variable.

6 _____

7 Jordin and Olivia are hang-gliding at Kitty Hawk. They notice that they can fly farther on a calm day with a hang glider that has a larger wing than with one that has a smaller wing. If they want to show the effect of wing area on flight distance, what should they graph?

A flight distance as a function of wing area

B flight distance as a function of which of them is flying

C wing area as a function of flight distance

D flight distance as a function of wind speed

7 _____

8 A group of parents compare their data on food consumption from their children's parties to help plan for a neighborhood party. They plot the number of guests as the independent variable on their reference graph. What should be the dependent variable on their graph?

A time of day **B** number of guests

C type of music **D** amount of food eaten
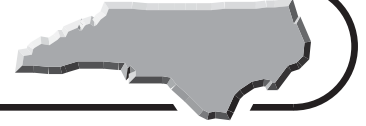
8 _____
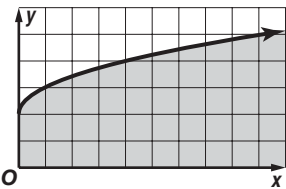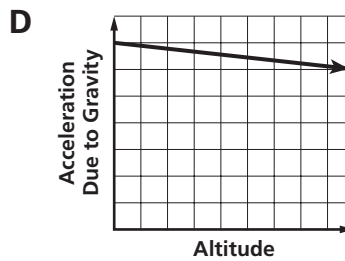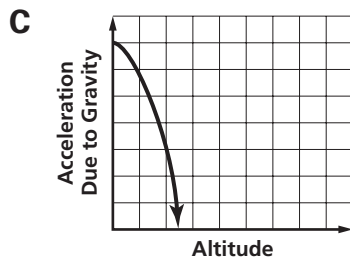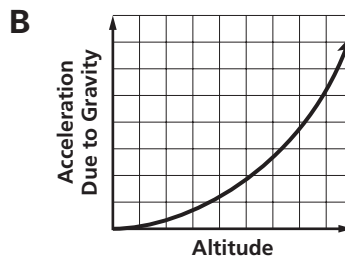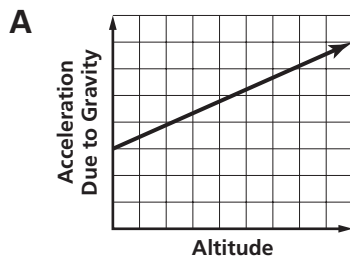
Standards Practice
Objective 3.04

Graph, and interpret in the context of the problem, relations and functions on the coordinate plane. Include linear equations and inequalities, quadratics, and exponentials.

Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

The graph compares linear growth of $1,000 invested at 5% simple interest to exponential growth of the same amount invested at 5% compounded annually. For each function, A represents the amount in dollars of the investment after t years. Use the graph to answer Questions 1 through 3.
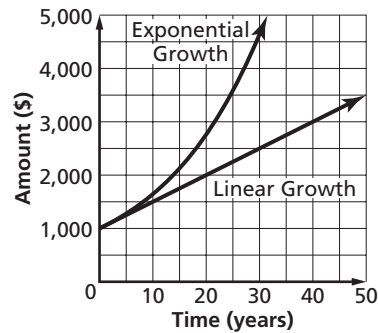
1 Which is the most reasonable estimate of the amount of time it takes $1,000 to double in value when invested at 5% simple interest?

A 10 years   **B** 12 years   **C** 20 years   **D** 30 years

1 _____

2 Which is the most reasonable estimate of the amount of time it takes $1,000 to double in value when invested at 5% compounded annually?

A 5 years   **B** 14 years   **C** 18 years   **D** 20 years

2 _____

3 Which is the most reasonable estimate of the difference between the balances after 20 years for $1,000 invested by each method?

A $300   **B** $650   **C** $1,650   **D** $2,000

3 _____

4 Which inequality is shown in the figure?

A $y \geq 2$
B $y \leq \sqrt{x} + 2$
C $y = x^2 + 2$
D $x \leq 2 \leq y$

4 _____

5 On an analog clock, the distance traveled around the face of the clock by the second hand is what kind of function of elapsed time?

A a relation but not a function   **B** a linear function
C a quadratic function   **D** an exponential function

5 _____

6 The growth of a quantity after x years can be modeled by the function $y = 200(1.04)^x$. By what percent does the quantity increase each year?

A 200%   **B** 104%   **C** 4%   **D** 1.04%

6 _____

Standards Practice
Objective 3.04 (continued)

Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

7 At Earth's surface, acceleration due to gravity is 9.8 meters per second squared. This means that the pull of gravity increases the speed of a falling object by about 9.8 meters per second for every second that the object falls. The acceleration due to gravity decreases linearly as you move away from the surface, and at an altitude of 100 kilometers above Earth's surface, the acceleration due to gravity is only about 9.5 meters per second squared. Which of the following graphs describes this relationship?

7 _____

A

B

C

D

8 Which of these is the graph of $y = x^2 - 4x + 3$?

8 _____

A

B

C

D
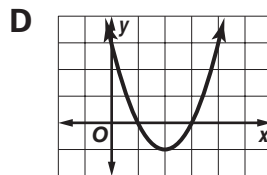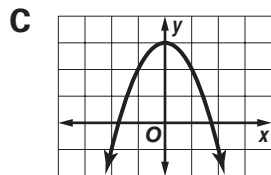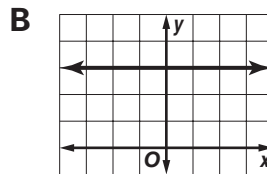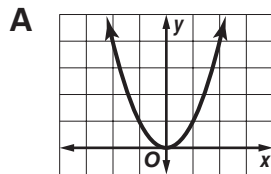
9 Which inequality is shown?
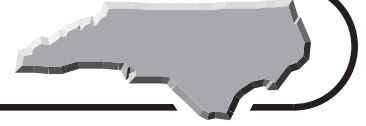
9 _____

A $y > x$
B $y > -x$
C $y = x$
D $x + y > 1$

Standards Practice
Objective 3.05

Determine and use slopes of linear relationships to solve problems.

Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

1 What is the slope of the line?

  A 4

  B $\frac{1}{2}$

  C $\frac{1}{4}$

  D $-\frac{1}{2}$
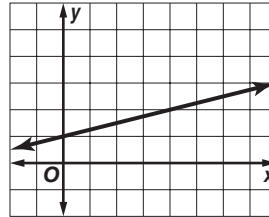
1 _____

2 What is the slope of the line passing through $(-4, -2)$ and $(1, 0)$?

  A $-\frac{1}{2}$

  B $\frac{2}{5}$

  C $\frac{1}{2}$

  D $\frac{5}{2}$

2 _____

3 What is the slope of the line described by $y = -\frac{9}{4}x - 1$?

  A -9

  B $-\frac{13}{4}$

  C $-\frac{9}{4}$

  D -1

3 _____

4 The graph shows the number of cats and dogs that received half-price rabies shots at the county animal shelter. What does the slope of the graph show about the ratio of dogs to cats?

  A There were 2 dogs for every 1 cat.
  B There were 5 dogs for every 2.5 cats.
  C There were 2 dogs for every 5 cats.
  D There were 5 dogs for every 2 cats.

4 _____
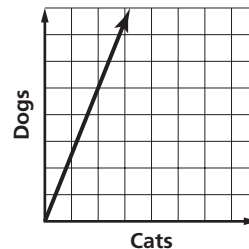
Standards Practice
Objective 3.05 (continued)
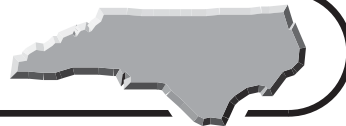
Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

5 Becky and her dog Charleston go running at Jordan Lake. What does the slope of the graph tell about their run?

  A their time in hours

  B their distance in miles

  C their speed in mph

  D the length of time they ran
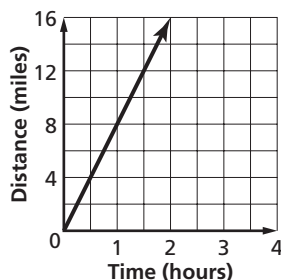
5 _____

6 Becky's husband Daryl heads out on the same path a few minutes later with his dog, Cheyenne. Daryl and Cheyenne average 10 miles per hour. Which graph shows their run?

A

B

C

D
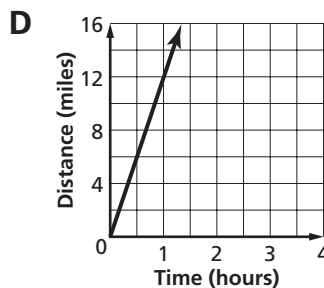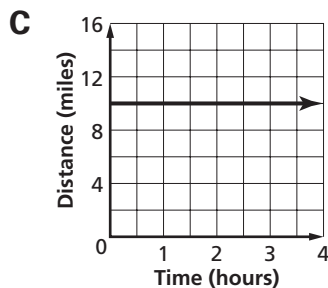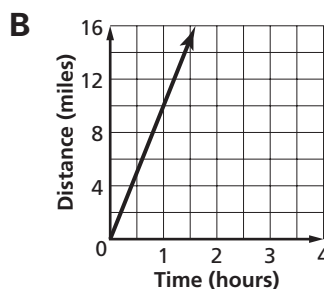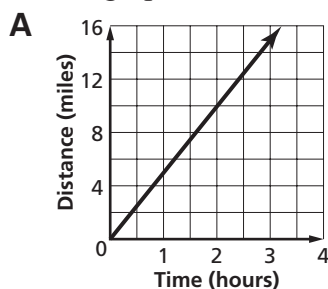
6 _____

7 If Lauren and her dog Buffy jog at half the speed of Becky and Charleston, what will be the slope of a graph showing their distance as a function of time?

  A 1

  B 2

  C 4

 **D** 8

7 _____

Standards Practice
Objective 3.06

Write the equation of and graph linear relationships given the following information: slope and *y*-intercept, slope and one point on the line, two points on the line.

Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.
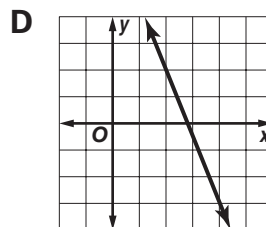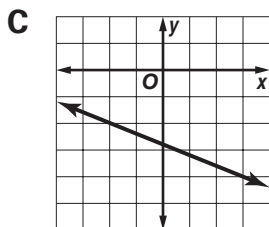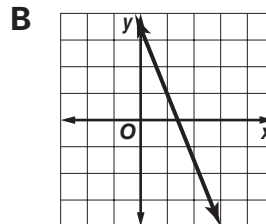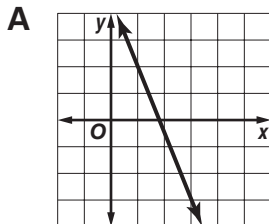
1 Which of these is the graph of the line passing through (3, 1) and (−4, −2)?

A

B

C

D

1 _____
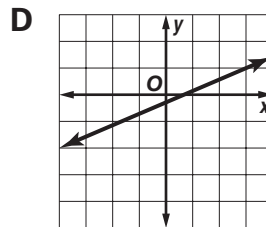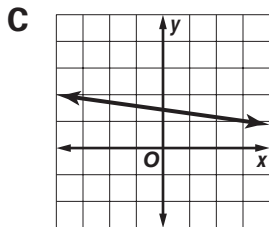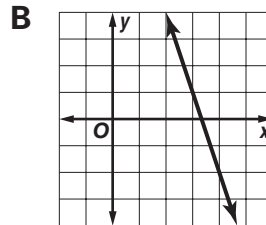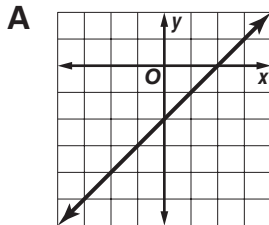
2 Which of these is the graph of the line passing through (3, −4) with slope $-\frac{5}{2}$?

A

B

C

D

2 _____

Standards Practice
Objective 3.06 (continued)

Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

3 Which of these is the equation of the line with *y*-intercept 11 and slope $\frac{3}{4}$?

    A $y = \frac{3}{4}x + 11$

    B $y = 11x + \frac{3}{4}$

    C $y = \frac{3}{4}(11) + x$

    D $11y = \frac{3}{4}x$

3 _____

4 Which of these is the equation of the line with slope -1 passing through $(-3, 5)$?

    A $-3y = 5x$

    B $y = x + 8$

    C $y = -x + 2$

    D $y = -3x + 5$

4 _____

5 Which of these is the equation of the line passing through $(5, -1)$ and $(-4, 2)$?

    A $y = \frac{1}{3}x - \frac{2}{3}$

    B $y = -\frac{1}{3}x - \frac{2}{3}$

    C $y = -\frac{1}{3}x + \frac{2}{3}$

    D $y = \frac{1}{3}x + \frac{2}{3}$

5 _____

6 Which of these is the equation of the line with *y*-intercept 4 and *x*-intercept 4?
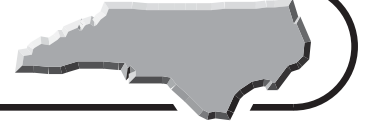
    A $y = -x + 4$

    B $y = -4x$

    C $y = x - 4$

    D $4y = -4x$

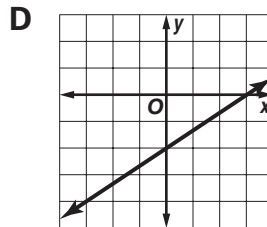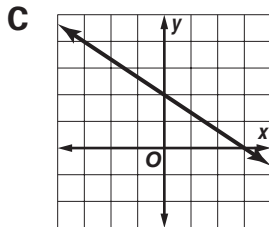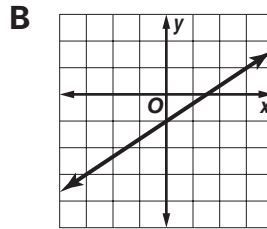**6** _____

Standards Practice
Objective 3.07

Investigate and determine the effects of changes in slope and intercepts
on the graph and equation of a line.

*Read each question and choose the best answer. Then write the
letter for the answer you have chosen in the blank at the right of
each question.*

1 To the right is the graph of $y = mx + 2$. Which
of these is the graph of $y = mx - 2$?

1 _____

A

B

C

D
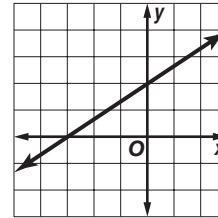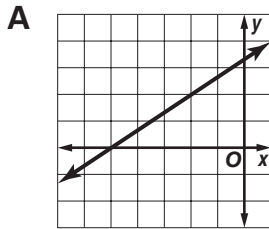
2 To the right is the graph of $y = mx + 3$. Which
of these is the graph of $y = -mx + 3$?

2 _____

A

B

C

D
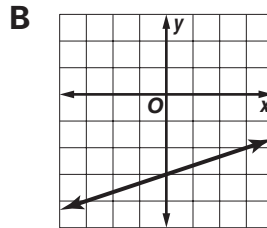
Standards Practice
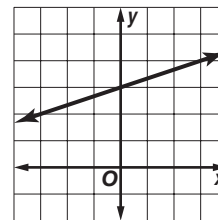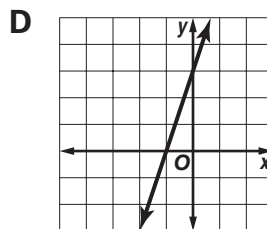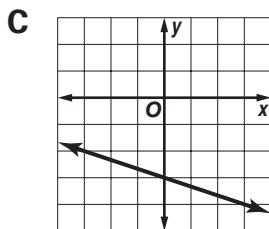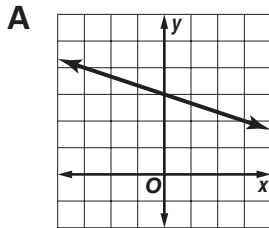## Objective 3.07 (continued)

Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

3 To the right is a graph with slope $\frac{1}{2}$. Which of these is the graph of a line with the same slope, but intercepting the *x*-axis at -1?

3 _____

A

B

C

D
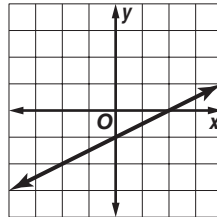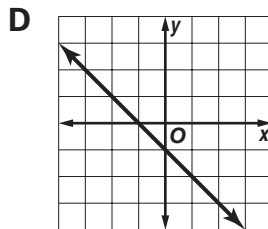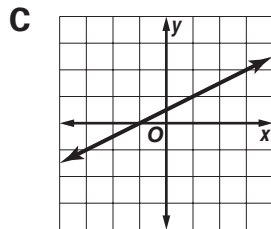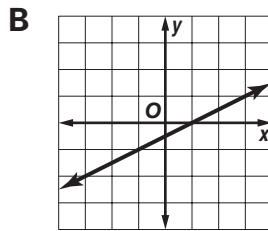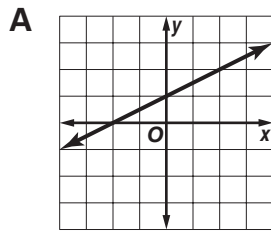
4 Which best describes the difference(s) between the graphs of $f(x) = 12x + 4$ and $g(x) = 24x - 4$?

4 _____

  A The graph of $f(x)$ is twice as steep as the graph of $g(x)$.

  B The graph of $f(x)$ is half as steep as the graph of $g(x)$.

  C The graph of $f(x)$ has a *y*-intercept of 4 while $g(x)$ has a *y*-intercept of -4.

  D Both B and C are true.

5 What equation results when the graph of $y = -\frac{1}{2}x + 3$ is changed to pass through $(0, 5)$?

5 _____

  A $y = -\frac{1}{2}x + 5$

  B $y = -\frac{1}{2}x - 5$

  C $y = -5x + 3$

  D $y = 5x + 3$

Standards Practice
Objective 3.08 ————————

Use linear equations or inequalities to solve problems.

Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

Dennis has $1,500 saved for a motorcycle. He expects to make deposits to his account each month. The graph illustrates how his savings will increase. Use the graph to answer Questions 1 and 2.
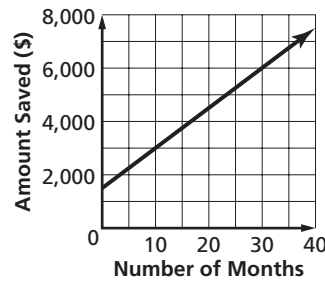
1 Which is the slope of the line that contains the points on the graph?

A $-1,500$ **B** -150

C 150 **D** $1,500$

1 _____

2 What does the slope of the line represent?

A the amount Dennis will save each month

B the cost of the motorcycle

C the number of months Dennis will save for the motorcycle

D the difference between the cost of the motorcycle and the amount Dennis has saved

2 _____

3 Carl has budgeted $60 to buy pork ribs and chicken legs for a faculty barbecue. Pork ribs cost $3.75 per pound, and chicken legs cost 75 cents per pound. If Carl plans to buy x pounds of chicken, which inequality represents the number of pounds y of ribs he can buy and not exceed his budget?

A $y \le -0.75x + 60$

B $y \le -0.2x + 16$

C $3.75y - 60 \le 0.75x$

D $0.75x + 3.75y > 60$

3 _____

4 Justin must have an average of at least 90% on five tests to receive a grade of A. His grades on the first four tests were 85%, 93%, 88%, and 94%. Which inequality can Justin use to find the minimum percent score he must make on the fifth test to receive an A?

A $\frac{x - 360}{5} \le 90$ **B** $\frac{x - 360}{5} \ge 90$

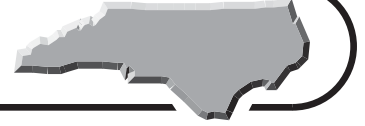**C** $\frac{360 + x}{5} \le 90$ **D** $\frac{360 + x}{5} \ge 90$

4 _____

Standards Practice
Objective 3.08 (continued)

Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

5 Which is the graph of the solution set of $y \geq -2x + 3$?   **5** _____

A

B

C

D
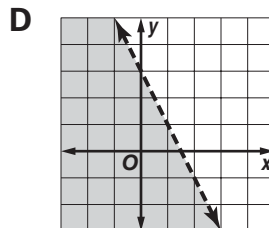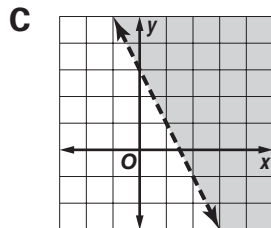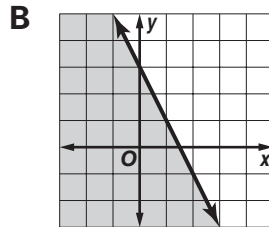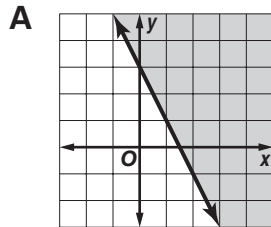
6 Which properties justify the statement $\frac{3}{4}(1 - 5m) \times \frac{4}{3} = 1 - 5m$?   **6** _____

  I   multiplicative inverse property

  II   multiplicative identity property

  III   commutative property for multiplication

  IV   associative property for multiplication

  A   I and II   **B**   II and III

  C   II, III, and IV   **D**   I, II, III, and IV

Ahmad begins traveling east on Interstate 40 from Asheville with a full tank of gasoline. His car has a 15-gallon gas tank and gets 30 miles per gallon during highway travel. Use this information to answer Questions 7 and 8.

7 Which function describes the relationship between the number of miles   **7** _____
m that Ahmad has driven and the number of gallons g of gasoline
remaining in his tank?

  A $g = 15 - 30m$ **B** $m = 30g - 15$

  C $g = 15 - \frac{m}{30}$ **D** $m = \frac{30}{g} - 15$

8 How far can Ahmad travel before he has only one gallon of gas left in   **8** _____
his tank?

  A   420 mi   **B**   450 mi   **C**   480 mi   **D**   510 mi

Standards Practice
## Objective 3.09

Use systems of linear equations or inequalities in two variables to solve problems.

Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

1 Which set of equivalent equations can be used to eliminate the x terms when solving by the elimination method?

$5x - 2y = 8$
$3x + 3y = -10$

A $15x - 6y = 24$
   $15x + 15y = -50$

B $15x - 6y = 24$
   $-15x - 15y = 50$

C $15x - 6y = 24$
   $6x + 6y = -20$

D $15x - 6y = 24$
   $-15x + 15y = 50$

1 _____

2 Which is the solution of the system of equations?

$3x - 2y = 1$
$5x - 3y = 4$

A $(-5, -8)$

B $\left(\frac{11}{19}, -\frac{7}{19}\right)$

C $(5, 7)$

D $(11, 16)$

2 _____

3 Which is the graph of the solution set of the system of inequalities?

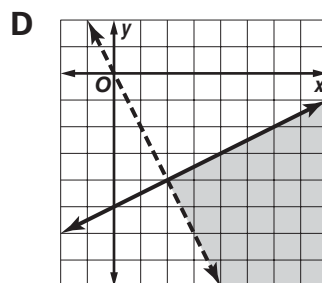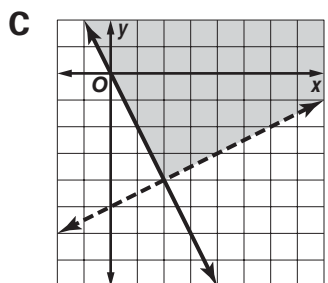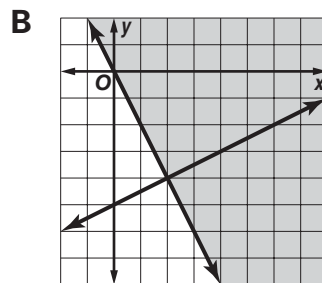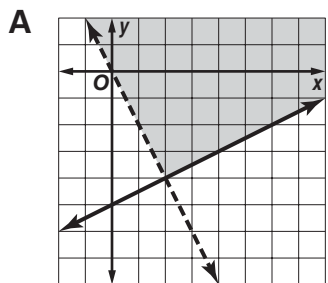$x - 2y \leq 10$
$2x + y > 0$

3 _____

Standards Practice
Objective 3.09 (continued)

Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

4 The solution set of which system of inequalities is graphed?

A $y < 3x - 1$
   $y < -2x + 3$

B $y < 3x - 1$
   $y > -2x + 3$

C $y > 3x - 1$
   $y < -2x + 3$

D $y > 3x - 1$
   $y > -2x + 3$
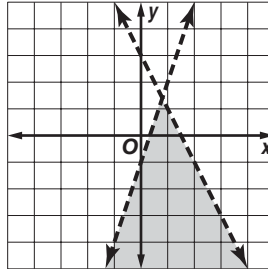
4 _____

5 An environmental planner in Greensboro, North Carolina, bid on the feasibility study of a greenway project. Her bid included a flat fee of $3,500 plus $60 for each hour spent on the study. Her competitor's bid included a flat fee of $5,000 plus $40 for each hour spent on the study. In how many project hours will the costs for the two competitors be the same?

A 30 hours

B $58\frac{1}{3}$ hours

C $66\frac{2}{3}$ hours

D 75 hours

5 _____

6 Last season, sales of mugs and pennants at a baseball stadium totaled $4,540. Pennants cost $5 and mugs cost $6. This year, sales for the two items were $6,560, mugs cost $7, and pennants cost $9. If the same number of both items was sold each year, which system of linear equations models this situation?

A $11(x + y) = 4,540; 16(x + y) = 6,560$
B $5x + 6y = 4,540; 7x + 9y = 6,560$
C $11xy = 4,540; 17xy = 6,560$
D $x + y = z; 12x + 15y = 11,100$

6 _____

7 Which set of equivalent equations can be used to eliminate the b terms when solving by the elimination method?

$4a - 5b = 1$
$2a + 6b = -1$

A $24a + 30b = 6$
   $10a + 30b = -5$

B $24a - 30b = 6$
   $10a + 30b = -5$

C $4a - 5b = 1$
   $2a + 6b = -1$

D $4a - 5b = 1$
   $-4a - 12b = -2$

7 _____

Standards Practice

Objective 3.10 ———————————

Graph quadratic functions.

Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

1 Which is the graph of $y = x^2 + x - 1$?

1 _____

A

B

C

D
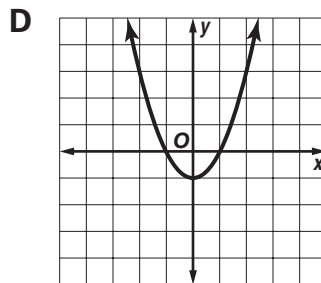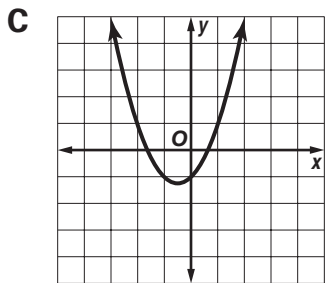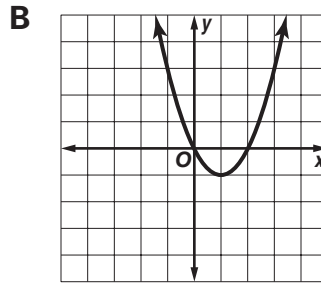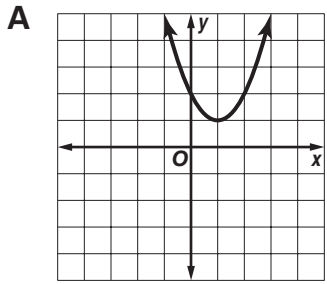
2 Which are the correct intercepts and vertex for this graph?

A x-intercepts -2 and 2; y-intercept 4; vertex $(0, 4)$

B x-intercepts -4 and 4; y-intercept 4; vertex $(0, 4)$

C x-intercept 4; y-intercepts -2 and 2; vertex $(0, 4)$

D x-intercepts -2 and 2; y-intercept 4; vertex $(4, 0)$

2 _____
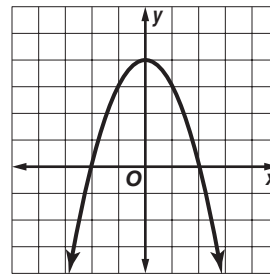
3 Which describes the solution set of the function graphed?

A no real roots

B 1 real root

C 2 real roots

D empty set

3 _____
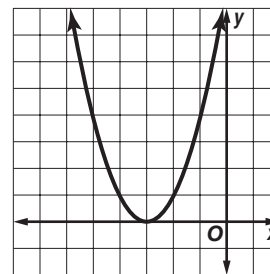
Standards Practice
Objective 3.10 (continued)

Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

4 The graphs of four quadratic equations are shown. Which equation has no real roots?

4 _____

A

B

C

D
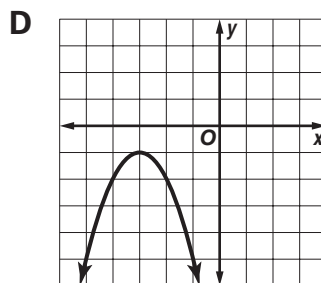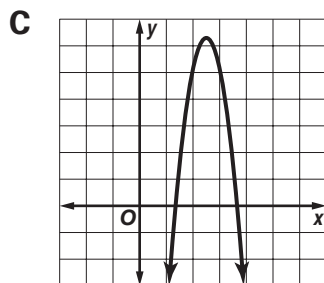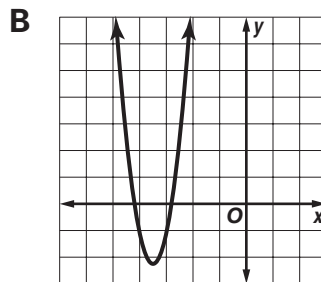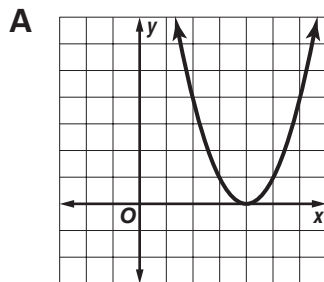
5 Nick's height in feet above the water x seconds after he dives from a diving board into a swimming pool can be modeled by the function $y = -4.9x^2 + 3.5x + 15$. How can you use the graph of the function to find the height of the diving board?

5 _____

A Find the value of y at the vertex of the graph.

B Find the value of the x-intercept.

C Find the value of x when $y = 0$.

D Find the value of the y-intercept of the graph.

6 The solution set of a quadratic equation is $\left\{-2, \frac{1}{4}\right\}$. How many x-intercepts does the graph of the equation have?

6 _____

A 2

B 1

C 0

D $-\frac{1}{2}$
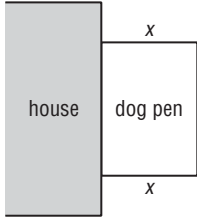
Standards Practice
Objective 3.11
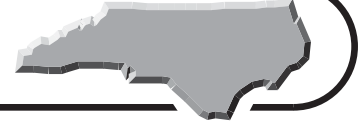
Use quadratic equations to solve problems.

Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

1 A pharmaceuticals researcher in Research Triangle Park uses a quadratic function $Q(t)$ to model the quantity Q of a drug present in a test subject as a function of time t. Which feature of the graph of this function will give the researcher the time at which the maximum quantity of the drug is present?

A the x-coordinate of the vertex
B the smaller x-intercept
C the y-coordinate of the vertex
D the larger x-intercept

1 _____

2 Kate is framing a picture to hang in her office in Johnson City. If the area of the rectangular frame can be represented by the expression $12x^2 - 4x - 5$, which expressions represent possible dimensions of the frame?

A $(6x + 5)$ and $(2x - 1)$
B $(6x - 5)$ and $(2x + 1)$
C $(3x - 5)$ and $(4x + 1)$
D $(4x - 5)$ and $(3x + 1)$

2 _____

3 Which equation has two irrational solutions?

A $2x^2 + 5x - 3 = 0$ **B** $16x^2 + 8x + 1 = 0$
C $3x^2 - 4x + 5 = 0$ **D** $x^2 - 4x + 2 = 0$

3 _____

4 Yukari is fencing in a rectangular section along an outside wall of her house for her dog. Yukari has 60 meters of fencing and wants to give her dog an enclosure with the greatest possible area. Which function can Yukari use to determine what the dimension x should be?

A $f(x) = x(60 - 2x)$
B $f(x) = x(60 - x)$
C $f(x) = x(2x - 60)$
D $f(x) = x(x - 60)$

4 _____

**5** How many x-intercepts does the graph of $y = x^2 - 9x + 3$ have?

A 0   **B** 1
**C** 2   **D** 3
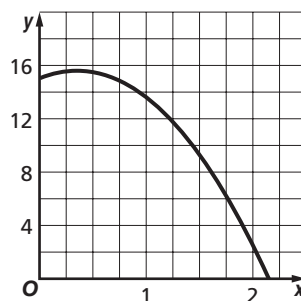
5 _____

Standards Practice

Objective 3.11 (continued)

Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

6 A state park charges $10 for an adult admission. The park estimates that they will lose 15 adult visitors per day for each one dollar increase in admission price. If the park averages 300 adult visitors a day, which is the most profitable adult admission price for the park to charge?

6 _____

    A $10
    B $12.50
    C $15
    D $16.50

7 Ryan is building a square tool shed and a square garage with a common wall. The combined length of the garage and shed will be 24 feet. How long should Ryan build each side of the tool shed so that the sum of the areas of both buildings will be as small as possible?

7 _____

shed | garage

|← 24 ft →|

    A 5 ft
    B 6 ft
    C 10 ft
    D 12 ft

8 Which graph shows that solutions of $0 = x^2 + 2x - 3$ are $\{-3, 1\}$?

8 _____

    A

    B

    C

    D
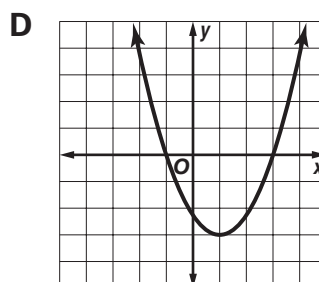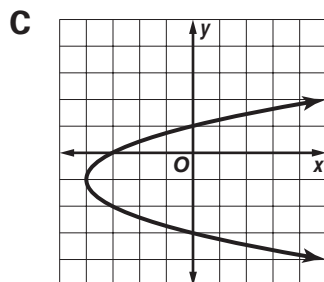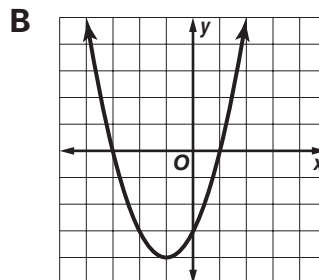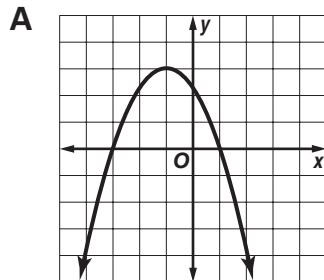
Standards Practice
Objective 3.12 ⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯

Use formulas and graphs to solve problems involving exponential functions.

Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

1 The amount of light filtering through a pond diminishes by one third for each meter of depth. Which formula expresses the amount of light a that remains at a depth of n meters?

A $a = \frac{1}{3}\left(\frac{1}{3}\right)^{n}$

B $a = \frac{1}{3}\left(\frac{1}{3}\right)^{n-1}$

C $a = \left(\frac{1}{3}\right)^{n-1}$

D $a = \left(\frac{1}{3}\right)^{n+1}$

1 _____

2 A city with a population of 200,000 grew at an annual rate of 2%. What was the city's approximate population after 10 years?

A 244,000
B 249,000
C 400,000
D 767,000

2 _____

Use the graph of y = 2ˣ to answer Questions 3 and 4.
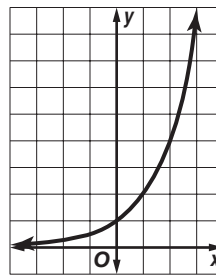
3 Which statement is true for $x > 1$?

A As x increases, y decreases.
B y decreases at the same rate as x.
C y increases at the same rate as x.
D y increases at a greater rate than x.

3 _____

4 Which statement is true?

I Each successive y value is two times the previous one.
II The graph has no x-intercept.
III The graph has no y-intercept.
IV The y-intercept is 1.

A I and III   **B** II only
C II and III   **D** I, II, and IV

4 _____

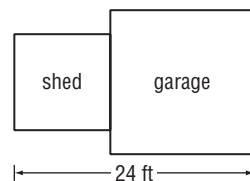# Standards Practice
Objective 3.12 (continued)

Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

5 A radioactive dye is injected into a laboratory rat for research purposes. After each hour, five eighths of the previous hour's dye remains in the rat. Approximately what percent of the dye remains in the rat's system after 10 hours?

A 91%   **B** 9.1%

C 0.9%   **D** 0.6%

5 _____

6 The number of snapping turtles s in a reservoir after t years is graphed. Using the graph, which is the most reasonable estimate of the number of turtles after 50 years?

A 270 turtles

B 310 turtles

C 770 turtles

D 1,040 turtles

6 _____

7 Which is the y-intercept of the graph of the function $y = -50\left(\frac{2}{3}\right)^{-x}$?

A -50 **B** -20

C $\frac{2}{3}$ **D** 50

7 _____

8 Consuela and Matthew paid $215,000 for their house in Cary. If the house appreciates at a constant rate each year, the value V of the house after n years can be represented by the function $V = 215{,}000(1.03)^n$. Which is the closest estimate of the value of their house after 5 years?

A $532,572

B $249,244

C $241,984

D $240,493

8 _____

9 One of North Carolina's towns had a population of 2,000 ten years ago. If the population has grown exponentially at a rate of 20% each year, what is its approximate population now?

A 10,320

B 12,383

C 14,860

D 123,835

9 _____

Standards Practice
Objective 4.01 ——————————————

Use matrices to display and interpret data.

Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

1 A company that manufactures office furniture produces four models of ergonomic desk chairs at three different plants. The company's production of these chairs in June is summarized in matrix *A* and its production of the chairs in July is summarized in matrix *B*.

$$A = \begin{array}{c} \text{Plant X} \\ \text{Plant Y} \\ \text{Plant Z} \end{array} \begin{array}{cccc} \text{Model A} & \text{Model B} & \text{Model C} & \text{Model D} \\ \left[\begin{array}{cccc} 420 & 880 & 540 & 200 \\ 280 & 280 & 460 & 320 \\ 360 & 0 & 580 & 480 \end{array}\right] \end{array}$$

$$B = \begin{array}{c} \text{Plant X} \\ \text{Plant Y} \\ \text{Plant Z} \end{array} \begin{array}{cccc} \text{Model A} & \text{Model B} & \text{Model C} & \text{Model D} \\ \left[\begin{array}{cccc} 180 & 210 & 330 & 180 \\ 420 & 180 & 280 & 740 \\ 450 & 40 & 300 & 400 \end{array}\right] \end{array}$$

Which information can the company gain directly from *A* + *B*?

A the total number of chairs produced at each location

B the model with the greatest production rate

C the total output at each plant

D the total production of the four models of chairs in June and July

1 _____

2 Three sisters, Becky, Lauren, and Shelby, are all being treated for high cholesterol. Each sister is on a different low-cholesterol diet as part of her treatment. Their cholesterol levels at the beginning of the first, third, fifth, and seventh months of their treatment are recorded in the matrix. Which is the most reasonable estimate of Shelby's cholesterol level at the beginning of the fourth month?

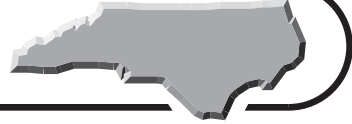$$\begin{array}{c} \text{Becky} \\ \text{Lauren} \\ \text{Shelby} \end{array} \begin{array}{cccc} \text{1st} & \text{3rd} & \text{5th} & \text{7th} \\ \left[\begin{array}{cccc} 220 & 210 & 200 & 195 \\ 215 & 205 & 195 & 190 \\ 220 & 215 & 210 & 205 \end{array}\right] \end{array}$$

A 218

B 213

C 205

D 200

2 _____

Standards Practice
Objective 4.01 (continued)

Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

3 Jennifer and Alex both own stock in four North Carolina businesses. The number of shares of each stock owned by Jennifer and Alex on January 1 is given in matrix S. The value of each share on January 1 is given in matrix V. What was the total value of Alex's stock on January 1?

3 _____

$$S = \begin{array}{c} \\ \text{Jennifer} \\ \text{Alex} \end{array} \begin{array}{cccc} \text{Stock A} & \text{Stock B} & \text{Stock C} & \text{Stock D} \\ \begin{bmatrix} 1{,}500 & 1{,}500 & 800 & 4{,}200 \\ 2{,}000 & 0 & 1{,}000 & 500 \end{bmatrix} \end{array}$$

$$V = \begin{array}{c} \\ \\ \end{array} \begin{array}{cccc} \text{Stock A} & \text{Stock B} & \text{Stock C} & \text{Stock D} \\ \begin{bmatrix} \$20 & \$18 & \$30 & \$40 \end{bmatrix} \end{array}$$

A $79,500

B $83,000

C $90,000

D $249,000

4 A real estate developer has plans to build two different models of condominiums in North Carolina, South Carolina, and Florida. The company's projections for the number of units it will build are given in matrix C. The profits the company expects to earn on each condominium are given in matrix D. Which matrix shows the total profit the company expects to earn in each state if it sells all of the condominiums?

4 _____

$$C = \begin{array}{c} \\ \text{NC} \\ \text{SC} \\ \text{FL} \end{array} \begin{array}{cc} \text{Model I} & \text{Model II} \\ \begin{bmatrix} 50 & 70 \\ 20 & 30 \\ 10 & 20 \end{bmatrix} \end{array} \qquad D = \begin{array}{c} \\ \text{Model I} \\ \text{Model II} \end{array} \begin{array}{c} \text{Profit} \\ \begin{bmatrix} \$30{,}000 \\ \$32{,}000 \end{bmatrix} \end{array}$$

A [$3,740,000 $940,000 $1,560,000]

B $\begin{bmatrix} \$3{,}740{,}000 \\ \$1{,}560{,}000 \\ \$940{,}000 \end{bmatrix}$

C [$1,500,000 $600,000 $320,000]

D $\begin{bmatrix} \$120{,}000 \\ \$50{,}000 \\ \$30{,}000 \end{bmatrix}$

Standards Practice
Objective 4.02

Recognize and identify linear and non-linear data.

Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

**1** Which situation can be represented by a linear function?

   A the distance traveled by a car that accelerates to 60 miles per hour in 10 seconds

   B the cost of horse riding lessons at $20 per hour

   C the mass of a 5-gram radioactive isotope with a half-life of 3 months

   D the balance of a bank account compounded daily at 1%

1 _____

2 The linear function shown on the graph could represent which of the following?

   A the flow rate of a section of the Haw River at 15 miles per hour

   B the height of a model rocket launched at 15 feet per second

   C the depreciation of an office photocopier at 15% per year

   D the total cost of Kitty Hawk souvenir sweatshirts at $15 each

2 _____
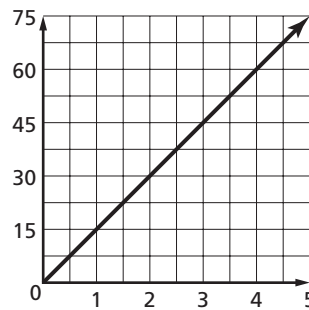
3 Which set of data is linear?

A

x	−1	0	1	2
y	3	6	9	12

B

x	−1	0	1	2
y	1	0	−1	0

C

x	−1	0	1	2
y	3	6	12	18

D

x	−1	0	1	2
y	2	3	5	8

3 _____

4 Which set of data is nonlinear?

A

x	2	4	6	8
y	2	3	4	5

B

x	2	4	6	8
y	4	2	0	−2

C

x	2	4	6	8
y	6	3	0	3

D

x	2	4	6	8
y	20	30	40	50

4 _____

Standards Practice
Objective 4.02 (continued) _____

Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

5 Which situation can be represented by a linear function?

  A the distance covered by a hiker walking at an average rate of 5 kilometers per hour

  B the amount Brian has in his bank account if he spends half of his savings each week

  C the height that a ball bounces if each bounce is half the height of the previous bounce

  D the number of canoes Doug rents each hour on Labor Day

5 _____

6 Which set of data is linear?

A

x	−3	−1	1	3
y	12	13	14	15

B

x	0	2	4	6
y	1	3	5	6

C

x	1	3	5	7
y	0	1	1	2

D

x	2	3	4	5
y	−2	−1	1	2

6 _____

7 Which set of data is nonlinear?

A

x	0	1	2	3
y	20	25	30	35

B

x	−1	0	1	2
y	−5	−3	−1	1

C

x	0	2	4	6
y	12	15	17	20

D

| x	1	3	5	7
y	1	0	−1	−2

7 _____

8 Which situation cannot be represented by a linear function?

  A the cost of dinner for a group of firefighters if each plate of pork barbecue costs $3.75

  B the volume of wood removed from a log by a chainsaw woodcarver

  C the number of rose bushes needed in a garden if there are five bushes in each rose bed

  D the weight of dog food to be carried on a trip lasting *x* days if a border collie eats 4 cups of food per day

8 _____

# Standards Practice
Objective 4.03
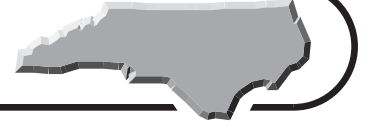
Create and use linear models based on real data.

Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

1 The table shows some amounts a Charlotte CD store charges for shipping CDs. Which is a graph of the data?

Number of CDs	Cost of Shipping
2	$2.50
4	$3.50
6	$4.50

1 _____

A

B

C

D
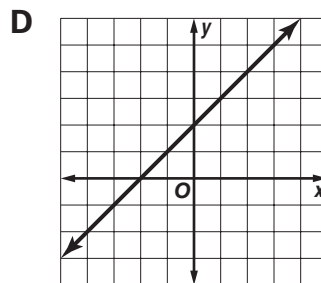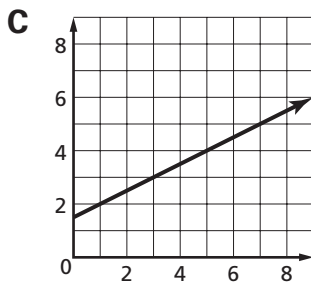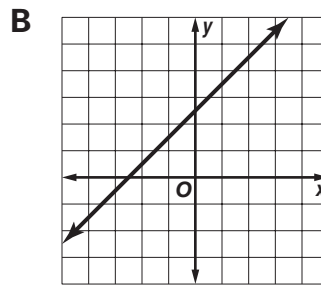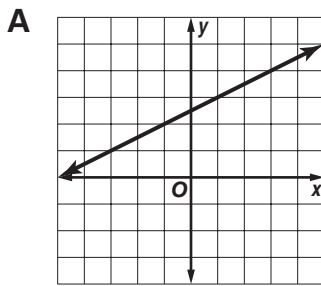
2 Which equation best fits the data in the table?

x	−2	−1	0	1	2	3
y	−3	−1	1	3	5	7

A $y = x - 1$ **B** $y = 2x$

C $y = -x - 2$ **D** $y = 2x + 1$

2 _____

3 The table shows the distance Shiangtai travels each hour driving from Wilmington to Asheville. Which is an equation that models these data?

Hours of Driving *h*	Miles Traveled *m*
1	65
2	130
3	195
4	260

A $m = 65h$

B $hm = 65$

C $m + h = 65$

D $h = 65m$

3 _____

Standards Practice
Objective 4.03 (continued)

Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

4 The county fair charges $10 admission and $1 per ride ticket. Carlos makes a graph to show the total cost depending on how many ride tickets are bought. Which is a true statement about his graph?

A The *y*-intercept is 1.
B The *x*-intercept is 10.
C The graph has a slope of 1.
D The graph has a slope of 10.

4 _____

5 For which data set would this graph be a line of best fit?

A

x	−1	0	1	2
y	1	1	0.5	0

B

x	−1	0	1	2
y	1	1	0.75	0.25

C

x	−1	0	1	2
y	1.5	1.25	1	0.75

D

x	−1	0	1	2
y	1	0.5	1.5	2.5

5 _____
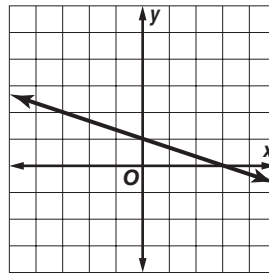
6 The graph models the amount charged by a print shop to print personalized pencils. Based on the graph, how much would you expect to pay for 50 pencils?
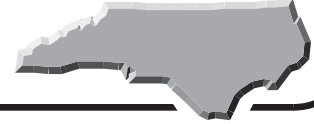
A $10.30
B $10.50
C $12.50
D $15.00

6 _____
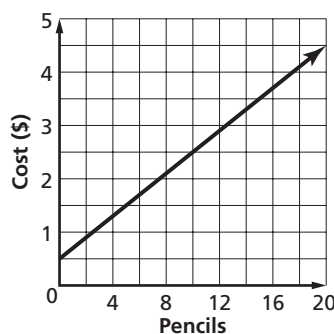
Sample Test 1
Test Practice

Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

1 Windows in the side of the largest aquarium tanks must be thick enough to withstand the water pressure. The thickness t of an acrylic window in inches is represented by $t = 0.4d$, where d is the depth in feet of the bottom of the window. In a large tank with the bottom of the window 15 feet below the water's surface, how thick should the acrylic be?

A 6 ft   **B** 4 ft
C 6 in.   **D** 4 in.

1 _____

2 Divide $3x^2 - 6x - 3$ by $3x$.

A $x^2 - 2x - 1$

B $x - 2 - \frac{1}{3}x$

C $3x - 2 - \frac{1}{x}$

D $x - 2 - \frac{1}{x}$

2 _____

3 If the average number c of cherry blossoms on a tree h feet tall can be modeled by the equation $c = 40h^2 - 1200$ when $h \geq 10$, will there normally be more blossoms on one tree 20 feet tall or on four trees 10 feet tall?

A 4 trees 10 feet tall
B 2 trees 10 feet tall
C They will have the same number.
D 1 tree 20 feet tall

3 _____

4 Solve for y if $y = |4|$.

A 4
B -4
C ± 4
D 2

4 _____

5 The area A of a circle is the square of its radius r multiplied by the constant pi. Which equation shows this?

A $A = \pi r^2$
B $A^2 = \pi r$
C $A = (\pi r)^2$
D $A = \pi \sqrt{r}$

5 _____

Go on

Sample Test 1 (continued)
Test Practice

Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

6 Factor $x^2 + 17x + 72$.   **6** _____

  A $(x + 12)(x + 6)$

  B $(x + 37)(x + 1)$

  C $\left(x + \frac{17}{72}\right)^2$

  D $(x + 8)(x + 9)$

7 Simplify $5\left(x^2 + 3 - \frac{x}{5}\right)$.   **7** _____

  A $5x^2 + 15x - 1$

  B $5x^2 + 3x - 1$

  C $5x^2 - x + 15$

  D $5x^2 + \frac{3}{5}x - 1$

8 Masato's boss tells him that he can work as many overtime hours as he   **8** _____
wants to work and adds, "so your pay range is unlimited." If Masato's
pay is a function of the number of hours he works, is the statement true
by the definition of the range of a function?

  A Yes, because his boss has set no limit on Masato's hours.

  B No, because the number of hours in a year is finite.

  C Yes, because overtime pay is 1.5 times regular pay.

  D No, because pay is the domain of the function, not the range.

9 Earl knows that the number of cartons s of soft drinks he sells daily in the   **9** _____
summer at his grocery store is a function of the day's high temperature
T in degrees Fahrenheit. He has found that $s = T - 40$ on days when
$T \geq 80°F$. How many cartons of soft drinks should he have on hand if
there are 3 days before his next delivery and the predicted highs for
those days are 91°F, 88°F, and 94°F?

  A at least 313

  B at least 273

  C at least 233

  D at least 153

10 What is the greatest common factor in the expression that results from   **10** _____
dividing $2x^2 - 4x$ by x?

  A 2   **B** x
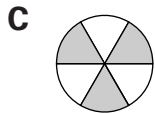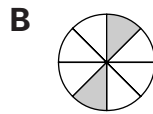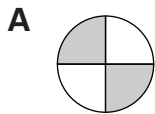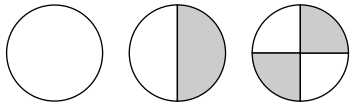
  C $2x$ **D** x^2

Go on

Sample Test 1 (continued)
Test Practice

Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

11 What is the next pattern in this sequence?   11 _____

A   **B**

C   **D**
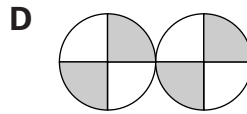
12 For the function $y = x^2 - 5$, which of the following are true?   12 _____

I x is always ≥ -5.
II y is always ≥ -5.
III There are positive and negative values for both x and y.

A I and III   **B** II and III   **C** II only   **D** III only

13 Simplify $49\sqrt{4}$.   13 _____

A 24.5   **B** $\sqrt{98}$ **C** 98   **D** 196

14 If the amount of sound s made by a flock of birds increases directly with   14 _____
the number of birds n in the flock, which of the following is true?

A There is a relation here but not a function.
B n is a function of s^2.
C There is neither a relation nor a function here.
D s is a function of n.

15 Simplify $(2x^2 - 3) - (5x^2 + 4)$.   15 _____

A $-10x^2 - 12$ **B** $-3x^2 - 7$
C $-3x^2 + 1$ **D** $10x^2 + 7x - 12$

16 The total number of petals in one handful of 5-petaled flowers p is five   16 _____
times the number of flowers f in the handful. What equation expresses
p as a function of f?

A $f = 5p$ **B** $p = 5f$ **C** $\dfrac{5}{p} = f$ **D** $f \times p = 5$

Go on

Sample Test 1 (continued)
Test Practice

Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

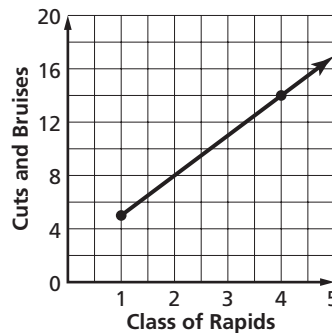**17** What is the greatest common factor in the expression $4x - 4$?

  A 2   **B** 4

  C 8   **D** 16

17 _____

18 Konyanko notices a linear relationship when he goes kayaking on the Nantahala River. He usually gets about 5 cuts and bruises during a day of kayaking in Class 1 rapids, and he gets about 14 cuts and bruises in a day on Class 4 (more difficult) rapids. What does the slope of this line indicate?

18 _____

  A that Class 4 rapids are almost 3 times as hard as Class 1 rapids

  B that he gets about 3 more cuts and bruises per day for every increase in the difficulty rating of the rapids

  C that he gets about 4 more cuts and bruises per day for every increase in the difficulty rating of the rapids

  D that he should take up mountain biking

19 Molly finds a kudzu vine seven feet long growing on a 40-foot tree at the edge of her yard. If the vine's height h in inches on day d can be modeled by $h = 6d + 84$, how far up the tree will it reach 60 days later?

19 _____

  A 367 ft

  B 37 ft

  C 17 ft

  D 12 ft

20 Sarah and her friends like to go to Lake Norman to swim. A tree at the lake's edge has ropes tied to 3 branches that reach over the water at different heights. The ends of all the ropes just touch the water, and they can swing farther and faster on the longer ropes. Sarah estimates that the size S of the splash they can make as they swing out and jump into the lake is roughly the product of the square of the length ℓ of the rope and a constant she calls k. What equation describes this?

20 _____

  A $S^2 = k\ell$

  B $S = k + \ell^2$

  C $k = S\ell^2$

  D $S = k\ell^2$

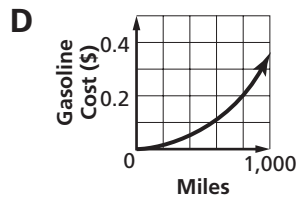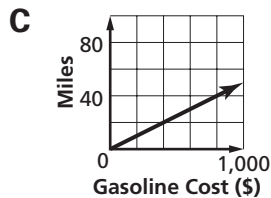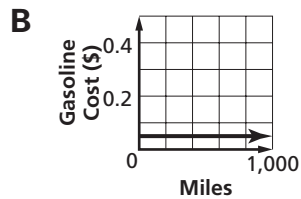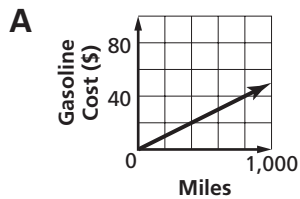*Go on*

Sample Test 1 (continued)
Test Practice

Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

In his boat off Cape Fear, Jeremy finds that the number z of zooplankton (tiny animals) that he catches with each sweep of his plankton net can be described by $z = 50v^2 - 150v$, where v is the speed of his boat in knots. Negative values of z mean that the zooplankton can see and avoid the net at that speed. Use this information to answer Questions 21 and 22.

21 Which graph shows this function correctly?   **21** _____

A

B

C

D
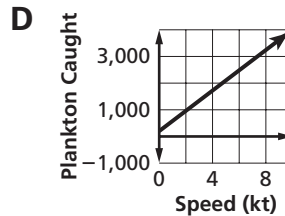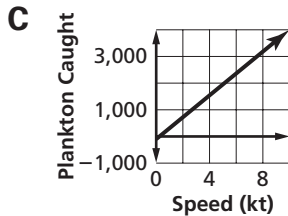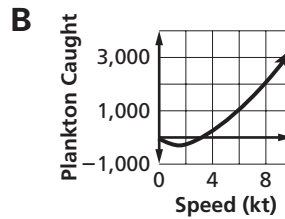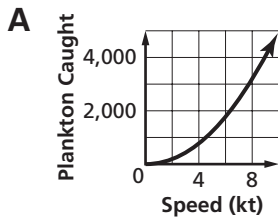
22 The zooplankton are swimming independently when Jeremy comes   **22** _____
along. Does this mean that *z* is an independent variable?
  A No, *z* is a dependent variable.
  B Yes, the plankton are free to move unless they are caught.
  C Yes, but only when the boat is moving slowly.
  D Yes, because it defines the range of the function.

23 What is the next pattern in this sequence?   **23** _____
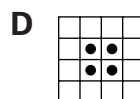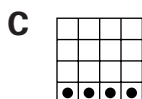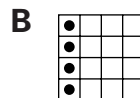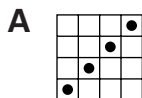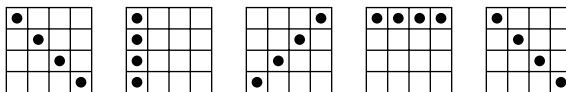
A

B

C

D

Go on

Sample Test 1 (continued)
Test Practice

Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

Shawna's calculations show a linear relationship between the money she spends on gasoline g and the miles m that she drives. She finds her total gasoline cost to be g = 0.05m. Use this information to answer Questions 24 through 26.
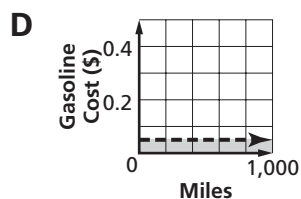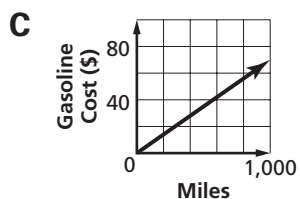
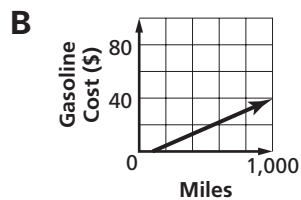**24** Which graph shows this function?   **24** _____

A

B

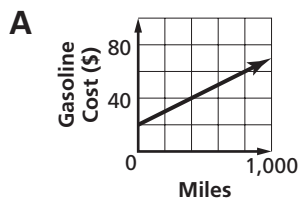**C**

D

25 What is represented by the slope of the line?   **25** _____
   A the miles per gallon
   B the miles per dollar spent
   C the price of gasoline per gallon
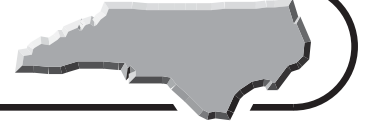   **D** the cost of gasoline per mile

26 If Bobby's car gets fewer miles per gallon than Shawna's car, which   **26** _____
   graph could show the cost of gasoline for Bobby's car?

A

B

C

D

Go on

Sample Test 1 (continued)
Test Practice

Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

27 Express 3^4 as an integer.   27 _____

   A 12   **B** 27

   C 64   **D** 81

28 Factor $2x^2 + 7x + 5$.   28 _____

   A $(x + 5)(2x + 1)$

   B $(2x + 7)(x + 5)$

   C $(2x + 5)(x + 1)$

   D $2(x + 5)(x + 1)$

29 What is the next pattern in this sequence?   29 _____

30 Elizabeth and Philip each sell clothing over the Internet. Elizabeth adds a shipping charge of 10 percent to each order, while Philip adds a shipping charge of $7. The total cost including shipping from these two merchants can be graphed as a function of the cost before shipping. Which merchant has a graph with a greater slope?   30 _____

   A Philip, if the clothing costs less than $70; otherwise Elizabeth

   B Philip

   C Elizabeth

   D Elizabeth, if the clothing costs less than $70; otherwise Philip
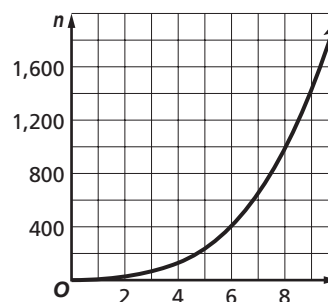
31 The graph shows the maximum number of marbles n that can fit into a ball of radius r. Which equation could describe n as a function of r?   31 _____

   A $n = \frac{4}{3}\pi r^3$

   B $n = 20r^2$

   C $n = 4r^2$
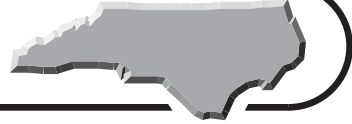
   D $n = 2r^3$

Go on

Sample Test 1 (continued)
Test Practice

Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

32 If $y = 2x^2 + 3$, which of the following is true?   32 _____

  A x will always be greater than y.

  B x can equal y for a real value of x.

  C y will always be greater than x.

  D y will always be less than $|x|$.

33 Expand $5(x + 3)$.   33 _____

  A $5x + 15$ **B** $5x + 3$

  C $8x$ **D** $15x$

34 While visiting the North Carolina Botanical Garden in Chapel Hill, Max calculates that each pitcher plant has an average of 2.4 flies trapped inside, except for 10 plants that have no flies at all. If Max sees p pitcher plants in the area he has assessed, how many flies f are trapped inside all of these plants?   34 _____

  A $f = 2.4p - 10$

  B $f = 2.4(p - 10)$

  C $p = 2.4f - 10$

  D $p = 2.4(f - 10)$

35 A circle with its center at the origin and a radius of 2 units can be described by the equation $x^2 + y^2 = 4$. Is it a function?   35 _____

  A Yes, because an equation defines a function.

  B Yes, because it has positive and negative values.

  C No, because some values of x give more than 1 value of y.

  D No, because its domain is only from $x = -2$ to $x = 2$.

36 Mandy is building a pier on the lake behind her house. She needs 20 boards for its top surface if she makes the pier 10 feet long, and she would need 40 boards to make it 20 feet long. If she graphs the number of boards she needs as a function of pier length, what is the slope of the line and what does it mean?   36 _____

  A The slope is 2; it takes 2 boards to make the pier a foot longer.

  B The slope is $\frac{4}{3}$; it takes 4 boards to make it 3 feet longer.

  C The slope is $\frac{1}{2}$; it takes 2 boards to make the pier a foot longer.

  D The slope is 2; she is using boards 2 feet long.

Go on

Sample Test 1 (continued)
Test Practice

Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

37 What does the equation $S = 2\pi r^2 + 2\pi rh$ show about cylinders?

   37 _____

  A The radius r of cylinders is a constant.

  B You can never divide by zero, so a large radius r always means that the cylinder must have a small height h.

  C The surface area S of a cylinder is the sum of the areas of both ends (each of which is πr^2) and its lateral area $2\pi rh$.

  D For its surface area S to be a positive number, the sum of the areas of a cylinder's ends (each of which is πr^2) must be greater than its lateral area $2\pi rh$.

38 What is the next pattern in this sequence?

   38 _____

39 What can you tell from this table about Helen's effort in growing tomatoes in her garden?

   39 _____

Year	Time (min/day)	Money Spent on Plant Care	Tomato Harvest (lb)
1	10	$100	50
2	20	$100	100
3	20	$200	105
4	20	$300	110
5	30	$200	155
6	30	$100	150

  A Her tomato harvest depends more on the time she spends looking after the plants than on the money she spends.

  B A little more money brings a very large increase in the number of tomatoes she harvests.

  C Next year, she will increase her tomato crop the most if she spends $400 on the part of her garden where she has tomatoes.
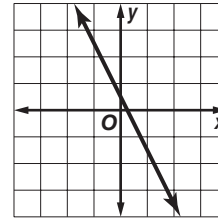
  D It makes no difference how much time she spends in her garden.

Go on
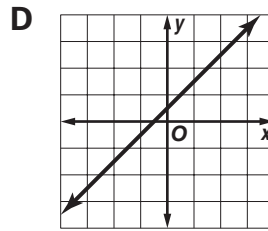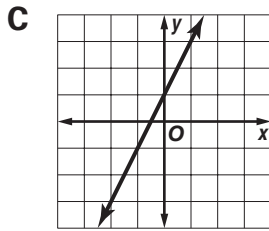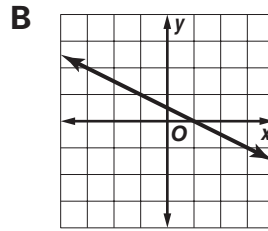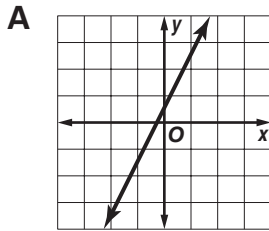
Sample Test 1 (continued)
Test Practice

Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

40 Simplify $(17 - 5 \times 3)^2$.

  A 2   **B** 4   **C** 36   **D** 72

40 _____

41 A chemist at Camp LeJeune uses a quadratic function to model the quantity q of toxic fumes present in the air during a hazardous materials exercise as a function of time t. Which feature of the graph of this function will give the chemist the initial quantity of fumes at the start of the hazardous materials exercise?

  A the value of q when $t = 0$ **B** the smaller x-intercept
  C the x-coordinate of the vertex   **D** the larger x-intercept

41 _____

42 The graph models the amount Becky charges for pet-sitting. Based on the graph, how much will Becky charge for 8 days of taking care of her neighbor's python?

  A $25
  B $30
  C $40
  D $45
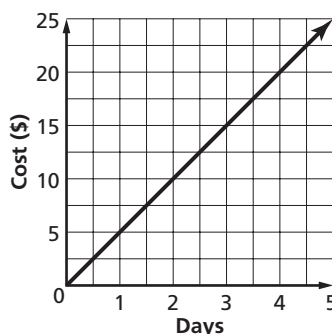
42 _____

43 Which set of data is nonlinear?

A

x	−1	0	1	2
y	1	10	100	1,000

B

x	−1	0	1	2
y	0	0	0	0

C

x	−1	0	1	2
y	−1	0	1	2

D

x	−1	0	1	2
y	54	53	52	51

43 _____

44 Which of the following shows the expression $x^2 - 14x + 48$ correctly factored?

  A $(x - 7)(x - 6)$ **B** $(x - 8)(x + 6)$
  C $(x - 4)(x - 12)$ **D** $(x - 8)(x - 6)$

44 _____

45 What equation results when the graph of $y = 2x + 2$ is changed to have a slope of 4 and a y-intercept of 3?

  A $y = 4x + 3y$ **B** $3y = 4x + 1$
  C $y = 3x + 4$ **D** $y = 4x + 3$

45 _____

Go on

Sample Test 1 (continued)
Test Practice

Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

46 To the right is the graph of $y = -mx + \frac{1}{2}$. Which of these is the graph of $y = mx + \frac{1}{2}$?
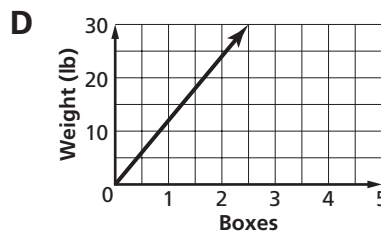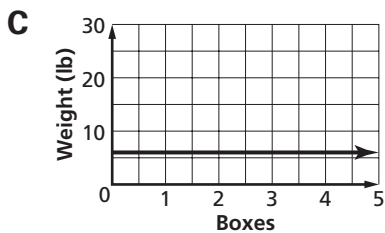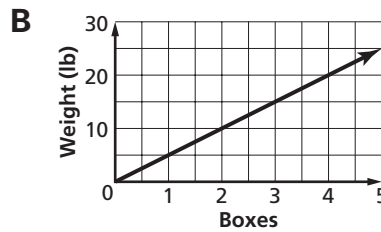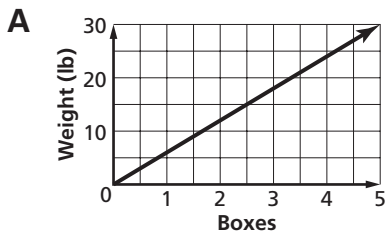
46 _____

A

B

C

D

47 The table shows the weight of some boxes of computer parts that James is ordering for his computer repair business in Cary. Which is a graph of the data?

47 _____

Number of Boxes	Total Weight (lb)
2	12
3	18
5	30

A

B

C

D

Go on

Sample Test 1 (continued)
Test Practice

Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

48 Which best describes the difference(s) between the graphs of
$f(x) = 7x + 8$ and $g(x) = 7x + 4$?

  A The graph of $f(x)$ is twice as steep as the graph of $g(x)$.
  B The graph of $f(x)$ is half as steep as the graph of $g(x)$.
  C The graph of $f(x)$ has a y-intercept of 8 while $g(x)$ has a y-intercept of 4.
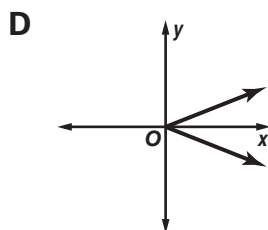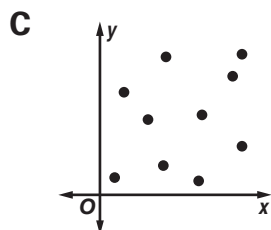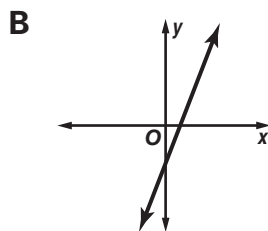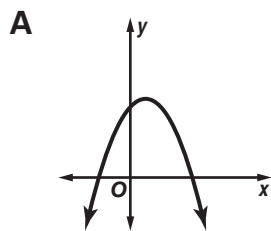 **D** Both A and C are true.

48 _____

49 To the right is a graph with a slope of 3 that intercepts the x-axis at (3, 0). Which of these is a graph with a slope of 2 that intercepts the x-axis at (2, 0)?
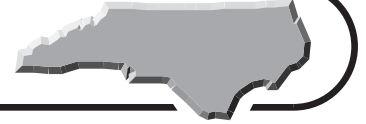
49 _____

A   **B**

C   **D**
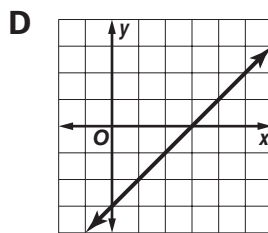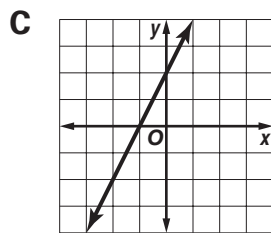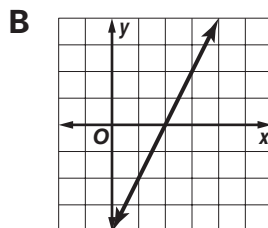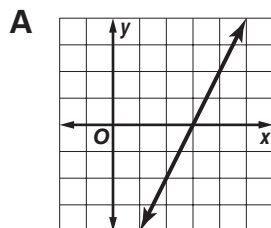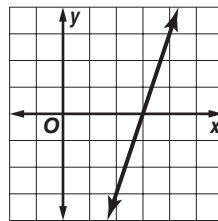
50 Which set of data is linear?

50 _____

A   **B**

C   **D**

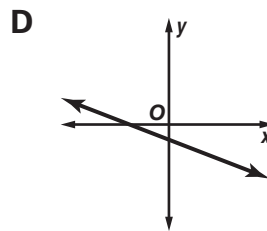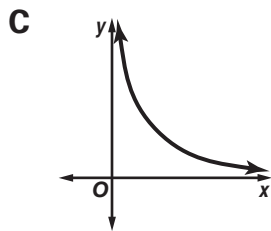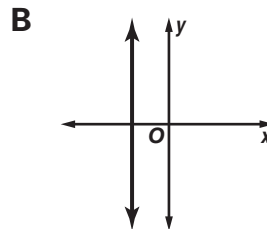*Go on*

Sample Test 1 (continued)
Test Practice

Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

51 Which of these is the equation of the line with *y*-intercept (0, 1) and slope 2?

A $y = 2x + 1$ **B** $y = x + 2$ **C** $y = 2x$ **D** $2y = x$

51 _____

52 Which set of data is nonlinear?

A

B

C

D

52 _____

53 Which graph shows that the solutions of $0 = x^2 - 8x + 7$ are {1, 7}?

A

B

C

D
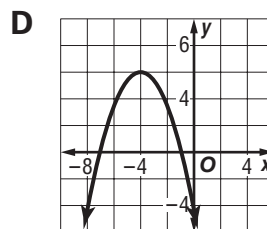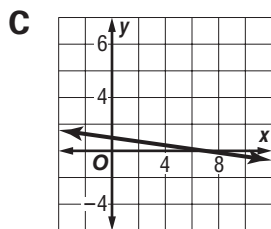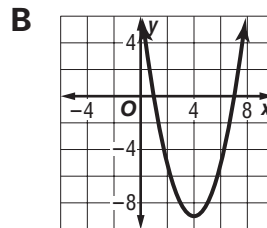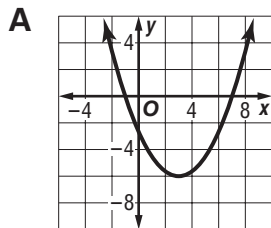
53 _____

54 Which equation best fits the data in the table?

x	−2	−1	0	1	2	3
y	−5	−3	−1	1	3	5

A $y = x - 3$ **B** $y = 2x - 1$ **C** $y = x - 1$ **D** $y = 3x + 1$

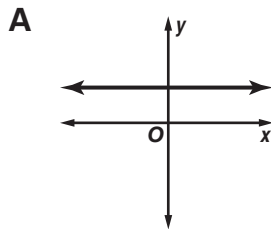**54** _____

Go on

Sample Test 1 (continued)
Test Practice

Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

The number of canoes, paddleboats, and sailboats rented to students and to non-students during one week at a park adjacent to a college campus is shown in matrices A and B below. Use the matrices to answer Questions 55–58.

$$A = \begin{array}{c} \text{students} \\ \text{non-students} \end{array} \begin{bmatrix} \overset{\text{C}}{118} & \overset{\text{P}}{120} & \overset{\text{S}}{42} \\ 12 & 14 & 7 \end{bmatrix} \quad \text{Weekdays}$$

$$B = \begin{array}{c} \text{students} \\ \text{non-students} \end{array} \begin{bmatrix} \overset{\text{C}}{78} & \overset{\text{P}}{82} & \overset{\text{S}}{24} \\ 12 & 132 & 56 \end{bmatrix} \quad \text{Weekend}$$

55 On weekdays, which is shown by the data?   55 _____
- **A** More paddleboats than canoes are rented.
- **B** Most non-students do not know how to use a canoe.
- **C** Students prefer sailing to canoeing.
- **D** Canoes are more expensive to rent than sailboats.

56 Which category had the least rentals on weekends?   56 _____
- **A** student paddleboats
- **B** student sailboats
- **C** non-student canoes
- **D** non-students sailboats

57 If you add matrices *A* and *B* to form matrix *G*, what does *G* represent?   57 _____
- **A** the number of students who spend weekends on campus
- **B** the number of students and non-students who sail
- **C** the number of canoes, paddleboats, and sailboats rented to non-students and students one month
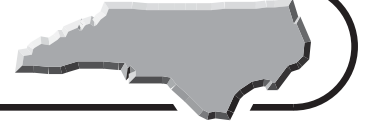- **D** the number of canoes, paddleboats, and sailboats rented to students and non-students for one week

58 Which matrix is *G*?   58 _____

A $\begin{array}{c} \text{students} \\ \text{non-students} \end{array} \begin{bmatrix} \overset{\text{C}}{118} & \overset{\text{P}}{120} & \overset{\text{S}}{42} \\ 12 & 14 & 7 \end{bmatrix}$ **B** $\begin{array}{c} \text{students} \\ \text{non-students} \end{array} \begin{bmatrix} \overset{\text{C}}{78} & \overset{\text{P}}{82} & \overset{\text{S}}{24} \\ 54 & 132 & 56 \end{bmatrix}$

C $\begin{array}{c} \text{students} \\ \text{non-students} \end{array} \begin{bmatrix} \overset{\text{C}}{196} & \overset{\text{P}}{202} & \overset{\text{S}}{66} \\ 24 & 146 & 63 \end{bmatrix}$ **D** $\begin{array}{c} \text{students} \\ \text{non-students} \end{array} \begin{bmatrix} \overset{\text{C}}{186} & \overset{\text{P}}{212} & \overset{\text{S}}{66} \\ 56 & 148 & 64 \end{bmatrix}$

Go on

Sample Test 1 (continued)
Test Practice

*Read each question and choose the best answer. Then write the
letter for the answer you have chosen in the blank at the right of
each question.*

*The population of a town t years after the town's largest
employer went bankrupt can be modeled with the equation
$p(t) = 27,500(0.85)^t$. Use this information to answer
Questions 59–62.*

59 What does $p(0)$ represent?   **59** _____

   A the amount the employer was worth

   B the year the employer went bankrupt

   C the number of people unemployed

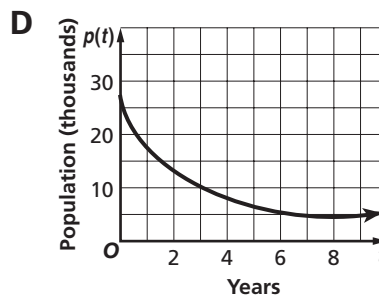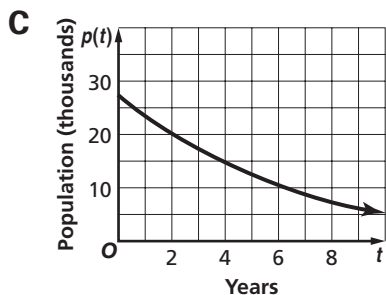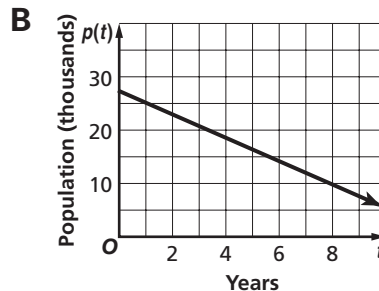   **D** the population when the town's largest employer went bankrupt

60 What was the initial population of the town when the employer went   **60** _____
bankrupt?

   A 27,500   **B** 27,085

   C 23,375   **D** 8,500

61 After how many years will the population be less than 10,000?   **61** _____

   A 2.4 yr   **B** 6.3 yr

   C 8.5 yr   **D** 12.4 yr

62 Which is the graph of this function?   **62** _____
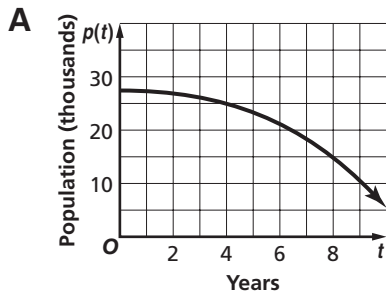
A

B

C

D

Go on

Sample Test 1 (continued)
Test Practice

Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

63 Shelby walks her dog Sampson around Mallard Pond 5 times in an hour. She makes a graph to show how many laps around the pond they will walk depending on the number of hours they walk. Which is a true statement about her graph?

63 _____

A The *y*-intercept is 5.
B The *x*-intercept is 5.
C The graph passes through (5, 5).
D The graph has a slope of 5.

64 Which situation can be represented by a linear function?

64 _____

A the distance traveled by an accelerating rocket
B the population of a town that is doubling in size every five years
C the temperature of water in the ocean over a 1-year period
D the cost of piano lessons at $20 per hour

65 The solution set of a quadratic equation is $\{-3\}$. How many *x*-intercepts does the graph of the equation have?

65 _____

A -3
B -1
C 0
D 1

66 Which of these is the graph of the line with *y*-intercept $\left(0, \frac{3}{2}\right)$ and slope $-\frac{3}{4}$?

66 _____
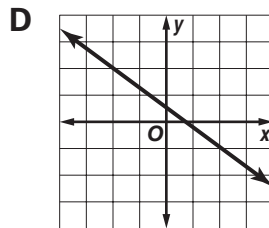
A

B

C

D

Go on

Sample Test 1 (continued)
Test Practice

Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.
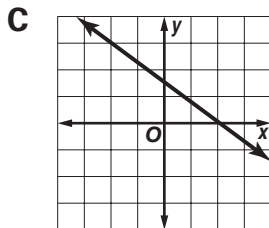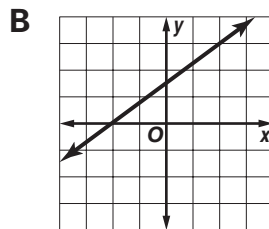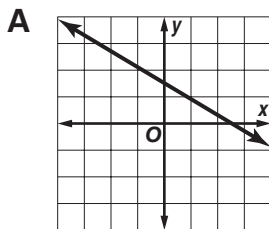
67 Which of these is the graph of the line through $(-2, -1)$ with slope $-\frac{1}{3}$?

67 _____

A

B

C

D
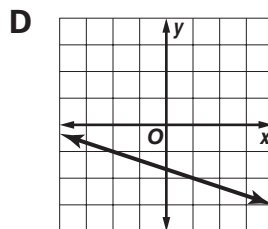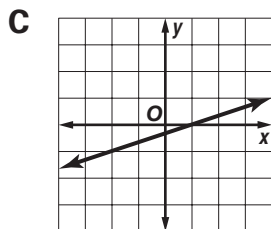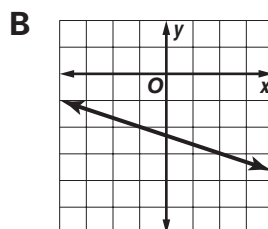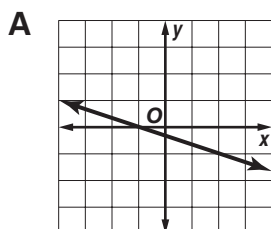
68 Margaret launches a model rocket into the air at time t. The equation $y = -16t^2 + 160t$ can be used to model the path of the rocket. At about what time does the rocket hit the ground?

68 _____

A 5 s   **B** 7 s
C 10 s   **D** 25 s

69 Which of these is the equation of the line through $(2, 1)$ and $(4, 0)$?

69 _____

A $y = 2x + 1$ **B** $y = -\frac{1}{2}x + 2$

C $y = \frac{1}{2}x + 4$ **D** $y = 2x - 1$

70 Which are the intercepts and vertex of this graph?

70 _____

A x-intercept 9; y-intercepts -3 and 3; vertex $(0, -9)$
B x-intercepts -3 and 3; y-intercept 3; vertex $(0, 9)$
C x-intercepts -3 and 3; y-intercept 9; vertex $(0, 9)$
D x-intercepts -9 and 9; y-intercept 3; vertex $(9, 0)$


Go on
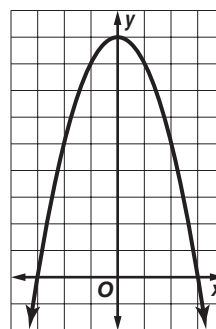
Sample Test 1 (continued)
Test Practice

Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

71 Which is the graph of $y = x^2 - x + 1$?   71 _____

A

B

C

D

72 The solution set of a quadratic equation is $\{-1, 4\}$. How many   72 _____
x-intercepts does the graph of the equation have?

A 2

B 1

C -1

D -4

73 Which set of equivalent equations can be used to eliminate the x terms   73 _____
when solving Equation 1 and Equation 2 by the elimination method?

Equation 1: $4x + 3y = 9$
Equation 2: $-8x + 5y = -1$

A $4x + 3y = 9$
$-4x + 2y = -1$

B $8x + 3y = 9$
$-8x + 5y = -1$

C $8x + 6y = 18$
$-8x + 5y = -1$

D $6x + 5y = 11$
$-8x + 5y = -1$

Go on

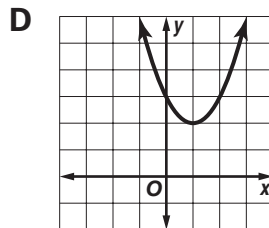**78**   *North Carolina Algebra 1 End-of-Course Test*
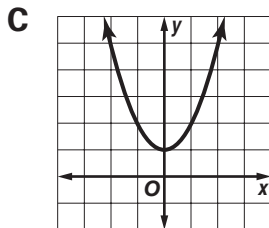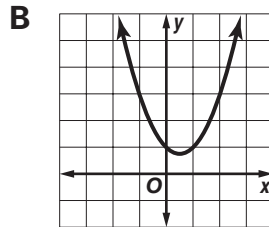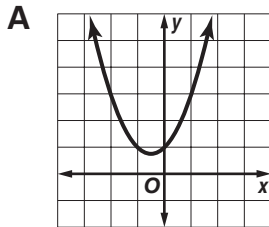
Sample Test 1 (continued)
Test Practice

Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

74 Which is the graph of the solution set of the system of inequalities? **74** _____

$x - 2y \le 4$
$x + y > 3$

A

B

C

D
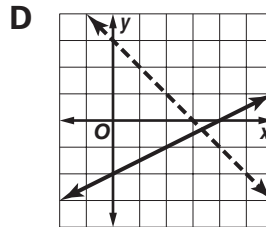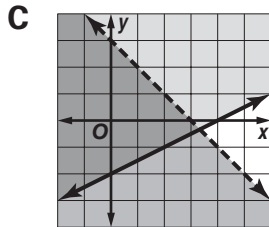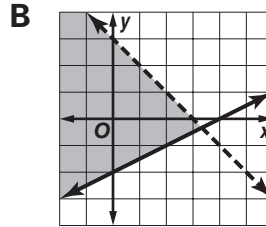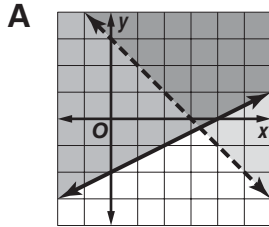
75 Which properties justify the statement **75** _____
$-4(12 - 2x) + 3 = (-48 + 8x) + 3$?

I Multiplicative Inverse Property
II Distributive Property
III Commutative Property
IV Associative Property

A I only
B II only
C II and III
D II, III, and IV

76 Kinji has budgeted $75 to buy grass skirts and silk flower leis for a **76** _____
Hawaiian theme party. Grass skirts cost $5 each and silk flower leis cost
$0.50 each. If Kinji plans to buy x grass skirts, which inequality represents
the number of leis y he can buy and not exceed his budget?

A $y \le 75 + 10x$
B $y \ge 10x - 150$
C $5y - 75 \le 50x$
D $y \le 150 - 10x$

Go on

Sample Test 1 (continued)
Test Practice

Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

A tennis instructor charges $40 for each hour lesson and $25 for each half-hour lesson. Her income from 35 students was $1,160. Use this information to answer Questions 77 and 78.

77 Which system of equations can be used to find the number of half-hour lessons h and full-hour lessons f taught?

A $40f + 25h = 1,160$
$40f + 25h = 35(f + h)$

B $40f + 25h = 1,160$
$f + h = 35$

C $65(f + h) = 1,160$
$f + h = 35$

D $40h + 25f = 1,160$
$f + h = 35$

77 _____

78 How many half-hour lessons were taught?

A 35
B 21
C 19
D 16

78 _____

Selma's digital camera can store 52 images on one storage card. She takes her camera and 8 storage cards with her on a photography trip down the White Oak River. Use this information to answer Questions 79 and 80.

79 Which function describes the relationship between the number of cards c that Selma has and the number of images i she can store?

A $\frac{c}{i} = 8$
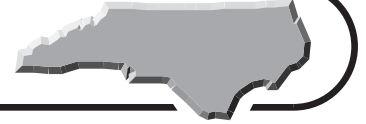**B** $c + i = 52$
C $i = 52c$
D $c = 52i$

79 _____

80 By sunset, Selma has 400 images. How many images of the sunset can she store before all her storage cards are full?

A 16
B 44
C 60
D 104

80 _____

STOP

Sample Test 2
Test Practice

Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

Firefighters Ronnie and Tenita are fighting a house fire. Ronnie is spraying 150 gallons of water per minute (gpm). Tenita's firehose sprays 100 gpm, and the nozzle is always either closed (0 gpm) or fully open (100 gpm) as she fights the fire. Use this information to answer Questions 1–3.

1 Which graph shows water output from both hoses at time t?

1 _____

A

B

C

D
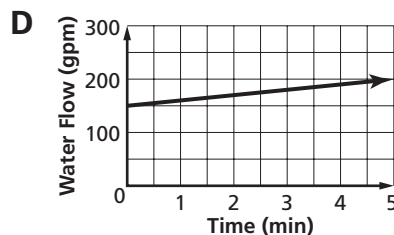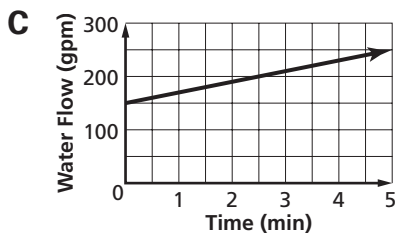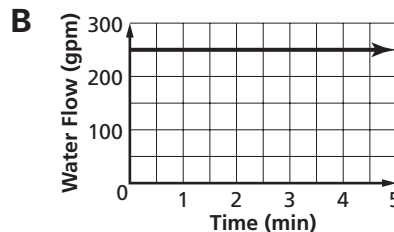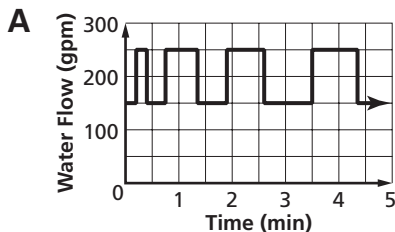
2 What is the slope of the line showing the water flow in gallons per minute at time t, if we ignore the moments when Tenita is opening or closing the nozzle?

2 _____

A The slope is 250 gpm.
B The slope is 100 gpm.
C The slope is 10 gpm.
D The slope is 0, because water flow at a given t is constant.

3 Todd is operating the pump on the fire engine that supplies Ronnie and Tenita. How much water must Todd be able to deliver to them at the most?

3 _____

A 50 gpm
B 160 gpm
C 250 gpm
D 1500 gpm

4 Simplify $(2x + 3) + (x + 14)$.

4 _____

A $3x + 17$
B $2x^2 + 42$
**C** $2x^2 + 31x + 42$
D $34x + 17$

*Go on*

Sample Test 2 (continued)
Test Practice

Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

5 The speed S of the tip of a spinning airplane propeller in feet per minute is the product of the total length ℓ of the propeller in feet, π, and the propeller's spin rate R in revolutions per minute. Which is an equation for this relationship that gives propeller tip speed S in feet per second?

5 _____

A $S = \frac{\pi \ell R}{60}$ **B** $\frac{S}{60} = \pi \ell R$ **C** $S = \pi \ell R$ **D** $\frac{S}{\pi} = 60 \ell R$

6 What is the greatest common factor in the terms $14x^2$ and $-70x$?

6 _____

A $14x^2$ **B** $14x$ **C** 14 **D** -70

7 How many leaves will this pondweed plant have in week 17?

7 _____

A 71
B 69
C 67
D 65

Week 1   **Week 2**   **Week 3**
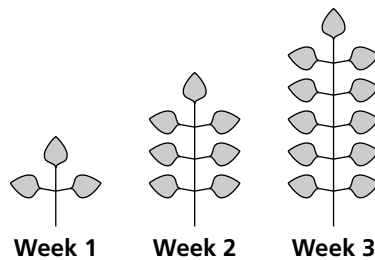
8 Factor $-x^2 - 3x + 10$.

8 _____

A $1 - (x + 2)(x + 5)$ **B** $(x + 2)(x - 5)$
C $(-x + 2)(x + 5)$ **D** $(x - \sqrt{10})^2$

9 Woody knows that the cost of the fuel his helicopter uses c is the product of the amount of time t his engine runs, the average amount of jet fuel f that his turbine engine consumes per hour, and the cost per gallon g of the fuel. Which equation expresses this?

9 _____

A $c \times g = f \times t$ **B** $c = \frac{ft}{g}$
C $f = \frac{g^2}{t}$ **D** $c = tfg$

10 Solve for y if $y = |-4|$.

10 _____

A ± 4 **B** 4 **C** -2 **D** -4

11 If the number of people n who stop at a yard sale is related to the day's high temperature T by $n = T + 14$, how many people will attend a yard sale when the high temperature for the day is 93°F?

11 _____

A 107   **B** 93   **C** 79   **D** 14

Go on

Sample Test 2 (continued)
Test Practice

Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

Sted sees that the number of fish he has caught during each of the past several years is a fairly constant function of the number of days each year he has spent fishing. Use the graph to answer Questions 12 and 13.
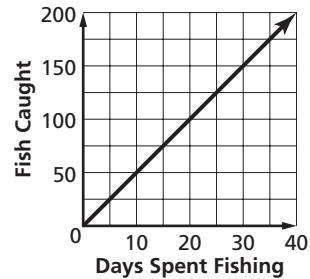
12 How many fish can Sted expect to catch in a year in which he spends 17 days fishing?

  A 17

  B 47

  C 52

  D 85

12 _____

13 What are the domain and range of this function?

  A The domain is 0 to 40 and the range is 0 to 200.

  B The domain is 0 to 200 and the range is 0 to 40.

  C This function has no domain or range; the graph continues.

  D The domain is 0 to the maximum number of days he could go fishing in a year, and the range is 0 to the maximum possible number of fish that he would catch.

13 _____

14 What does the equation $C = 2\pi r$ mean?

  A The value of π decreases as the radius of a circle increases.

  B The circumference of a circle is twice the product of its radius r and the constant pi.

  C The value of π increases as the radius of a circle increases.

  D The circumference of a circle is twice the square of its radius r multiplied by the constant pi.

14 _____

15 Simplify $(x(5 + 3) - 8x)^2$.

  A $8x^2 + 8x$

  B $8x^2 - 8x$

 **C** 0

  D $64x - 8x^2$

15 _____

*Go on*

Sample Test 2 (continued)
Test Practice

Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

In a 30°-60°-90° triangle, the length c of the longest side is twice the length a of the shortest side. Use this information to answer Questions 16–18.

16 Which graph shows c as a function of a?   **16** _____

A

B

C

D
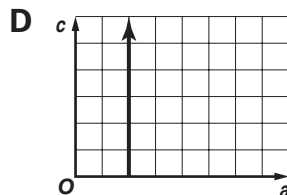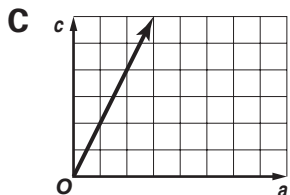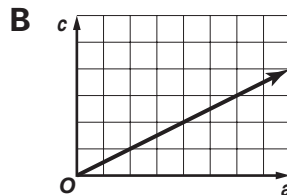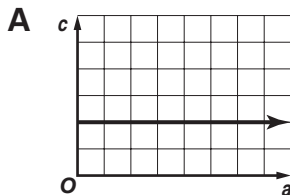
17 What is the slope of the line $c = 2a$?   **17** _____

  A 2   **B** $2a$

  C a **D** 0.5

18 Is $c = 2a$ a relation or a function?   **18** _____

  A It is neither a relation nor a function. A triangle is not a graph.

  B It is a function that specifies c in terms of a.

  C It is a relation but not a function, because a vertical line can cut a
     triangle at more than one point.

  D It is a function with an unknown domain.

19 Karla draws a graph that shows how often she must wash her car in the   **19** _____
     spring as a linear function of the number of birds that nest in her trees.
     In years with no nesting birds, she washes it once a month. There were
     5 nests one spring, and Karla washed her car six times a month. What
     does the slope of her line show?

  A the number of birds in each nest

  B the total number of times that she washes her car

  C that she must wash her car one additional time per month for each
     bird nest in her trees

  D that she must wash her car six additional times per month for every
     5 bird nests in her trees
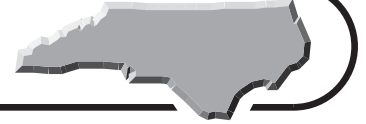
Go on

Sample Test 2 (continued)
Test Practice

Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

20 What is the next figure in this sequence?   20 _____

A

B

C

D
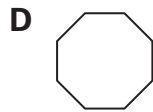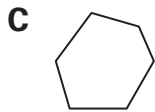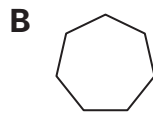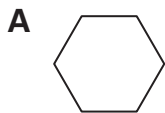
21 Simplify $\sqrt{(17 - 5 \times 3)^2}$.   21 _____

  A 2   **B** 4   **C** 6   **D** 36

22 The amount of money M in Etta's savings account has increased over time t according to the function shown in the graph. She deposits the same amount from every paycheck, and she has done so for several years. The line has been smoothed to even out the small jumps in her account from her deposits. Which of the following is true about the effect of regular deposits into an account with compound interest?   22 _____

  A M increases to a certain point and then stops growing.
  B M increases according to an exponential function.
  C M increases according to a linear function.
  D M increases in an unpredictable way.

23 Which of the following is the same as 2^7?   23 _____

  A 14   **B** 49
  C 72   **D** 128

24 Factor $5x^2 - 25x - 180$.   24 _____

  A $(x + 6)(x - 6)(5x)$ **B** $(x + 5)(x - 36)$
  C $(x + 30)(5x - 60)$ **D** $5(x + 4)(x - 9)$
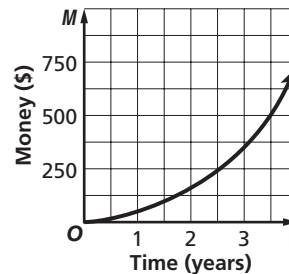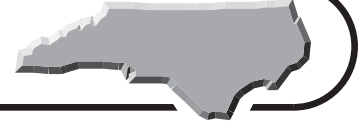
Go on

Sample Test 2 (continued)
Test Practice

Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

The number N of raincoats Lorri's department store sells each month follows the formula 3r + 40, when r is the rainfall in inches during the month. Use this equation to answer Questions 25 and 26.

25 How many additional raincoats do they sell each month for every inch of rain that falls?

    A r **B** 3

    C $3r$ **D** 40

25 _____

26 If the highest recorded monthly rainfall at Lorri's store is 15 inches, what is the range of the function?

    A from 0 to 15   **B** 15

    C from 40 to 85   **D** 85

26 _____

Ceil's 3 by 5 inch index cards are $\frac{1}{32}$ inch thick. Use this information to answer Questions 27 and 28.

27 If Ceil starts with a stack of recipe cards 5 inches thick and writes an average of 128 new recipes on index cards per year, what will be the thickness of her stack of index cards t years later?

    A $\frac{t}{32}$ in.   **B** $\frac{128}{32}t + 5$ in.

    C $32t$ in.   **D** $32t + 5$ in.

27 _____

28 Which graph shows the growth of Ceil's stack of recipe cards over time?

28 _____

Go on

Sample Test 2 (continued)
Test Practice

Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

Bob saw that the amount of poetry he had learned and the amount of time he had spent teaching other people in math, history, and English could be described by the following table. Use the table to answer Questions 29–31.

Period	Teaching (hours per year)	Poetry Learned (lines per year)
High School	40	250
Military Service	100	600
College	20	400
Working, before children	40	200
Working, with children at home	1,200	40
Working, with children grown	100	100
Retired	400	200

29 When did Bob learn the most new poetry each year?

    A during high school and college

    B during military service

    C while his children were at home

    D when he retired

29 _____

30 When did Bob spend the most time teaching others each year?

    A during high school and college

    B during military service

    C while his children were at home

    D when he retired

30 _____

31 Is the amount of poetry Bob learned each year a positive linear function of the number of hours he spent teaching others?

    A No; when he spent more time teaching, he learned less new poetry himself.

    B No; there is no relation at all between poetry and teaching.

    C No; however, there is a positive, linear relation between hours spent teaching and new lines of poetry learned.

    D Yes; this is a positive linear function.
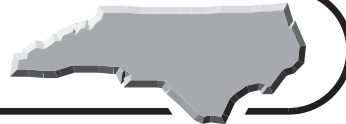
31 _____

Go on

Sample Test 2 (continued)
Test Practice

Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

32 As a group of students studied the sharks in an aquarium tank, one of the students asked the aquarium manager, Tara, how the large tank had been built. Tara answered, "First, we had to make the floor strong enough. There are 6,000 gallons of seawater in this tank. At about $8\frac{1}{2}$ pounds per gallon, that means that the water alone weighs more than 25 tons." What expression represents Tara's calculation?

32 _____

A $\sqrt{6{,}000}$ gallons $\times$ 2,000 pounds per ton $\times$ 8.5 gallons

B $\dfrac{6{,}000 \text{ gallons}}{1 \text{ ton}}$

C $\dfrac{6{,}000 \text{ gallons} \times 8.5 \text{ pounds per gallon}}{2{,}000 \text{ pounds per ton}}$

D $\dfrac{6{,}000 \text{ gallons}}{8.5 \text{ pounds}}$

33 What is the next figure in this sequence?

33 _____

A   **B**

C   **D**
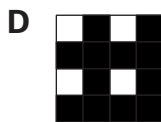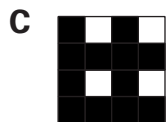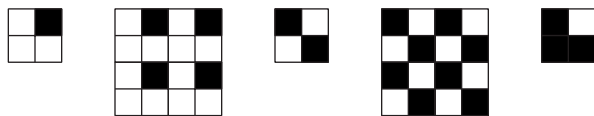
34 Simplify $\dfrac{121x^3 - 77x^2 + 99x}{11x}$.

34 _____

A $11x^3 - 7x^2 - 9$
B $121x^2 - 77x + 99$
C $11x^2 - 77x - 9$
D $11x^2 - 7x + 9$
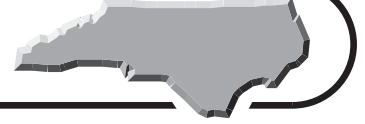
35 Simplify $(x + 4) - (2 - x)$.

35 _____

A 2
B $2x - 2$
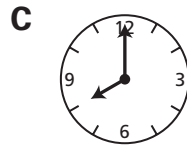**C** $2x + 2$
D $6 - x$

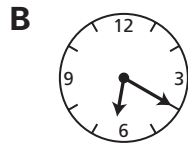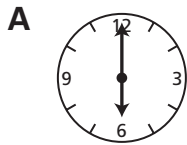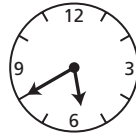*Go on*

Sample Test 2 (continued)
Test Practice

Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

36 What is the next figure in this sequence?   36 _____

A   **B**   **C**   **D**
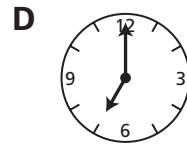
37 Simplify $9\sqrt{27}$.   37 _____

   A $3\sqrt{9}$ **B** $9\sqrt{3}$ **C** $27\sqrt{3}$ **D** 27

Kelli leans an adjustable extension ladder against a wall so that the distance a from the base of the wall to the top of the ladder is four times the distance b from the base of the wall to the foot of the ladder. The ladder is extended to be c feet long. Use this information to answer Questions 38 and 39.

38 The Pythagorean Theorem states that $a^2 + b^2 = c^2$. If $a = 20$ feet, what is c to the nearest foot?   38 _____

   A 50 ft   **B** 25 ft

   C 21 ft   **D** 20 ft

39 If it is safest to set up a ladder with $a = 4b$ whenever possible, what determines the best length (maximum value of c) of extension ladder to buy, for values of a of less than about 50 feet?   39 _____

   A It should be exactly a feet long, or it will be too heavy.

   B It should be $2a$ feet long, or it will usually be too short.

   C Although a and b can be changed, an adjustable ladder will always have the same value for c.

   D It should be able to extend to a few feet longer than the greatest expected value of a.

40 What is the greatest common factor in the terms $2x^2$ and $-8x$?   40 _____
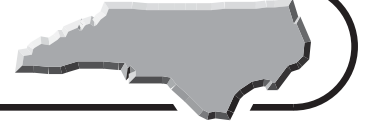
   A $2x$ **B** $8x$

   C 2 **D** 8

Go on
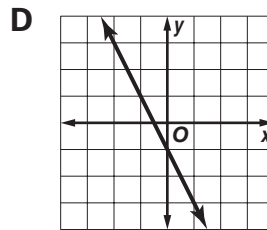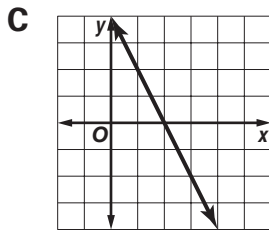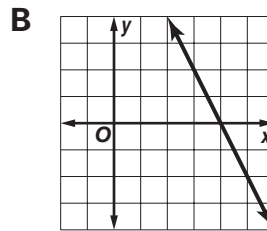
Sample Test 2 (continued)
Test Practice

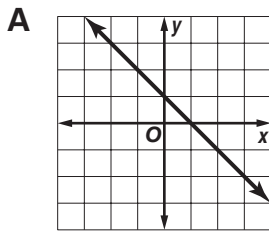*Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.*

There are already 30 guests on the roof of a high-rise building in Charlotte for a summer social. An express elevator is bringing up more guests in groups. The graph illustrates how the number of guests at the party increases with each run of the elevator. Use the graph to answer Questions 41 and 42.

41 Which is the slope of the line that contains the points on the graph?   **41** _____

    A -30 **B** 2

    C 12   **D** 30

42 What does the slope of the line represent?   **42** _____

    A the number of guests arriving with each elevator run

    B the initial number of guests

    C the number of floors in the high rise

    D the number of minutes it takes the elevator to reach the roof

43 Which property justifies the following?   **43** _____

    $38x + 17 = 50$
    $38x = 50 - 17$

    I   Multiplicative inverse Property

    II Distributive Property

    III Commutative Property

    IV Subtraction Property

    A I only   **B** II only

    C II and III   **D** IV only

44 Which of these is the equation of the line through $(-3, 1)$ with slope $-\frac{5}{4}$?   **44** _____

    A $y = -\frac{5}{4}x - \frac{11}{4}$

    B $y = -3x - \frac{5}{4}$

    C $y = -\frac{5}{4}x$

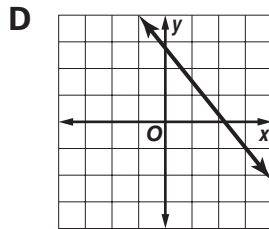   **D** $-\frac{5}{4}y = x$

Go on

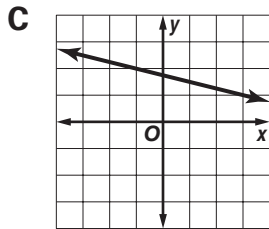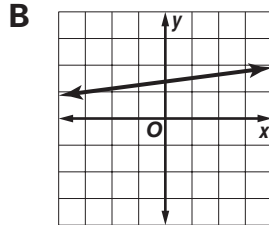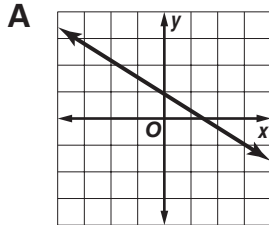# Sample Test 2 (continued)
Test Practice

Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

45 Alfonso is a sales manager for a company that rents beach condominiums on Emerald Isle. Alfonso's weekly goal is for his sales team to average $9,000 in sales each day this week. Their sales for the first four days of this week were $8,200, $9,100, $9,300, and $7,400. Which inequality can Alfonso use to find the minimum sales his team must achieve on Friday to average $9,000 each day for the week?

45 _____

A $\frac{x - 34,000}{5} \leq 9,000$

B $\frac{34,000 + x}{5} \geq 9,000$

C $\frac{34,000 + x}{5} \leq 9,000$

D $\frac{x - 34,000}{5} \geq 9,000$

46 The graph of $y = -2x + k$ intercepts the x-axis at $(3, 0)$. What equation results from changing k so that the x-intercept is $(4, 0)$?

46 _____

A $y = -2x + 6$

B $y = -2x + 4$

C $y = -x + 4$

D $y = -2x + 8$

47 Which of these is the graph of the line through $(3, -2)$ with slope -2?

47 _____

A

B

C

D

48 Which best describes the difference(s) between the graphs of $f(x) = -5x + \frac{3}{4}$ and $g(x) = -10x + \frac{3}{4}$?

48 _____

A The graph of $f(x)$ is twice as steep as the graph of $g(x)$.

B The graph of $f(x)$ is half as steep as the graph of $g(x)$.

C The graph of $f(x)$ has a y-intercept of 5 while $g(x)$ has a y-intercept of 10.

D Both A and C are true.

Go on

Sample Test 2 (continued)

Test Practice

Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.
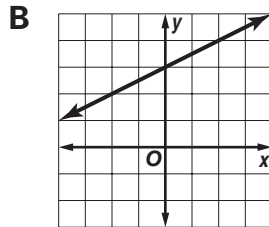
49 Which of these is the graph of the line through $(3, -1)$ and $\left(1, \frac{3}{2}\right)$? **49** _____

A

B

C

D

50 To the right is the graph of $y = mx - 2$. Which of these is the graph of $y = mx - 3$? **50** _____

A

B

C

D
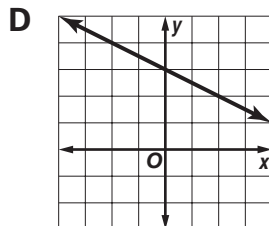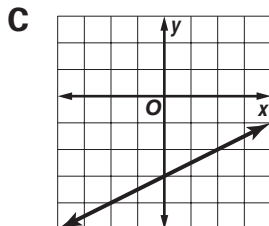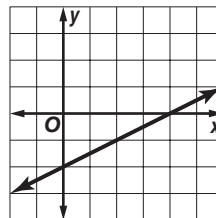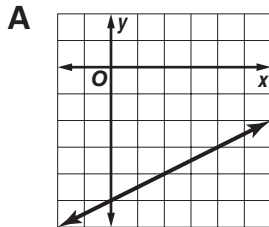
51 Which of these is the equation of the line through $(-3, 1)$ and $(-1, 3)$? **51** _____

   A $y = x + 1$
   B $y = x + 4$
   C $y = -x$
   D $y = 3x + 1$
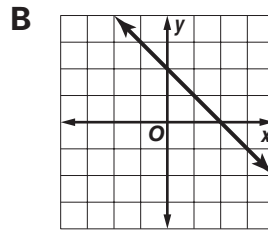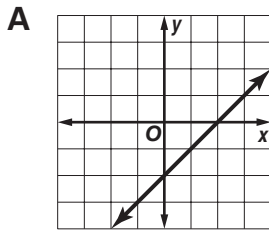
Go on

Sample Test 2 (continued)
Test Practice

Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

52 To the right is a graph with a slope of $-\frac{1}{2}$ that intercepts the *x*-axis at (1, 0). Which of these is a graph with a slope of -1 that intercepts the *x*-axis at (2, 0)?

52 _____

A

B

C

D
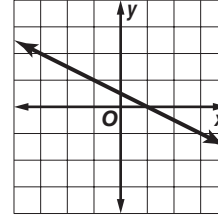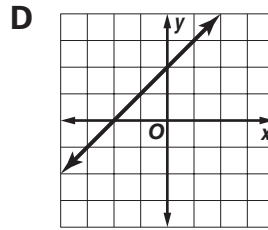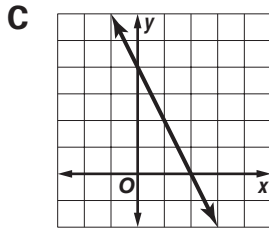
53 A traffic engineer in Raleigh uses a quadratic function $D(t)$ to model the time delay D in minutes that occurs t seconds after an accident for commuters on Interstate 40 after an accident occurs at rush hour. Which feature of the graph of this function will show the engineer the maximum time delay for commuters?

53 _____

A the *x*-coordinate of the vertex
B the *y*-coordinate of the vertex
C the smaller *x*-intercept
D the larger *x*-intercept

54 Which set of data is linear?

54 _____

A

x	−1	0	1	2
y	7	12	22	27

B

x	−1	0	1	2
y	5	−5	5	−5

C

x	−1	0	1	2
y	2	3	2	3

D

x	−1	0	1	2
y	54	52	50	48

Go on

Sample Test 2 (continued)
Test Practice

Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

The number of new releases and older stock of DVDs, videos, and games rented one week at Alden's video store in Raleigh is shown in matrices A and B below. Use the matrices to answer Questions 55–58.

Monday through Friday

$$A = \begin{array}{c} \\ \text{new} \\ \text{older} \end{array} \begin{array}{ccc} \text{DVDs} & \text{Videos} & \text{Games} \\ \left[\begin{array}{ccc} 150 & 130 & 22 \\ 85 & 103 & 7 \end{array} \right] \end{array}$$

Saturday and Sunday

$$B = \begin{array}{c} \\ \text{new} \\ \text{older} \end{array} \begin{array}{ccc} \text{DVDs} & \text{Videos} & \text{Games} \\ \left[\begin{array}{ccc} 140 & 180 & 22 \\ 65 & 88 & 5 \end{array} \right] \end{array}$$

55 During the week, which items did people rent the most from Alden?

    A new-release DVDs   **B** new-release videos

    C older DVDs   **D** new-release games

55 _____

56 Which category had more rentals on the weekend than during the rest of the week?

    A older DVDs   **B** older videos

    C new-release DVDs   **D** new-release videos

56 _____

57 If you add matrices *A* and *B* to form matrix *R*, what does *R* represent?

    A the number of DVDs and videos rented in one week

    B the number of new releases rented in one week

    C the number of DVDs, videos, and games rented in one week

    D the number of DVDs, videos, and games Alden has in his store

57 _____

58 Which matrix is *R*?

A
$$\begin{array}{c} \\ \text{new} \\ \text{older} \end{array} \begin{array}{ccc} \text{DVDs} & \text{Videos} & \text{Games} \\ \left[\begin{array}{ccc} 150 & 130 & 22 \\ 85 & 103 & 7 \end{array} \right] \end{array}$$

B
$$\begin{array}{c} \\ \text{new} \\ \text{older} \end{array} \begin{array}{ccc} \text{DVDs} & \text{Videos} & \text{Games} \\ \left[\begin{array}{ccc} 290 & 310 & 44 \\ 150 & 191 & 12 \end{array} \right] \end{array}$$

C
$$\begin{array}{c} \\ \text{new} \\ \text{older} \end{array} \begin{array}{ccc} \text{DVDs} & \text{Videos} & \text{Games} \\ \left[\begin{array}{ccc} 190 & 310 & 44 \\ 140 & 191 & 12 \end{array} \right] \end{array}$$

D
$$\begin{array}{c} \\ \text{new} \\ \text{older} \end{array} \begin{array}{ccc} \text{DVDs} & \text{Videos} & \text{Games} \\ \left[\begin{array}{ccc} 140 & 180 & 22 \\ 65 & 88 & 5 \end{array} \right] \end{array}$$

58 _____

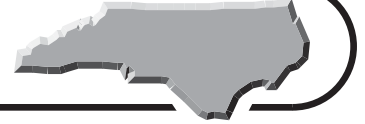**59** Annushka throws a ball for her dog Jezebel at time *t*. The equation $y = -16t^2 + 20t + 4$ can be used to model the path of the ball. About how long is the ball in the air?

    A 0.5 s   **B** 1 s

    C 1.5 s   **D** 2 s

59 _____

Go on

Sample Test 2 (continued)
Test Practice

Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.
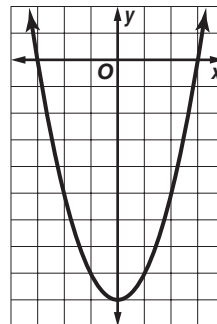
A parking meter on Hillsborough Street in Raleigh contains 31 coins, with a total value of $5.80. The coins are all dimes and quarters. Use this information to answer Questions 60 and 61.

60 Which system of equations can be used to find the number of dimes d and quarters q?

    A $10d + 25q = 580$
        $10d + 25q = 31(d + q)$
    C $10d + 25q = 580$
        $d + q = 31$

    B $35(d + q) = 580$
        $d + q = 35$
    D $10q + 25d = 580$
        $d + q = 35$

60 _____

61 How many quarters are in the meter?

    A 11
    C 16

    B 13
    D 18

61 _____

62 Which set of equivalent equations can be used to eliminate the x terms when solving Equation 1 and Equation 2 by the elimination method?

Equation 1: $3x - 2y = 4$
Equation 2: $-7x + y = -1$

    A $3x - 2y = 4$
        $-14x + 2y = -2$
    C $21x - 14y = 28$
        $-21x + 3y = -3$

    B $2x - y = 3$
        $-7x + y = -1$
    D $4x - 2y = 4$
        $-14x + 2y = -4$

62 _____

63 Which are the intercepts and vertex of this graph?

    A x-intercept 9; y-intercepts -3 and 3; vertex $(0, -9)$
    B x-intercepts -3 and 3; y-intercept 3; vertex $(0, 9)$
    C x-intercepts -3 and 3; y-intercept -9; vertex $(0, -9)$
    D x-intercepts -9 and 9; y-intercept 3; vertex $(9, 0)$

63 _____

Go on

Sample Test 2 (continued)
Test Practice

Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

64 The solution set of a quadratic equation is $\{\varnothing\}$. How many x-intercepts does the graph of the equation have?

64 _____

   A -1

   B 0

   C 1

   D 2

65 A pigeon builds a nest on the sill of a second-story office building window in Rocky Mount. During a storm, an egg falls out of the nest. The height of the egg in feet above the sidewalk x seconds after the fall can be modeled by the function $y = -16x^2 + 20$. How can you use the graph of the function to find the height of the nest above the sidewalk?
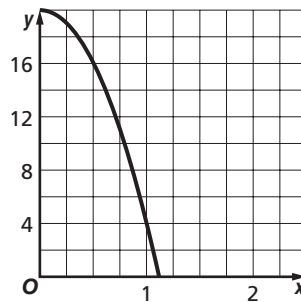
65 _____

   A Find the value of the y-intercept of the graph.

   B Find the value of the x-intercept.

   C Find the value of x when $y = 0$.

   D Find the slope of the graph at the y-intercept.

66 Tamika serves each breakfast customer 3 strips of bacon with their eggs, grits, and toast. She is expecting a large number of breakfast customers one morning so Tamika makes a graph to show the total strips of bacon she will need depending on the number of breakfast orders. Which is a true statement about her graph?

66 _____

   A The y-intercept is 3.

   B The x-intercept is 3.

   C The graph passes through $(3, 3)$.
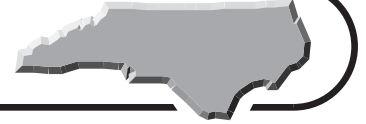
   D The graph has a slope of 3.

67 Which situation can be represented by a linear function?

67 _____

   A the number of customers in a bank over an afternoon

   B the number of eggs in x crates containing 24 eggs per crate

   C the weight of an infant over 6 months

   D the value of a savings account that earns interest compounded annually

Go on

Sample Test 2 (continued)
Test Practice

Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

68 The table shows the cost of airline tickets from Raleigh to Dallas, Texas, that Kate is buying for her family. Which is a graph of the data?

Number of Tickets	Total Cost ($)
1	250
2	500
3	750

68 _____

A

B

C

D
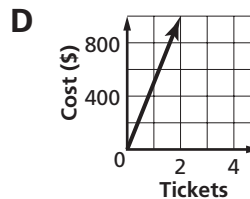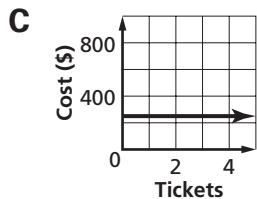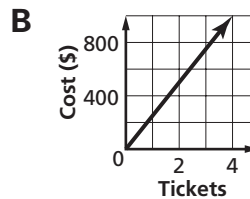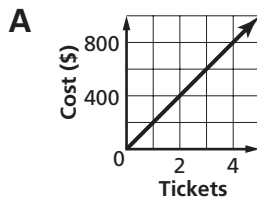
69 Which of the following shows the expression $x^2 - x - 30$ correctly factored?

A $(x + 5)(x + 6)$
B $(x - 5)(x - 6)$
C $(x - 5)(x + 6)$
D $(x + 5)(x - 6)$

69 _____

70 Which equation best fits the data in the table?

x	−2	−1	0	1	2	3
y	−6	−4	−2	0	2	4

A $y = x - 4$ **B** $y = 3x$
C $y = 2(x - 1)$ **D** $y = -3x + 1$

70 _____

71 Which situation must be represented by a nonlinear function?

A the distance traveled by an accelerating car
B the total cost of rabies shots for p puppies
C the number of bran muffins in m boxes of a dozen muffins
D the length of a desk as a function of time

71 _____

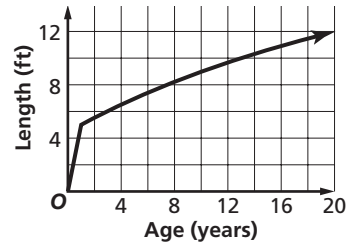*Go on*

Sample Test 2 (continued)
Test Practice

Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

The population of a town t years after a vacation resort is built can be modeled with the equation p(t) = 45,500(1.2)^t. Use this information to answer Questions 72 through 75.

72 What does $p(0)$ represent?

   A the number of infants under 1 year old in the town

   B the year the resort was built

   C the number of tourists in the resort

   D the population when the resort was built

72 _____

73 What was the initial population of the town when the resort was built?

   A 45,500   **B** 41,200

   C 37,916   **D** 11,200

73 _____

74 After how many years will the population be over 60,000?

   A 1 yr   **B** 2 yr

   C 3 yr   **D** 4 yr

74 _____

75 Which is the graph of this function?

75 _____
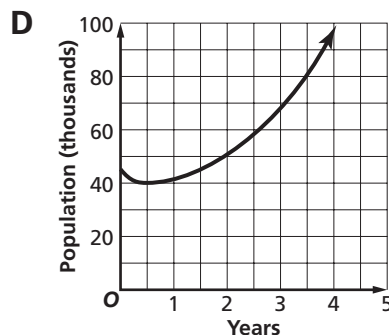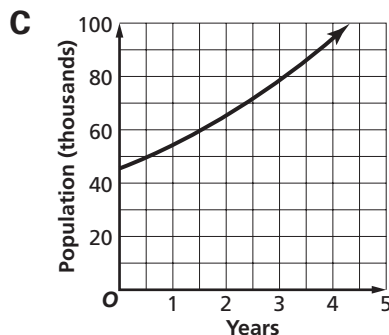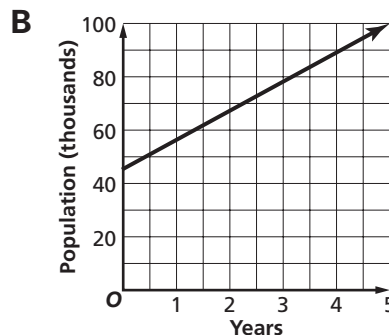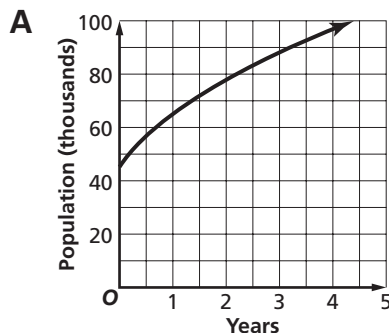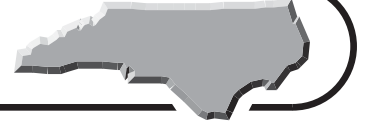
A

B

C

D

Go on

Sample Test 2 (continued)
Test Practice

Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.
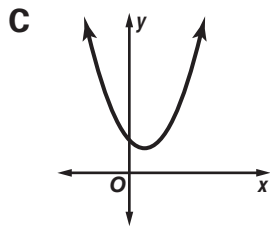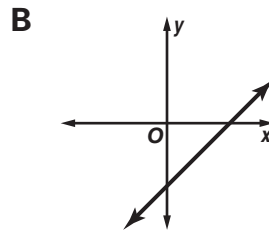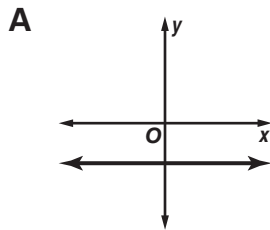
76 The graph models the length of Louise the python. Based on the graph, how long will Louise be when she is 20 years old?

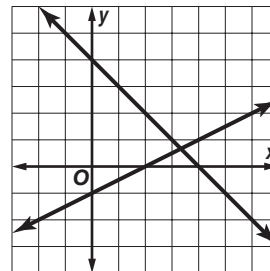   **A** 12 ft
   B 13 ft
   C 14 ft
   D 15 ft

76 _____

77 Which set of data is nonlinear?

   A

   B

   C

   D
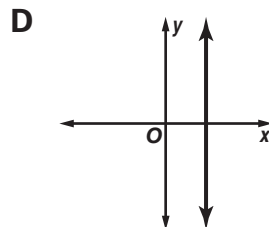
77 _____

78 The solution set of which system of equations is graphed?

   A $y < \frac{1}{2}x - 1$
      $y = -x + 4$

   B $y = \frac{1}{2}x - 1$
      $y = -x + 4$

   C $y > \frac{1}{2}x - 1$
      $y < -x + 4$

   D $y = \frac{1}{2}x - 1$
      $y < -x + 4$

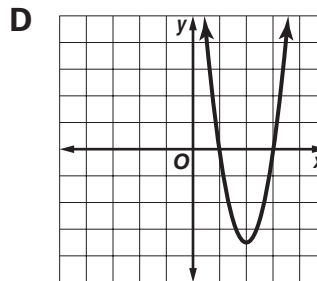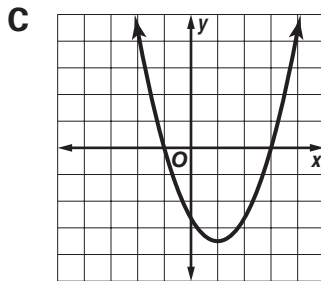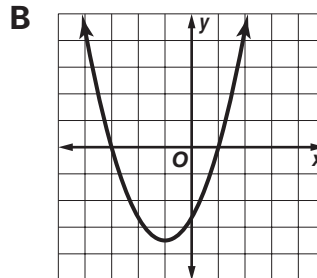
78 _____

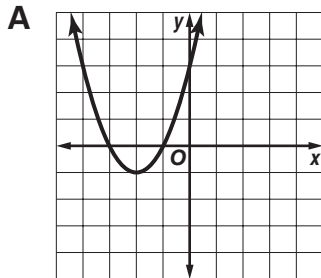*Go on*

Sample Test 2 (continued)
Test Practice

Read each question and choose the best answer. Then write the letter for the answer you have chosen in the blank at the right of each question.

79 Which graph shows that solutions of $0 = x^2 + 4x + 3$ are $\{-3, -1\}$?   **79** _____

A

B

C

D

80 The graphs of four quadratic equations are shown. Which equation has two real roots?   **80** _____

A

B

C

D

STOP