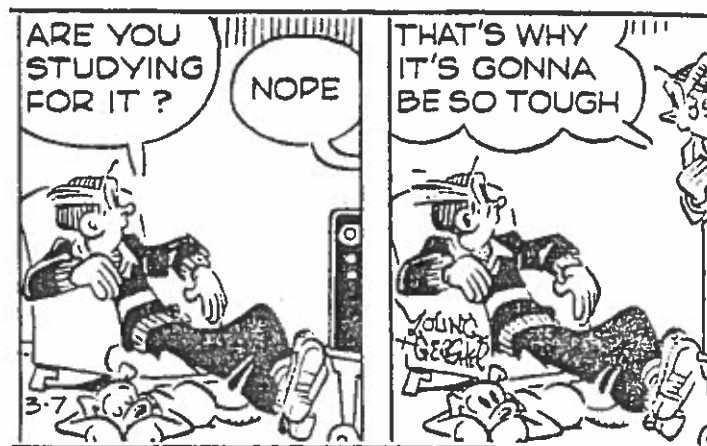


# GMAS Review



Let's make sure we study so that the GMAS won't be so tough!





Below are the formulas you may find useful as you work the problems. However, some of the formulas may not be used. You may refer to this page as you take the test.

### Linear Formulas

#### Slope Formula

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

#### Linear Equations

Slope-intercept Form:  $y = mx + b$

Point-slope Form:  $y - y_1 = m(x - x_1)$

Standard Form:  $Ax + By = C$

#### Arithmetic Sequence Formulas

Recursive:  $a_n = a_{n-1} + d$

Explicit:  $a_n = a_1 + (n - 1)d$

### Exponential Formulas

#### Exponential Equation

$$y = ab^x$$

#### Geometric Sequence Formulas

Recursive:  $a_n = r(a_{n-1})$

Explicit:  $a_n = a_1 \cdot r^{n-1}$

#### Compound Interest Formula

$$A = P\left(1 + \frac{r}{n}\right)^{nt}$$

### Quadratic Formulas

#### Quadratic Equations

Standard Form:  $y = ax^2 + bx + c$

Vertex Form:  $y = a(x - h)^2 + k$

#### Quadratic Formula

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

### Average Rate of Change

The change in the  $y$ -value divided by the change in the  $x$ -value for two distinct points on a graph.

### Statistics Formulas

#### Mean

$$\bar{x} = \frac{x_1 + x_2 + x_3 + \dots + x_n}{n}$$

#### Interquartile Range

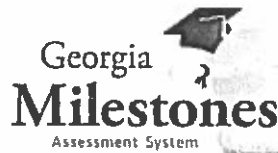
$$IR = Q_3 - Q_1$$

The difference between the first quartile and third quartile of a set of data.

#### Mean Absolute Deviation

$$\frac{\sum_{i=1}^n |x_i - \bar{x}|}{n}$$

The sum of the distances between each data value and the mean, divided by the number of data values.



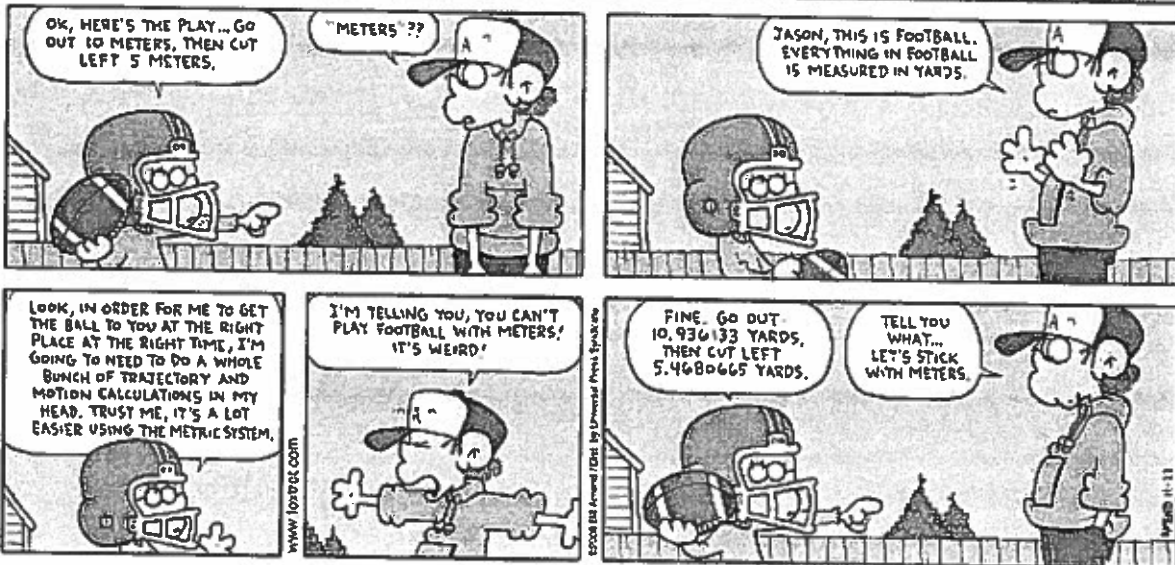
**Georgia Milestones Assessment System**  
**Algebra I: Georgia Standards of Excellence**  
**DOMAIN STRUCTURES AND CONTENT WEIGHTS**

**Item Types:**  
**Selected Response**  
**Constructed Response**  
**Extended Constructed Response**

**Total Number of Items = 53**  
**Total Number of Points = 58**

Reporting Category	Standards Assessed	Approximate % of Test
<b>Equations</b>	N-Q (01, 01a, 01b, 01c, 02, 03)	30%
	A-CED (01, 02, 03, 04)	
	A-REI (01, 03, 04, 04a, 04b, 05, 06, 10, 11, 12)	
<b>Expressions</b>	N-RN (02, 03)	20%
	A-SSE (01, 01a, 01b, 02, 03, 03a, 03b)	
	A-APR (01)	
<b>Functions</b>	F-IF (01, 02, 03, 04, 05, 06, 07, 07a, 07e, 08, 08a, 09)	35%
	F-BF (01, 01a, 02, 03)	
	F-LE (01, 01a, 01b, 01c, 02, 03, 05)	
<b>Algebra Connections to Statistics and Probability</b>	S-ID (01, 02, 03, 05, 06, 06a, 06c, 07, 08, 09)	15%

# Unit 1: Conversions and Simplifying Radicals





# Unit 1 REVIEW

Convert the following units.

- 35 feet into yards.
- 3 miles into inches.
- 12 days into seconds.
- 4 miles per hour into feet per minute.

Metric System.

5. What are the three units used in the metric system? \_\_\_\_\_

6. Fill in the blanks with the appropriate abbreviations.

\_\_\_\_\_ units \_\_\_\_\_

7. 12 mL = \_\_\_\_\_ kL      8. 1.3g = \_\_\_\_\_ cg      9. 160m = \_\_\_\_\_ km

Find the perimeter and area of each rectangle. Be sure to convert to the appropriate units first!!!

$$P = 2l + 2w$$

$$A = lw$$

10.



Area: \_\_\_\_\_ yd<sup>2</sup>

Perimeter: \_\_\_\_\_ yd

11. A square has side lengths 5,000 mm. Find the perimeter and area in *meters*.

Area: \_\_\_\_\_ m<sup>2</sup>

Perimeter: \_\_\_\_\_ m

12. John rode 2 kilometers on his bike. His sister Sally rode 3000 meters on her bike. Who rode the farthest and how much farther did they ride in km?

## Conversions

1 hour = 3600 seconds

1 meter = 3.28 feet

1 kg = 2.2 lbs

1 m/s = 2.2 miles/hour

1 mile = 5280 feet

1 km = 0.62 miles

1 lb = 0.45 kg

1 foot = 12 inches

1 yard = 3 feet

1 light second = 300,000,000 meters

1 quart = 0.946 liters

1 inch = 2.54 cm = 25.4 mm

2

Simplify the following radical expressions. State if the answer is Rational or Irrational.

13.  $-\sqrt{121}$

14.  $\sqrt{\frac{36}{81}}$

15.  $\sqrt{\frac{3}{81}}$

16.  $5\sqrt{4} + 3\sqrt{36}$

17.  $\sqrt{\frac{1}{4}}(2\sqrt{16} - \sqrt{9})$

18.  $\sqrt{75}$

19.  $-\sqrt{180}$

20.  $\sqrt{125}$

21.  $5\sqrt{32}$

22.  $-\sqrt{2} \cdot \sqrt{50}$

23.  $2\sqrt{3} \cdot \sqrt{3}$

24.  $\sqrt{\frac{4}{3}} \cdot \sqrt{\frac{4}{27}}$

25.  $3\sqrt{12}$

26.  $\sqrt{54}$

27.  $-9\sqrt{72}$

28. Is an irrational number multiplied by an irrational number always, sometimes, or never rational? Explain your answer and provide examples.

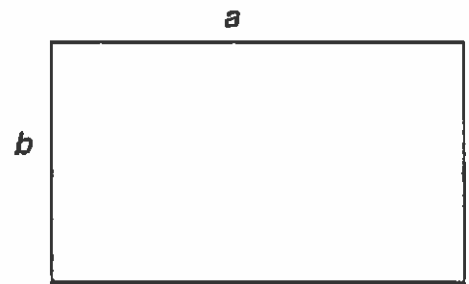


20. The rectangle to the right has sides lengths  $a$  and  $b$ .

$$A = l \cdot w \qquad P = l + l + w + w$$

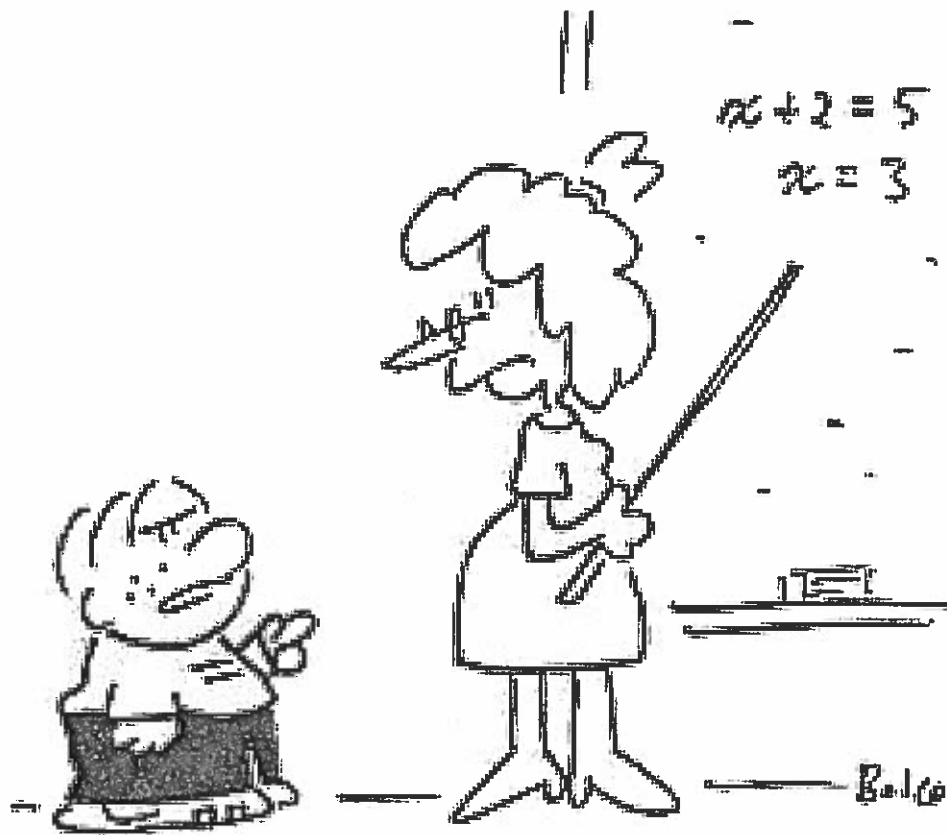
$$\text{OR } P = 2l + 2w$$

Is it possible for the perimeter and area to both rational numbers? If you think it is possible, give values for  $a$  and  $b$ . If you think it is NOT possible, explain why no values for  $a$  and  $b$  will work.

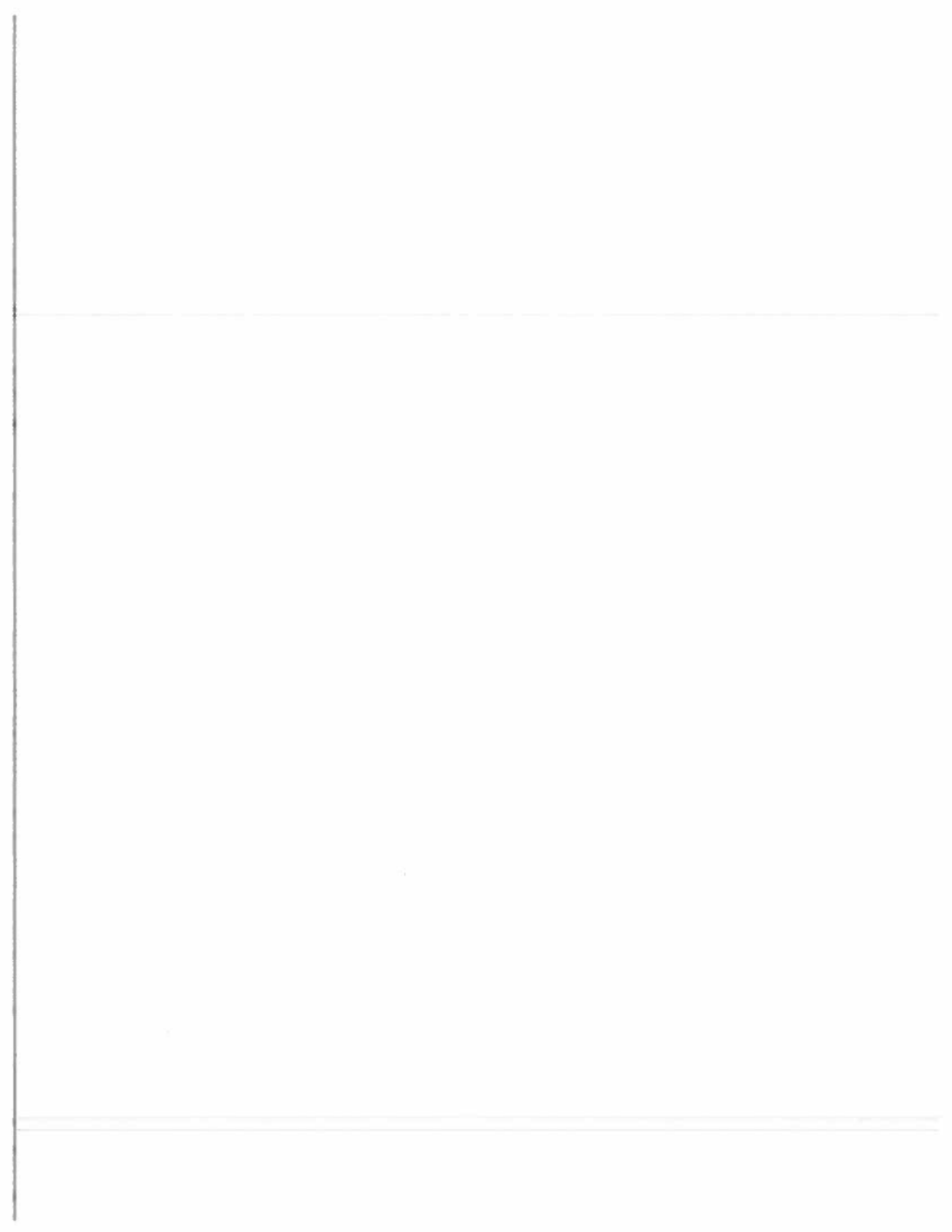


4

# Unit 2: Solving Equations and Solving Inequalities



"Just a darn minute! — Yesterday  
you said that X equals two!"



## Unit 2

Solve each equation.

1)  $-18 = -9(-10 + x)$

2)  $-1 = \frac{x + 10}{10}$

3)  $-112 = 8 - 6(2r + 8)$

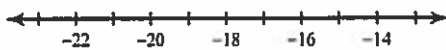
4)  $-2x - 30 = -6(4x - 6)$

5)  $6a + 23 = 6(a + 2)$

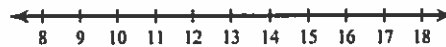
6)  $4(4 - 8n) - 2 = 6(5 - 4n)$

Solve each inequality and graph its solution.

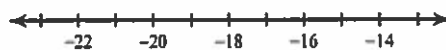
7)  $-266 > 14n$



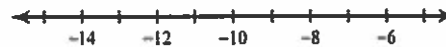
8)  $3 + 4x > 51$



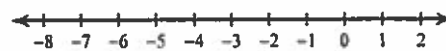
9)  $\frac{r}{3} - 1 \leq -6$



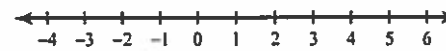
10)  $-2(-7n - 7) > -84$



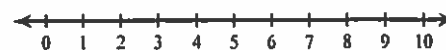
11)  $-364 > -7(4 - 8a)$



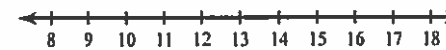
12)  $8 + 4n < 6(8n - 6)$



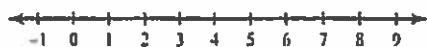
13)  $-38 - 8x < 6(4 - 6x) - 6$



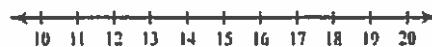
14)  $7x - 4(x - 8) > 4(x + 5)$



6) 15)  $-3(x+4) \leq -5(2x-6)$



16)  $-3 + 8b > 3(b-1) + 5b$



17)  $-3(1+2p) - 6 \geq -9 - 6p$



18) solve for x.

$$ax + b > c$$

19) solve for x.

$$ax - b = -cx + d$$

20) solve for a.

$$F = ma$$

21) solve for x.

$$5(ax + b) = -3$$

solve for x.

$$22) \frac{ax - bx + cx + dx}{2} = -3$$

23) solve for y.

$$4x - 3y = 9$$

24) Chad sold half of his stamp collection and then bought 16 more. He now has 36. With how many did he begin?

what equation form is this?

25) Anthony is 4 less than 2 times my age.

17. Simplify  $-5\sqrt{45}$

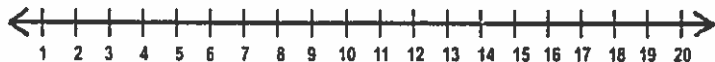
- a.  $-15\sqrt{5}$
- b.  $-3\sqrt{5}$
- c.  $-25\sqrt{9}$
- d.  $-\sqrt{5}$

18. Becky determined her mother's age is 3 less than three times her age. If  $x$  represents Becky's age, which expression represents her mother's age?

- a.  $4x-3$
- b.  $3x-3$
- c.  $3-3x$
- d.  $3(x-3)$

19. Solve the inequality for  $x$  and graph the solution on the provided number line.

a.  $-x - (3 - 2x) > 4x - 2(x - 7) - 2x$



20. Solve the inequality.  $-5x + 4 > -1 - 5(x + 2)$

a. What did you notice when solving?

b. What does this mean?

**GSE Algebra I**  
**Pre/Post Assessment**  
**Unit 1: Relationships Between Quantities and Expression**

**Directions:**

Today you will be taking the GSE Algebra I, Unit 1 assessment on Relationships Between Quantities and Expression.

You will have 60 minutes to complete the assessment.

Do your best work. Read each question carefully. For each selected-response item, indicate the best answer. For each constructed-response item, provide the most detailed and accurate response possible. Be sure to record your responses, legibly, on the answer document provided. The standard for each assessment item is referenced above the item.

You may use scratch paper to complete your work. The use of a scientific or graphing calculator may be necessary to solve some assessment items.

**N.RN.2**

1. Given that  $(\sqrt[3]{5})^3 = 5$ , what must be the value of  $\sqrt[3]{5}$  ?
  - a. 5
  - b.  $\frac{5}{3}$
  - c.  $5^{\frac{1}{3}}$
  - d.  $3\sqrt{5}$

**N.Q.1**

2. The time it takes to fill a tank depends upon the rate at which the water is flowing. It takes 40 minutes to fill the tank at the rate of 3 gallons per minute. How many minutes will it take to fill the tank at the rate of 4 gallons per minute?
  - a.  $\frac{12}{40}$
  - b. 30
  - c. 50
  - d.  $53^{\frac{1}{3}}$

**A.SSE.1**

3. Clarissa rents a booth to sell her necklaces at a craft fair. She uses the function  $y = cx - k$  to determine the profit she will make if she sells different numbers of necklaces at the craft fair. The expression part  $cx - k$  of the function has  $c$  and  $k$  representing constants. Additionally,  $c$  is the constant coefficient of  $x$ . What did Clarissa most likely use  $k$  to represent?
  - a. The cost per necklace
  - b. The revenue per necklace
  - c. The cost of participating in the craft fair
  - d. The revenue from participating in the craft fair



9

## A.SSE.1a

4. The total daily expenses to operate Sheila's pie bakery are the cost of salaries and ingredients. Sheila has four employees, and she pays each worker a daily rate. On average, it costs the same amount of money to make each pie. The expression,  $4(75) + \$0.50x$ , shows the total daily expenses for Sheila's bakery to make  $x$  pies. What does the term  $4(75)$  represent?
- Customers pay \$4.50 per pie.
  - Sheila must sell 600 pies per day.
  - The total daily expenses are \$300.
  - Each of the 4 employees earns \$75 per day.

## A.SSE.1a

5. Which statement is not true of the polynomial expression below?

$$x^2 - 7x - 10$$

- $x^2$  is the leading term
- $7x$  is the linear term
- 10 is the constant term
- 7 and 10 are coefficients

## A.APR.1

6. Which of the following is equivalent to  $ns^3 + n^2s$ ?

- $ns(s^2 + 1)$
- $ns(s^2 + n)$
- $ns(s^2 + s)$
- $ns^2(s + n)$

## A.APR.1

7. What is  $P(x) - Q(x)$ ? Use the equations below to answer this question.

$$P(x) = x^2 - x - 6$$

$$Q(x) = x - 3$$

- $x^2 - 3$
- $x^2 - 9$
- $x^2 - 2x - 3$
- $x^2 - 2x - 9$

## A.APR.1

8. A box is in the shape of a rectangular prism.

- Two faces each have an area of  $2x^2 + 6x$  square units.
- Two faces each have an area of  $2x^2 + 8x$  square units
- Two faces each have an area of  $x^2 + 7x + 12$  square units.

What is the surface area, in square units, of the box?

- $10x^2 + 21x + 12$
- $10x^2 + 42x + 24$
- $10x^4 + 21x^2 + 24$
- $10x^6 + 42x^3 + 24$

## N.RN.3

9. In the expression shown below,  $m$  and  $n$  are positive integers.

$$\frac{m}{n} \cdot \frac{p}{q}$$

What values of the variables  $p$  and  $q$  would produce a product that is always irrational?

- Both variables are irrational.
- Both variables are negative integers.
- One of the variables is zero, and the other variable is irrational.
- One of the variables is a positive integer, and the other variable is irrational.

## N.Q.2

10. Becky determined her mother's age is 3 less than three times her age. If  $x$  represents Becky's age, which expression represents her mother's age?

- $4x - 3$
- $3x - 3$
- $3 - 3x$
- $3(x - 3)$

## N.Q.2

11. Ronald wants to buy a shirt that is on sale for 15% off the regular price. The regular price of the shirt is  $p$  dollars. Which expression represents the sale price of the shirt?

- $0.15p$
- $p - 15p$
- $p - 0.15p$
- $p + 0.15p$

## N.Q.3

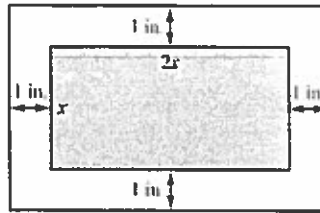
12. Elizabeth is baking chocolate chip cookies. A single batch uses  $\frac{3}{4}$  teaspoon of vanilla. If Elizabeth is mixing the ingredients for five batches at the same time, how many tablespoons of vanilla will she use?

$3 \text{ teaspoons} = 1 \text{ tablespoon}$
--

- $3\frac{3}{4}$
- $1\frac{3}{4}$
- $1\frac{1}{4}$
- $5\frac{3}{4}$

## A.APR.1

13. A picture (shown in gray) with a frame (shown in white) and its dimensions are shown in the diagram below. What is the area, in square inches, of the frame?



- a.  $4x + 4$
- b.  $6x + 2$
- c.  $6x + 4$
- d.  $8x + 4$

**A.SSE.1b**

14. The value,  $V$ , of an automobile  $n$  years after purchase can be modeled with this formula.

$$V = I(1 - d)^n$$

In the formula,  $I$  is the purchase price, in dollars, of the automobile and the expression  $(1 - d)^n$  is known as the *decay factor*.

A car purchased for \$21,000 has a decay factor of 0.7. What is the present value of the car?

- a. \$6,300
- b. \$14,700
- c. \$30,000
- d. \$35,700

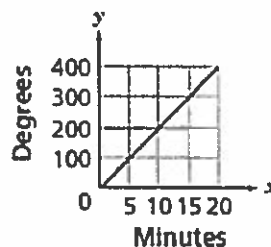
**A.SSE.1b**

15. If the value of  $z$  decreases by 2, how does the value of the expression  $y(16 + z)$  change?

- a. Decreases by  $2y$
- b. Decreases by  $32y$
- c. Increases by  $14y$
- d. Increases by  $18y$

**N.Q.1**

16. John drew the graph below to represent a situation.

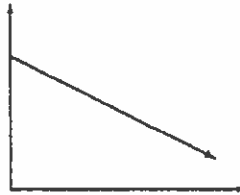


Which situation could describe the graph John graphed?

- a. The temperature of a frozen pizza cooking in an oven increases 5 degrees every minute.
- b. The temperature of a frozen pizza cooking in an oven increases 10 degrees every minute.
- c. The temperature of a frozen pizza cooking in an oven increases 15 degrees every minute.
- d. The temperature of a frozen pizza cooking in an oven increases 20 degrees every minute.

## N.Q.1

17. Which situation is best represented by the graph below?



- The height of a child from age ten to fifteen
- The volume of a balloon as it is being filled with air
- The amount of gasoline in a car's tank during a five-hour trip
- The volume of water in a swimming pool as it is being filled

## N.Q.1

18. **Constructed Response:** A train transports one tone of freight 2,400 miles on 4.8 gallons of diesel fuel from one location to another location. Harrison makes a graph to represent the miles per gallon the train uses.

- What should the origin of Harrison's graph represent for this situation?
- What rate of change should be shown in Harrison's graph? Show your work.

## A.SSE.1a

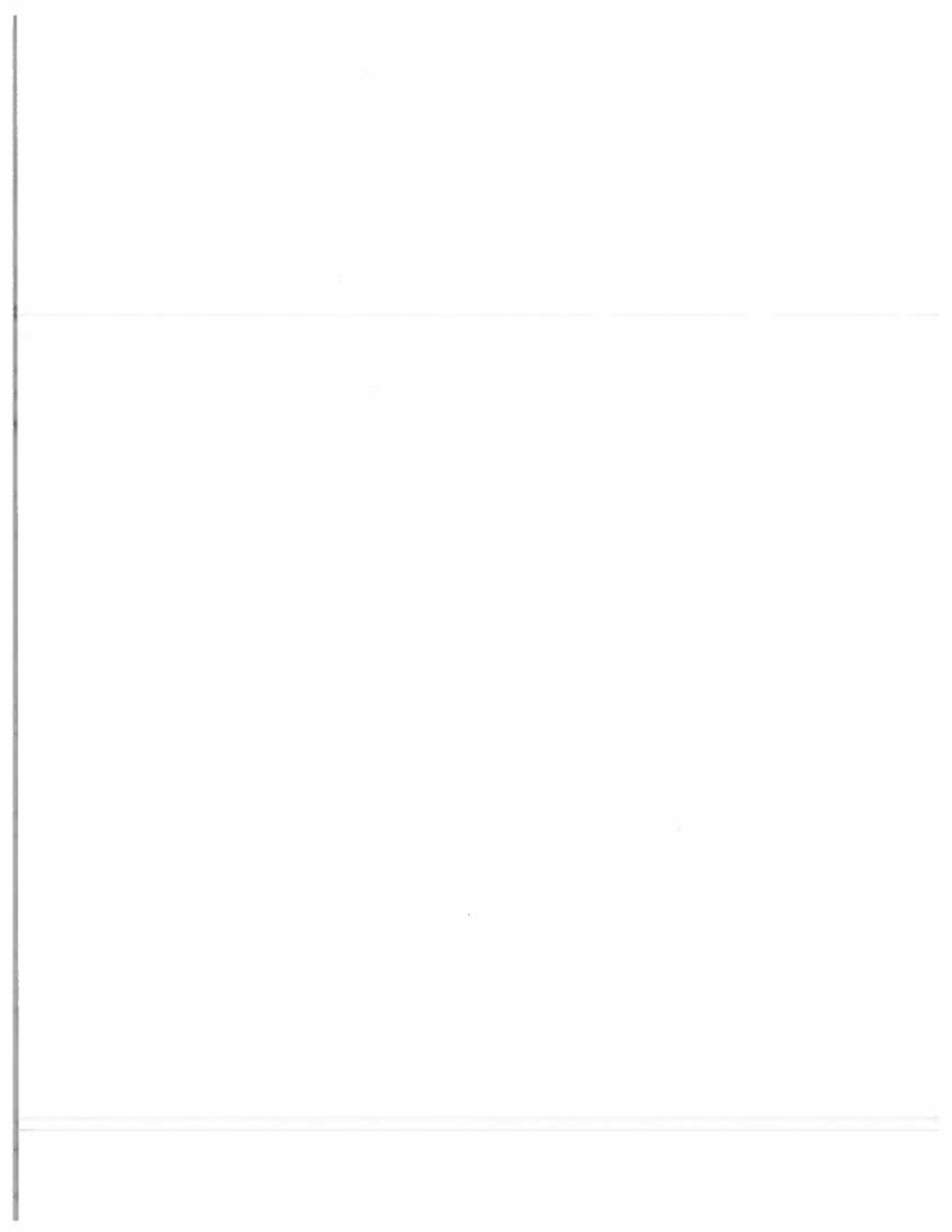
19. **Constructed-Response:** A company sells 125 skateboards per month at a price of \$35 each. In order to increase the sales of the skateboards, Jake calculates the monthly revenue,  $y$ , based on each dollar decrease,  $x$ , in the price of the skateboard. Jakes writes the function  $y = (35 - x)(125 + 5x)$  to represent the monthly revenue. Explain what each factor in the right-hand side of the equation represents.

## N.Q.3

20. **Constructed-Response:** The function  $V = 500(1.12)^t$  represents the value of Gale's investment,  $V$  dollars, at the end of  $t$  years. What are the values of the function  $V = 500(1.12)^t$  when  $t = 0, 1, 2, 5$ ? Show your work. Round your answer to the nearest cent.

# Unit 3: Systems of Equations and Inequalities



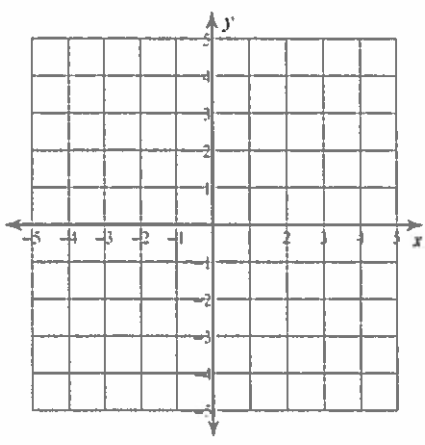


Unit 3 Review

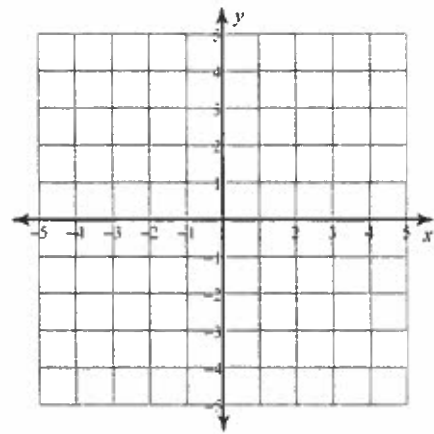
Solve each system by graphing.

1)  $y = \frac{7}{3}x - 4$

$y = -\frac{1}{3}x + 4$



2)  $2x + y = -2$   
 $x + 3y = 9$



Solve each system by substitution.

3)  $7x - y = 14$   
 $y = 7$

4)  $-5x - 3y = -21$   
 $x + 6y = 15$

Solve each system by elimination.

5)  $-9x + 10y = -20$   
 $9x - 7y = 14$

6)  $2x - 3y = -20$   
 $-5x + y = 11$

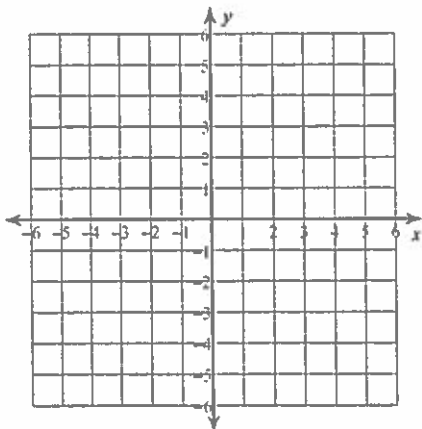
14

- 7) Rob and Abhasra are selling pies for a school fundraiser. Customers can buy apple pies and blackberry pies. Rob sold 10 apple pies and 9 blackberry pies for a total of \$250. Abhasra sold 5 apple pies and 3 blackberry pies for a total of \$95. Find the cost each of one apple pie and one blackberry pie.

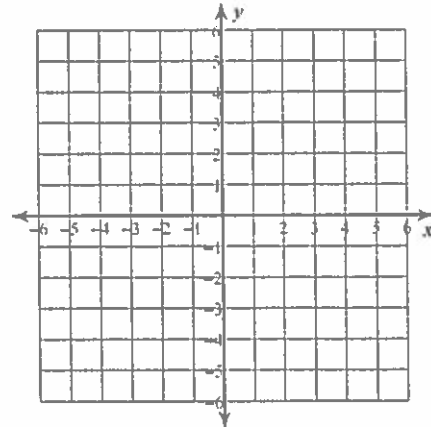
- 8) Jose's school is selling tickets to a fall musical. On the first day of ticket sales the school sold 8 senior citizen tickets and 9 child tickets for a total of \$96. The school took in \$36 on the second day by selling 4 senior citizen tickets and 3 child tickets. What is the price each of one senior citizen ticket and one child ticket?

Sketch the graph of each linear inequality.

9)  $y > \frac{3}{2}x - 4$



10)  $x - 3y < -3$

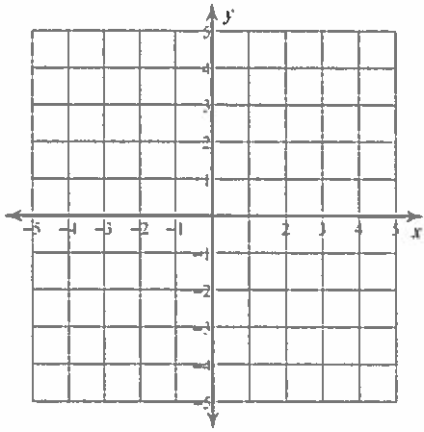




Sketch the solution to each system of inequalities.

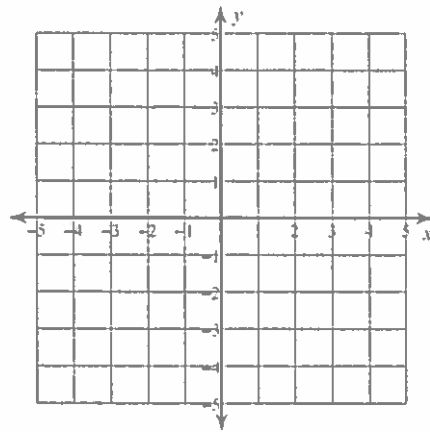
$$11) y \geq -\frac{2}{3}x - 1$$

$$y \geq \frac{2}{3}x + 3$$



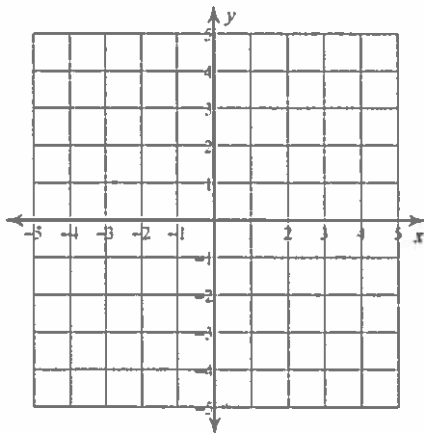
$$12) y < \frac{1}{2}x + 2$$

$$y \leq -\frac{3}{2}x - 2$$



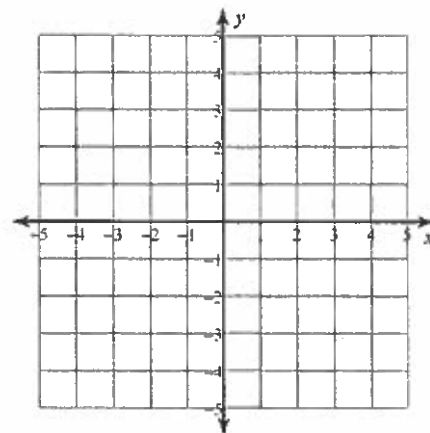
$$13) 2x + y < 1$$

$$x - y > 2$$



$$14) 5x + 2y < 6$$

$$5x + 2y \geq -2$$



**GSE Algebra I**  
**Common Unit Pre/Post Assessment**  
**Unit 2: Reasoning with Linear Equations and Inequalities**  
**Student Version**

**Directions:**

Today you will be taking the GSE Algebra I, Unit 2 assessment on Reasoning with Linear Equations and Inequalities.

You will have 60 minutes to complete the assessment.

Do your best work. Read each question carefully. For each selected-response item, indicate the best answer. For each constructed-response item, provide the most detailed and accurate response possible. Be sure to record your responses, legibly, on the answer document provided. The standard for each assessment item is referenced above the item.

You may use scratch paper to complete your work. The use of a scientific or graphing calculator may be necessary to solve some assessment items.

**A.CED.2**

1. What is the equation of the line that passes through the point (4,1) and has a y-intercept of  $-5$ ?

- a.  $y = \frac{3}{2}x$
- b.  $y = \frac{3}{2}x - 5$
- c.  $y = \frac{1}{9}x - 5$
- d.  $y = \frac{1}{9}x + \frac{5}{9}$

**A.REI.5**

2. Look at the system of equations.

$$\begin{aligned} ax + by &= c \\ dx + ey &= f \end{aligned}$$

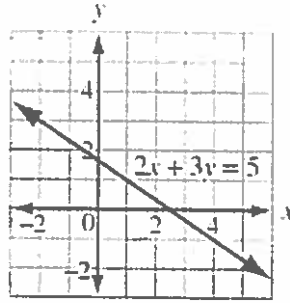
The system has a unique solution,  $(x, y)$ . Which system of equations has the same solution?

- a.  $ax + by = c$   
 $dx - ey = f$
- b.  $ax + by = c$   
 $(a + e)x + (b + d)y = c + f$
- c.  $ax + by = c$   
 $(a + d)x + (b - e)y = c + f$
- d.  $ax + by = c$   
 $(a + 2d)x + (b + 2e)y = c + 2f$

**A.REI.10**

3. The coordinate plane, seen below, shows the graph of an equation.

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Which statement about the solutions of the equation must be true?

- There is no solution for which both the  $x$ -value and the  $y$ -value are integers.
- There is only one solution for which both the  $x$ -value and the  $y$ -value are integers.
- If the  $x$ -value of a solution is positive, then the corresponding  $y$ -value is negative.
- If the  $x$ -value of a solution is negative, then the corresponding  $y$ -value is positive.

**A.REI.6**

4. What is the  $x$ -value of the solution to this system of equations?

$$\begin{aligned} 3x + 2y &= 6 \\ 2x + y &= 2 \end{aligned}$$

- $x = 2$
- $x = 4$
- $x = \frac{10}{7}$
- $x = -2$

**A.CED.1**

5. An artist paints designs on T-shirts. It takes 15 minutes to set up the equipment and 40 minutes to clean the equipment and put it away. Once everything is set up, it takes the artist about 12 minutes to paint the design on each T-shirt.

Which equation best models the number of shirts,  $s$ , the artist can make in 127 minutes?

- $12s - 55 = 127$
- $55 - 12s = 127$
- $12s + 25 = 127$
- $12s + 55 = 127$

**A.APR.1**

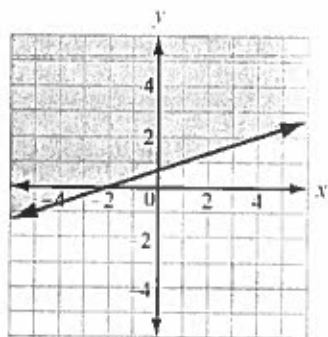
6. What is the solution to the system of equations below?

$$\begin{aligned} x - 3y &= 1 \\ x - 2y &= 6 \end{aligned}$$

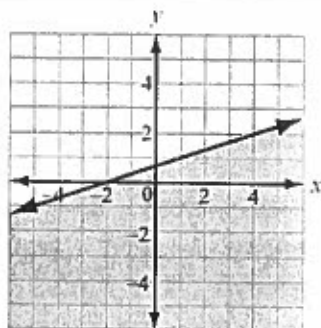
- (4,1)
- (16,5)
- (-2,-1)
- (-4,-5)

**A.REI.12**

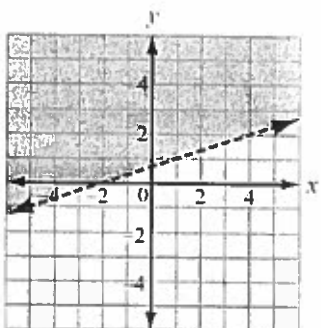
7. Which graph shows the solution set for the inequality  $x > 3y - 2$ ?



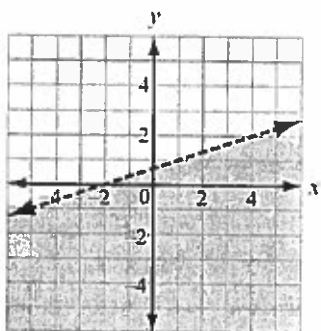
a.



b.



c.



d.

**F.IF.9**

8. Two linear functions are defined below.

Function 1:  $y = 2x + 3$

Function 2:

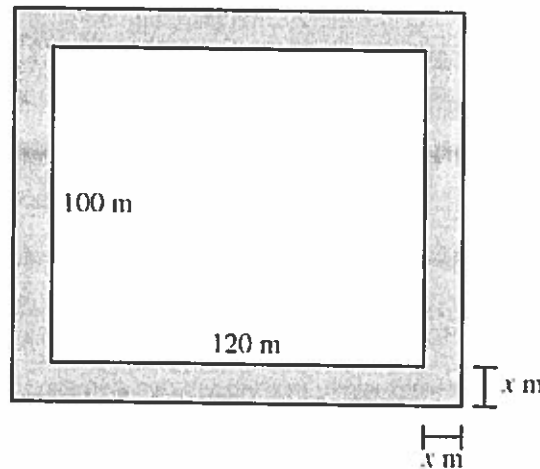
$x$	$f(x)$
1	-1
2	2
3	5
4	8

Which of these linear functions has a slope greater than the slope for Function 1 and less than the slope of Function 2?

- $f(x) = 3x + 2$
- $f(x) = 2.5x - 6$
- $f(x) = 2x + 2.5$
- $f(x) = 1.5x + 1$

**F.BF.1**

9. A rectangular field is 100 meters in width and 120 meters in length. The dimensions of the field will be expanded by  $x$  meters in each direction, as shown in the diagram below.



Which function describes the perimeter of the new field in terms of  $x$ ?

- $f(x) = 220 + 4x$
- $f(x) = 220 + 8x$
- $f(x) = 440 + 4x$
- $f(x) = 440 + 8x$

**A.CED.3**

10. Jose wants to spend no more than \$30 on apples and grapes for the month. Apples cost \$1.50 per pound and grapes cost \$2.00 per pound. Jose also wants his monthly caloric intake from apples and grapes to be greater than 2000 calories. He determines that 1 pound of apples has 200 calories and 1 pound of grapes has 300 calories. Let  $a$  represent the number of pounds of apples and  $g$  represent the number of pounds of grapes.

Which system of inequalities can be used to determine the number of pounds of apples and grapes that Jose can buy for a month?

- a.  $\begin{cases} 1.5a + 2g \geq 30 \\ 200a + 300g > 2000 \end{cases}$
- b.  $\begin{cases} 1.5a + 2g \leq 30 \\ 200a + 300g > 2000 \end{cases}$
- c.  $\begin{cases} 2a + 1.5g \leq 30 \\ 300a + 200g > 2000 \end{cases}$
- d.  $\begin{cases} 2a + 1.5g \geq 30 \\ 200a + 300g < 2000 \end{cases}$

### F.IF.3

11. The first term in an arithmetic sequence is 5. The fourth term in the sequence is  $-4$ . The tenth term is  $-22$ . Which function can be used to find the  $n$ th term of the arithmetic sequence?
- a.  $f(n) = -n$
- b.  $f(n) = n + 4$
- c.  $f(n) = -3n + 8$
- d.  $f(n) = \frac{1}{2}(n + 5) + 2$

### F.IF.2

12. Julian is planning a birthday party and wants to make sure that he has enough sandwiches for all of his guests. He wants to have 1 sandwich per invited guest and 5 extra sandwiches to put aside for lunch next week. He uses the function  $g(x) = x + 5$ . Which is the best interpretation of the function that Julian used?
- a. If  $x$  represents the total number of sandwiches,  $g(x)$  represents the number of guests who would be able to eat sandwiches.
- b. If  $x$  represents the total number of sandwiches,  $g(x)$  represents the number of sandwiches that would be left over at the end of the party.
- c. If  $x$  represents the number of invited guests,  $g(x)$  represents the number of sandwiches needed so that each guest gets 1 sandwich and there are 5 left over.
- d. If  $x$  represents the number of invited guests,  $g(x)$  represents the number of sandwiches needed so that each guest gets 5 sandwiches and there is 1 left over.

### A.APR.1

13. The table below represents ordered pairs of a relation.

$x$	$y$
$-2$	$2$
$-1$	$1$
$0$	$0$
$1$	$1$
$-2$	$5$

Which change could be made so that the relation becomes a function?

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- Replace  $(-1,1)$  with  $(1,4)$ .
- Replace  $(-2,5)$  with  $(3,8)$ .
- Replace  $(-1,1)$  with  $(-3,6)$ .
- Replace  $(-2,2)$  with  $(-2,3)$ .

**F.IF.4**

14. The function table below shows the air temperature in degrees Celsius over the course of 10 days.

Day	Temperature (°C)
1	23
2	25
3	27
4	26
5	24
6	28
7	30
8	32
9	29
10	28

- Increasing from day 1 to day 8; decreasing from day 8 to day 10
- Increasing from day 1 to day 3; decreasing from day 3 to day 10
- Increasing from day 1 to day 3; day 5 to day 8; decreasing from day 3 to day 5, day 8 to day 10
- Increasing from day 3 to day 5; day 8 to day 10; decreasing from day 1 to day 3, day 5 to day 8

**F.IF.6**

15. For Spring Break, Jenny and her friends are planning a road trip from Houston, Texas, to Los Angeles, California. With almost the entire trip on Interstate 10, the total distance will be 1,255 miles, one-way. If they average 55 miles per hour on the trip, to the nearest half hour, how long will it take Jenny and her friends to get there?

- 23 hours
- 25 hours
- 24.5 hours
- 11.5 hours

**A.REI.3**

16. Desmond wants to take guitar lessons. The one-time registration fee is \$60.00 and each lesson costs \$40.00. Which of the following inequalities can Desmond use to determine  $x$ , the number of lesson he can take if he wants to spend no more than  $c$  dollars?

- $60 + 40x \leq c$
- $60 + 40x \geq c$
- $60x + 40x \leq c$
- $60x + 40x \geq c$

**F.BF.1**

17. Which function represents the data in the table?

<b>x</b>	3	6	10	15
<b>y</b>	2.5	4	6	8.5

- $f(x) = 2x + 1$
- $f(x) = \frac{1}{2}x - 1$
- $f(x) = 2x - 1$
- $f(x) = \frac{1}{2}x + 1$

**A.CED.1**

18. Information about the costs of three catering companies is shown in the table below.

Catering Company Costs		
Acme Catering Company	Best Foods Company	Creative Catering Company
\$6 per person plus a flat \$100 time and equipment charge	\$8 per person plus a flat \$40 time and equipment charge	\$10 per person charge with no other fees

Garvin can spend no more than \$300 on catering. What is the greatest number of people he can invite using one of the three caterers?

- 30
- 32
- 33
- 37

**F.IF.7**

19. **Constructed-Response:** Two functions are given below.

$$g(x) = x - 4$$

$$h(x) = x - 2$$

**Part A.** Write a new function  $k$  in terms of  $x$  such that  $k(x) = g(x) + h(x)$ .

**Part B.** Sketch a graph of function  $k$  and state what type of function it is.

**Part C:** Does function  $k$  have any minimum or maximum values? Explain your answer.

**A.REI.11**

20. **Constructed-Response:** Brianna wants to buy some trees for her yard. A local garden store charges \$25.00 to plant each tree plus a delivery fee of \$50.00 for all trees purchased. A lawn service charges \$35 to plant each tree with free delivery.

**Part A.** Write the system of equations that could be graphed to represent this situation, where  $y$  is the total charge for delivery and planting  $x$  trees.

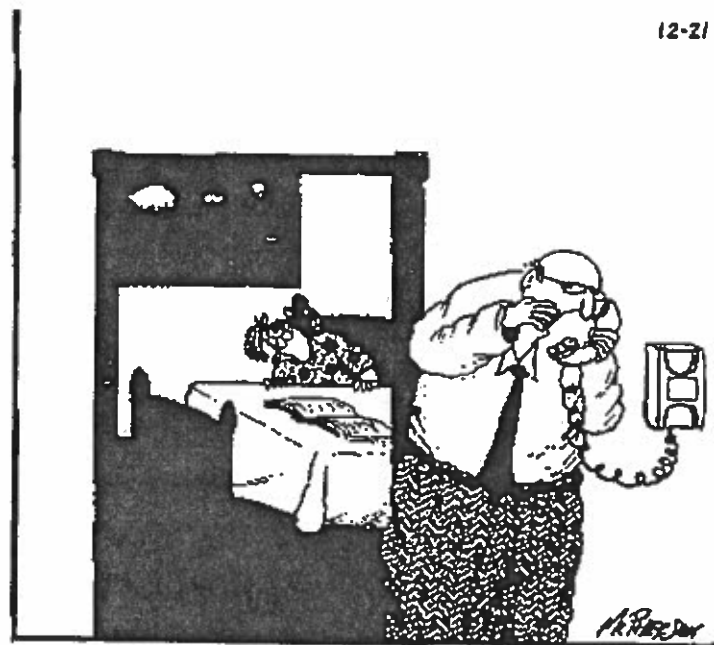
**Part B.** Explain how the graph could be used to determine the solution of the system of equations you wrote.

**Part C.** Determine the solution to the system of equation algebraically. Show your work and explain what the solution means in this context

**Part D.** Brianna wants to plant 8 or more trees in her yard. Which service provider would be the most economical? Explain your answer.

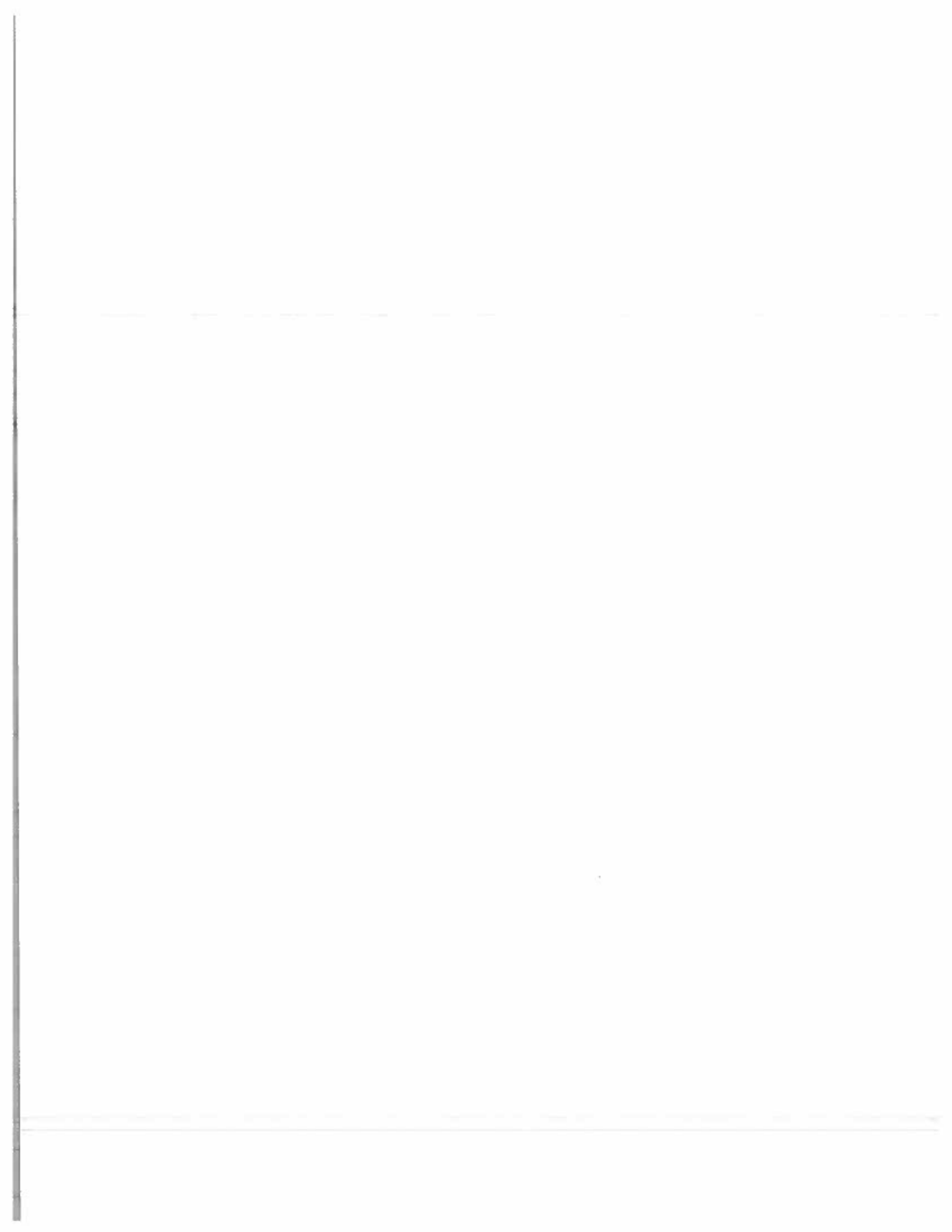


# Unit 4: Solving Quadratics



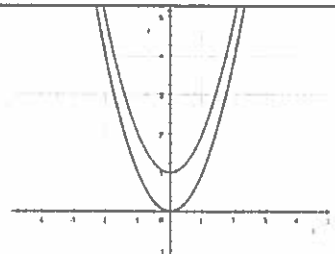
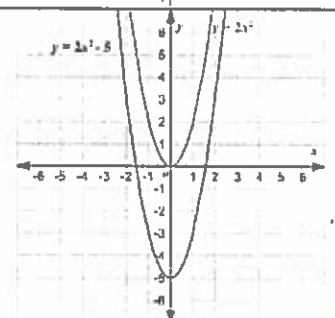
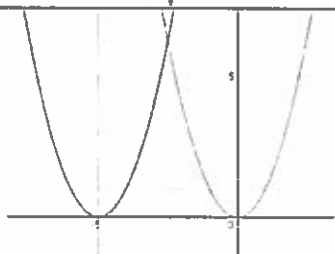
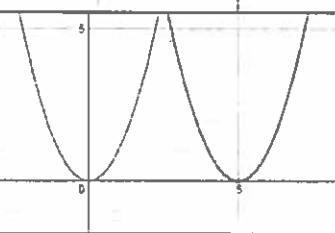
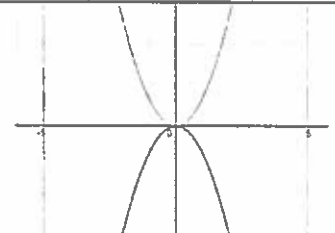
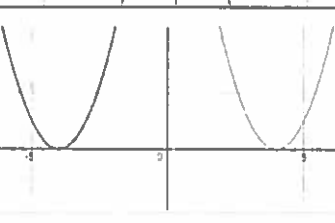
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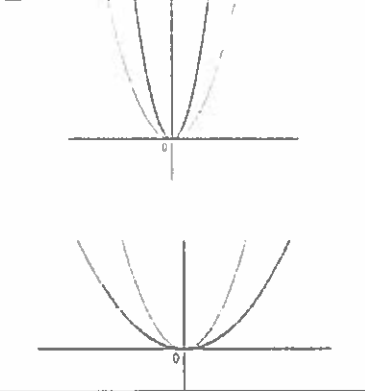
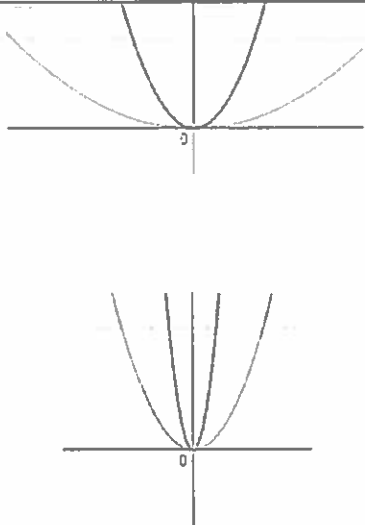
"Uh, yeah, Homework Help Line? I need to have you explain the quadratic equation in roughly the amount of time it takes to get a cup of coffee."



# TRANSFORMATION OF PARABOLAS

All these transformations apply to the graph of  $f(x) = x^2$

GRAPH	TRANSFORMATION DESCRIBED IN WORDS	WHAT IT LOOKS LIKE
$f(x) = x^2 + k$	Vertical translation up $k$ units	
$f(x) = x^2 - k$	Vertical translation down $k$ units	
$f(x) = (x + h)^2$	Horizontal translation left $h$ units	
$f(x) = (x - h)^2$	Horizontal translation right $h$ units	
$f(x) = -x^2$	Reflection across the x axis	
$f(x) = (-x)^2$	Reflection across the y axis	

$f(x) = ax^2$	<p>Vertical Stretch when <math>a &gt; 1</math></p> <p>Vertical Compression when <math>a &lt; 1</math></p>	
$f(x) = (ax)^2$	<p>Horizontal Stretch when <math>a &lt; 1</math></p> <p>Horizontal Compression when <math>a &gt; 1</math></p>	

Conclusions:

$F(x) = x^2$  is changed into  $f(x) = a(x-h)^2 + k$ .

What effect does  $a$  have on the graph?

What effect does  $h$  have on the graph?

What effect does  $k$  have on the graph?

Name \_\_\_\_\_ Date \_\_\_\_\_ Period \_\_\_\_\_

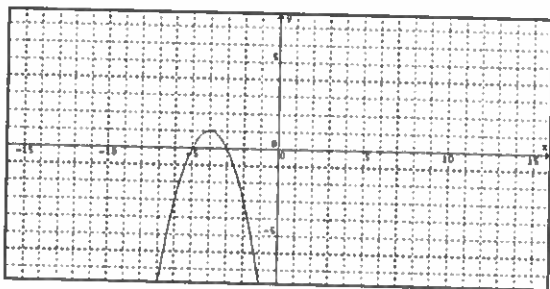
**WORKSHEET: Using Transformations to Graph Quadratic Functions**Describe the following transformations on the function  $y = x^2$ .

1. $y = -(x - 2)^2$	2. $y = (x + 3)^2 - 1$
3. $y = 3x^2 + 1$	4. $y = -2x^2$
5. $y = -x^2 - 5$	6. $y = 3(x + 1)^2$
7. $y = \frac{1}{3}(x + 2)^2 + 3$	8. $y = -\frac{1}{2}(x - 1)^2 + 3$
9. $y = (x + 3)^2$	10. $y = -(x - 1)^2 + 4$

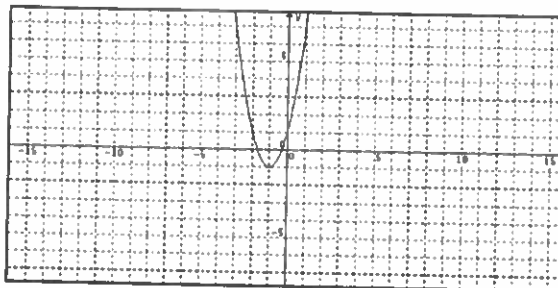
Write the equation for the function  $y = x^2$  with the following transformations.

11. reflect across the x-axis, shift down 1	12. vertically stretch by a factor of 3, shift right 5 and up 1
13. shift up 5	14. reflect across the x-axis, shift down 8
14. reflect across the x-axis and vertically compress by a factor of $\frac{1}{2}$	16. vertically stretch by a factor of 4, shift left 3 and down 2

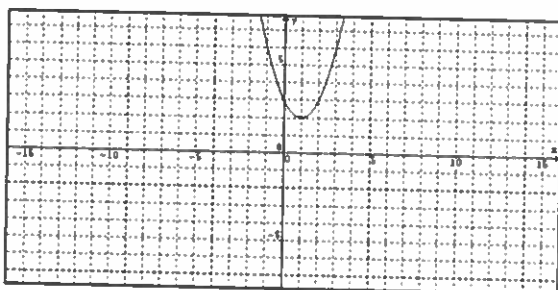
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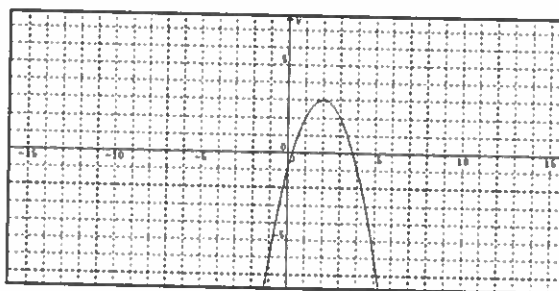
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21. If you wanted to shift  $y = -3(x - 2)^2 + 1$  down 4 and left 5, what would be the new equation?

22. If you wanted to shift  $y = x^2 + 3$  left 2 and up 5, what would be the new equation?

23. If you wanted to shift  $y = (x + 4)^2$  down 3 and right 2, what would be the new equation?

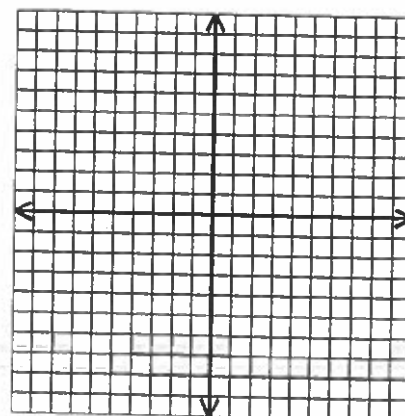
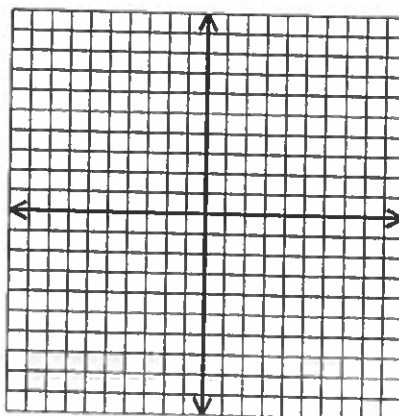
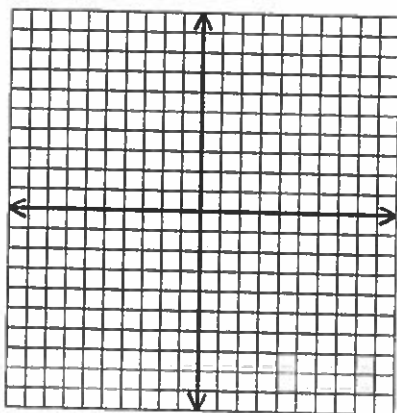
24. If you wanted to shift  $y = -x^2$  right 3 and up 5, what would be the new equation?

**Use transformations to graph each quadratic function.**

25.  $f(x) = 2(x - 2)^2$

26.  $g(x) = -(x + 4)^2 + 1$

27.  $f(x) = \frac{1}{2}x^2 + 3$



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Algebra I

Name \_\_\_\_\_

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## Unit 4 Final Test Review

Date \_\_\_\_\_ Period \_\_\_\_\_

**Simplify each expression.**

1)  $(3x^2 + 4x) + (8x + 8x^2 - 2x^4)$

2)  $(4 + 8x^3 + x^4) - (5x^4 - 1 - 5x^3)$

**Find each product.**

3)  $(x + 5)(2x + 8)$

4)  $(8p - 3)(4p^2 - 3p - 1)$

**Solve each equation by taking square roots.**

5)  $4r^2 + 10 = 42$

6)  $7x^2 - 10 = -114$

**Solve each equation with the quadratic formula.**

7)  $x^2 + 11x + 24 = 0$

**Solve each equation by completing the square.**

8)  $n^2 + 12n - 90 = 0$

**Factor each completely.**

9)  $m^2 - 5m - 36$

10)  $5x^2 + 23x - 42$

11)  $16p^2 - 9$

12)  $x^2 + 6x + 9$

Solve each equation by factoring.

13)  $x^2 + x - 6 = 0$

14)  $2n^2 - 9n - 35 = 0$

Sketch the graph of each function. State the vertex, the transformations, the axis of symmetry, and the zeros for each function.

15)  $y = -\frac{1}{2}(x + 2)^2 + 2$

16)  $y = -2x^2 + 16x - 36$

Vertex: \_\_\_\_\_

Vertex: \_\_\_\_\_

Transformations:

Transformations:

- 
- 
- 
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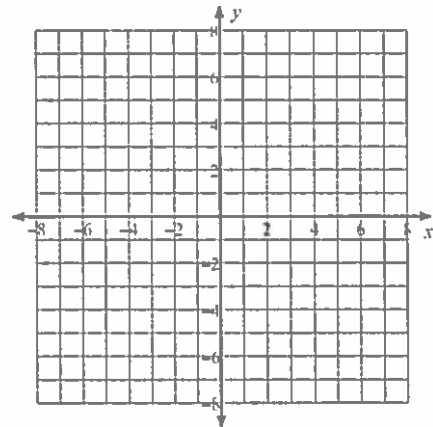
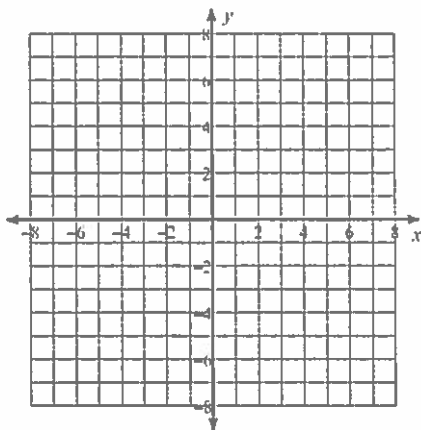
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Axis of Symmetry: \_\_\_\_\_

Axis of Symmetry: \_\_\_\_\_

Zeros: \_\_\_\_\_

Zeros: \_\_\_\_\_





**GSE Algebra I**  
**Common Unit Pre/Post Assessment**  
**Unit 3: Modeling and Analyzing Quadratic Functions**  
**Student Version**

**Directions:**

Today you will be taking the GSE Algebra I, Unit 3 assessment on Modeling and Analyzing Quadratic Functions.

You will have 60 minutes to complete the assessment.

Do your best work. Read each question carefully. For each selected-response item, indicate the best answer. For each constructed-response item, provide the most detailed and accurate response possible. Be sure to record your responses, legibly, on the answer document provided. The standard for each assessment item is referenced above the item.

You may use scratch paper to complete your work. The use of a scientific or graphing calculator may be necessary to solve some assessment items.

**A.SSE.2**

1. This polynomial can be factored such that all the terms in the factors are real and rational.

$$16x^4 - 625$$

Which polynomial is not a factor?

- a.  $2x + 5$
- b.  $2x - 5$
- c.  $4x - 25$
- d.  $4x^2 + 25$

**A.SSE.2**

2. Which expression is equivalent to  $(2x - 3y)^2 + 2(2x - 3y) - 3$ ?

- a.  $(2x - 3y)(2x - 3y - 1)$
- b.  $(2x - 3y)(4x - 6y - 3)$
- c.  $(2x - 3y + 3)(2x - 3y - 1)$
- d.  $(2x - 3y - 3)(2x - 3y + 1)$

**A.SSE.3**

3. This equation represents  $d$ , the distance in meters a ball rolls down a ramp in  $t$  seconds.

$$d = t^2 + 2t$$

How long will it take the ball to roll 15 meters down the ramp?

- a. 2 seconds
- b. 3 seconds
- c. 5 seconds
- d. 8 seconds

**A.SSE.3a**

4. In the function  $f(x) = x^2 - 2jx$ , the variable  $j$  represents a nonzero number. What is the minimum value of the function?

- a.  $2j$

- b.  $-j$
- c.  $j^2$
- d.  $-j^2$

## A.REI.4

5. A quadratic function has a root at  $x = 5 - i\sqrt{3}$ . Which equation could represent this function?
- a.  $f(x) = x^2 - 5x + 7$
  - b.  $f(x) = x^2 - 5x + \sqrt{-3}$
  - c.  $f(x) = x^2 + \sqrt{-300} - 22$
  - d.  $f(x) = x^2 - 10x + 28$

## A.REI.4

6. Which equation has no real solutions?
- a.  $x^2 - 3 = 0$
  - b.  $x^2 + 2x + 3 = 0$
  - c.  $-2x^2 + x + 3 = 0$
  - d.  $2x^2 + 2\sqrt{2}x + 1 = 0$

## F.BF.1

7. The function  $C(x)$  represents the clearance price on a piece of furniture after a 20% discount has been applied to the current price. The function  $x(w)$  represents the price on the same piece of furniture after the original price is decreased by \$15 for each week the piece of furniture does not sell. Which expression could represent the function  $C(x(w))$ ?
- a.  $0.2(x) - 15w$
  - b.  $0.2(x - 15w)$
  - c.  $0.8(x) - 15w$
  - d.  $0.8(x - 15w)$

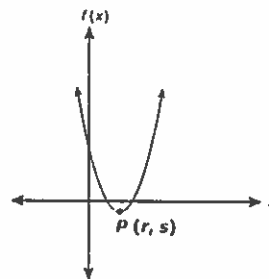
## F.BF.3

8. Which function is neither even nor odd?
- a.  $f(x) = x$
  - b.  $f(x) = x + 3$
  - c.  $f(x) = x^2 - 3$
  - d.  $f(x) = x^3$

## F.BF.3

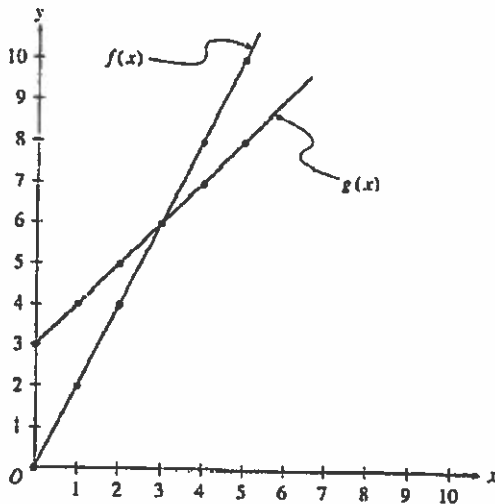
9. The graph of  $f(x)$  and vertex  $P$  are shown to the right. Which transformation of  $f(x)$  will produce an even function?

- a.  $f(x) = -f(x + r)$
- b.  $f(x) = -f(x) - s$
- c.  $f(x) = f(x + s) - r$
- d.  $f(x) = f(x + r) + s$



## F.IF.1

10. What is the value of  $g(1)$ ?



- a. 2
- b. 4
- c. 5
- d. 6

**F.IF.2**

11. A profit,  $P(x)$ , for a certain item is a function relating the income from sales,  $S(x)$ , and the cost of the item,  $C(x)$ . The function is stated by the equation shown, where  $x$  is the number of items sold:

$$P(x) = S(x) - C(x)$$

When  $S(x) = 0.5x$  and  $C(x) = 10 + 0.1x$ , the range of  $P(x)$  contains the elements  $\{350, 470, 590\}$ .

Which set of elements represents the corresponding domain?

- a.  $\{130, 178, 226\}$
- b.  $\{200, 272, 290\}$
- c.  $\{600, 800, 1000\}$
- d.  $\{900, 1200, 1500\}$

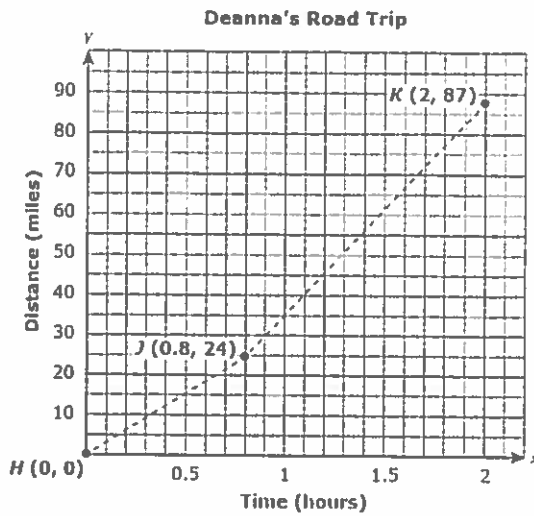
**F.IF.4**

12. In a biology class experiment, the teacher asked students to record their body temperatures at each hour from 8 am through 3 pm to determine their temperatures as a function of time. If the y-intercept represents the first temperature recorded, which set of numbers best represents the domain of this function.

- a. integers from 0 to 7
- b. integers from 8 to 15
- c. all real numbers from 0 to 50
- d. all real number from 93 to 103

**F.IF.6**

13. During the first 24 miles of Deanna's road trip, she drove through city traffic. When she reached the highway, she was able to drive at a faster rate. The graph represents the distance and time for her 87-mile trip. By what percent did Deanna's speed increase during the second part of her trip?



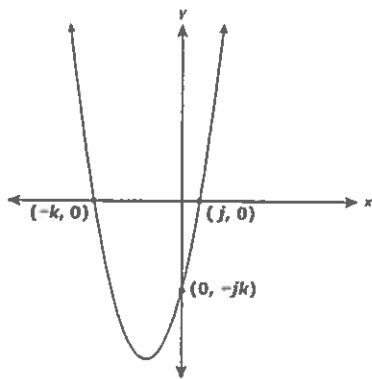
- a. 22.5%
- b. 45.0%
- c. 49.5%
- d. 75.0%

F.IF.7a

14. In the equation of the function  $f$  shown, the variables  $j$  and  $k$  represent real numbers such that  $0 < j < k$ .

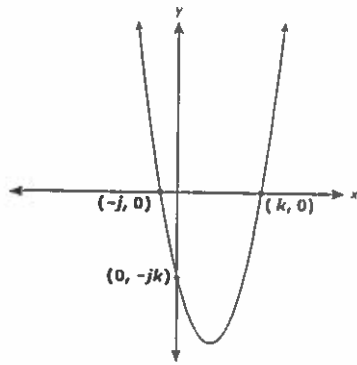
$$f(x) = -(j + x)(k - x)$$

Which graph represents the function  $f$ ?

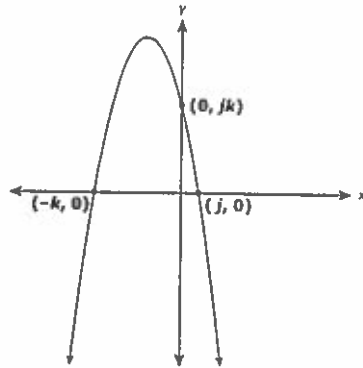


a.

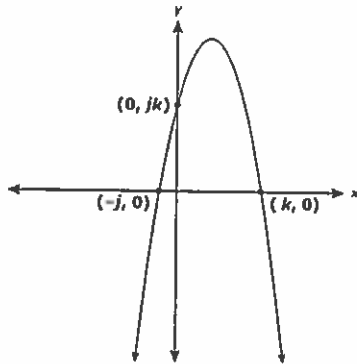
33



b.



c.



d.

**F.IF.8a**

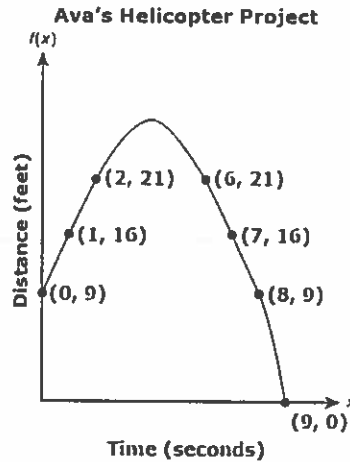
15. Paul built a bridge over his pond in the shape of a parabola. He used the equation  $y = -0.1x^2 + 1.5x - 3.125$  to represent the height of the bridge,  $y$  feet, based on the horizontal distance of  $x$  feet when  $x \geq 0$ . What is the maximum height of the bridge to the nearest tenth of a foot?

- a. 2.5 ft
- b. 3.1 ft
- c. 5.3 ft
- d. 8.8 ft

**F.IF.9**

16. Serena and Ava were partners for a science project. Serena and Ava each built a model helicopter for the project.

- The function  $h(x) = -x^2 + 6x + 9$  represents how many feet off the ground Serena's helicopter was after  $x$  seconds.
- The coordinate grid shows the graph of the function that represents how many feet off the ground Ava's helicopter was after  $x$  seconds.



The score on this science project is the sum of the maximum heights reached by the two helicopters. What score did Ava and Serena receive?

- 34
- 39
- 42
- 70

**A.CED.1**

17. Sam and Jeremy have ages that are consecutive odd integers. The product of their ages is 783. Which equation could be used to find Jeremy's age,  $j$ , if he is the younger man? If Jeremy is 34, how old is Sam?

- $j^2 + 2 = 783$ ; 35 years old
- $j^2 - 2 = 783$ ; 33 years old
- $j^2 + 2j = 783$ ; 35 years old
- $j^2 - 2j = 783$ ; 33 years old

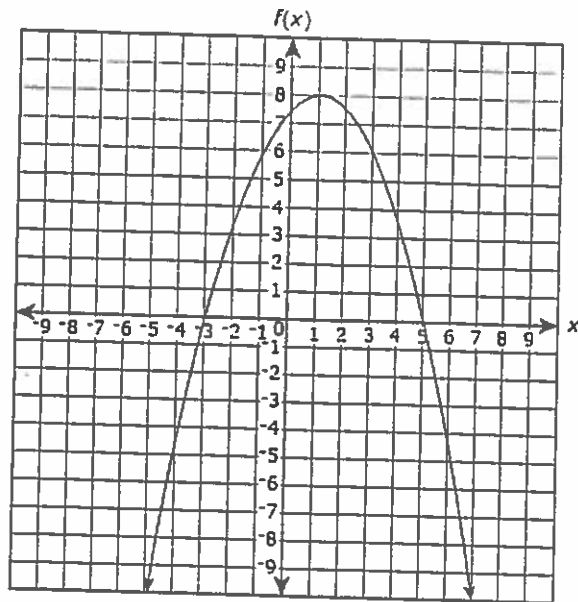
**A.CED.4**

18. **Constructed Response:** Solve the equation  $y = (x - h)^2 + k$  for  $h$ .

**A.CED.2**

19. **Constructed Response:** Answer the questions using the two quadratic function represented by the graph and the table.

35



$x$	$g(x)$
-7	0
-1	0
0	-7

- Write an equation to represent  $g(x)$ . Show or explain your work.
- Which of the functions has the greater maximum value? Justify your explanation.





# Unit 5: Sequences and Functions





## Unit 5 Test Review

For each sequence, state if it is arithmetic or geometric and write the explicit formula.

1)  $-2, -4, -8, -16, -32, \dots$

2)  $1, -\frac{1}{4}, \frac{1}{16}, -\frac{1}{64}, \frac{1}{256}, \dots$

3)  $16, 20, 24, 28, 32, \dots$

4)  $-40, -48, -56, -64, -72, \dots$

Find the tenth term in each sequence.

5)  $5, 7, 11, 19, 35, \dots$

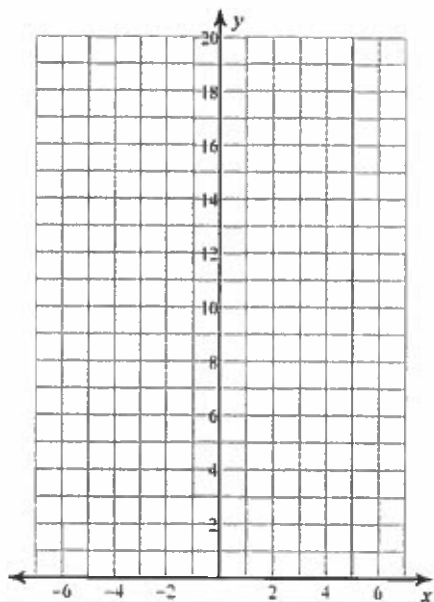
6)  $a_n = (-2)^n - 3$

7)  $a_n = a_{n-1} + 5$   
 $a_9 = 68$

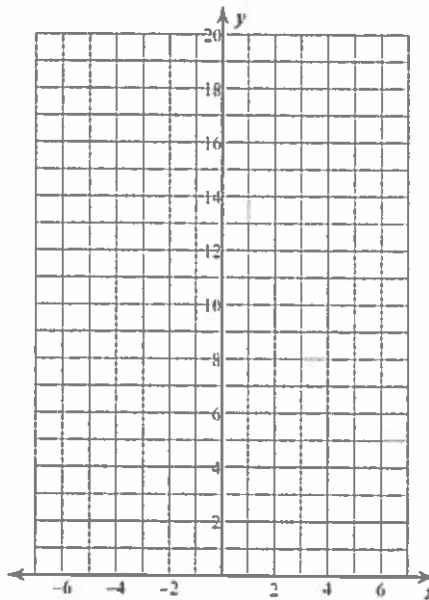
8)  $a_n = -5a_{n-1}$   
 $a_9 = -2$

Sketch the graph of each function. State if it is exponential growth or decay.

9)  $y = 5 \cdot \left(\frac{1}{2}\right)^x$



10)  $y = 3 \cdot 2^x$



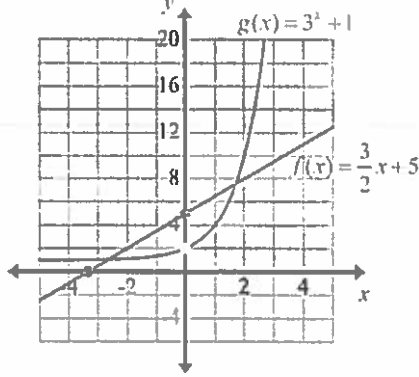
30

Find the average rate of change from  $[-2, 2]$  for the following exponential functions.

11.  $y = 100(.5)^x$

12.  $y = 100(2)^x$

13. Discuss and compare the functions by analyzing the rates of change, intercepts, and where one function is greater or less than the other.



#### Linear and Exponential Models:

14. Write an explicit formula to model the number of dots per day.

○ ○

Day 1

○ ○  
○ ○

Day 2

○ ○ ○ ○ ○ ○  
○ ○ ○ ○ ○ ○  
○ ○ ○ ○ ○ ○

Day 3

15. Sherry has a huge doll collection of 80 dolls. Her mom tells her that she needs to get rid of 5 per year to get it down to a decent number before leaving for college. Write an explicit formula to model the number of dolls per year. If she is 12, how many will she have left when she is 18?

16. You bought a Boston Whaler in 2004 for \$12,500. The boat's value depreciates by 7% a year. How much is the boat worth now? How much is it worth in 2020?

17. The population of a large city increases by tripling each year. When the 2000 census was taken, the population was 1000.

a) Write a model for this population growth.

b) What should the population be now? What is the projected population for 2020?

**Multiple Choice:** For each of the following questions, circle the letter of the answer that best answers the question.

1. Which of the following is the explicit formula for the sequence 5, 7, 9, 11, 13, ...

A.  $a_n = 5 + 2^{n-1}$

C.  $a_n = 2n+7$

B.  $a_n = 2n+3$

D.  $a_n = 2 + (n-1)5$

2. Which of the following is the explicit formula for the sequence -10, 20, -40, 80, ...

A.  $a_n = -2 + (-10)^{n-1}$

C.  $a_n = -10(-2)^{n-1}$

B.  $a_n = 2 + (n-1)10$

D.  $a_n = -10(n-1)^2$

3. Find  $a_{13}$  given that  $a_{12} = 22$  and  $d=3$ .

A. 19

C. 66

B. 25

D. -66

4. Write an explicit formula to model the number of dots per day.



Day 1

Day 2

Day 3

A.  $y = 4(2^x)$

C.  $y = 8(2^x)$

B.  $y = 2(4^x)$

D.  $y = 2(8^x)$

5. The population of a small city increases by a rate of 5% a year. The city's current population is 500. Write an explicit formula to represent the situation and state what the population will be in 5 years.

A.  $y = 500(1.05^x)$ ; 638

B.  $y = .02(500^x)$ ; 500

C.  $y = 500(1.5^x)$ ; 1125

D.  $y = 500(.5^x)$ ; 1256

6. A colony of 1000 bacteria cells doubles every hour. Write an explicit formula to represent the situation. How much bacteria cells will there be after 10 hours?

A.  $y = 1000(2^x)$ ; 1,024,000

B.  $y = 2(1000^x)$ ; 5,345,000,500

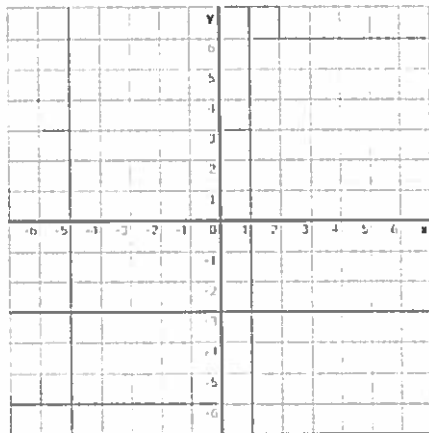
C.  $y = 1000(10^x)$ ; 1,024,000,000

D.  $y = 1000(-2^x)$ ; 125,456,000

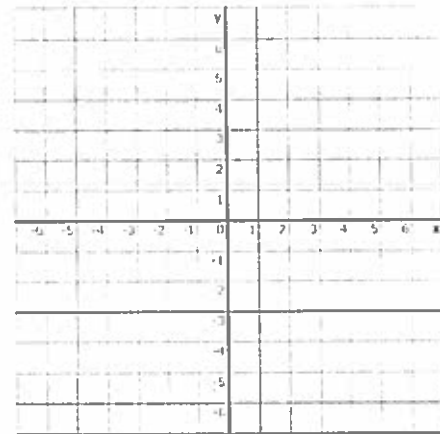
40

Graph the following functions and state whether the function is Exponential Growth or Exponential Decay.

7.  $f(x) = (1.3)^x$



8.  $g(x) = (0.5)^x$



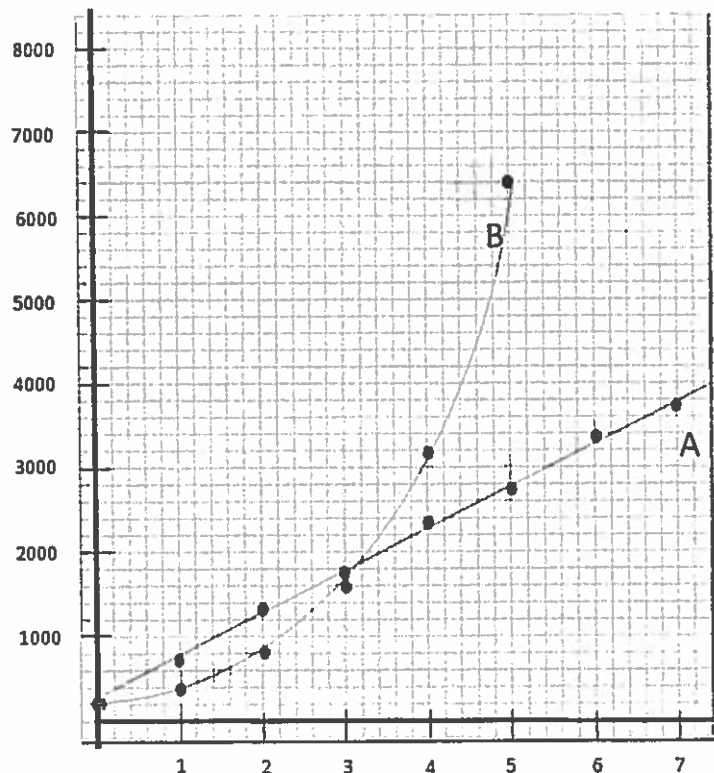
9. Given the function  $f(x) = 8(2)^x$ , find the average rate of change over the interval  $-1 \leq x \leq 0$ .

Use the graph to answer questions.

10. What is the average rate of change for Function A between  $[1, 5]$ ?

11. What is the average rate of change for Function B between  $[1, 5]$ ?

12. Which function (A or B) had a greater rate of change between  $[1, 5]$ ?



13. Function \_\_\_ has a Constant rate of change, where function \_\_\_ has a non-constant rate of change.

**GSE Algebra I**  
**Common Unit Pre/Post Assessment**  
**Unit 4: Modeling and Analyzing Exponential Functions**  
**Student Version**

**Directions:**

Today you will be taking the GSE Algebra I, Unit 4 assessment Modeling and Analyzing Exponential Functions.

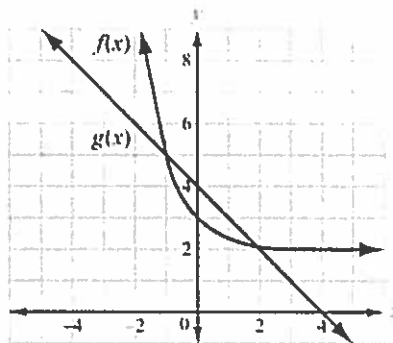
You will have 60 minutes to complete the assessment.

Do your best work. Read each question carefully. For each selected-response item, indicate the best answer. For each constructed-response item, provide the most detailed and accurate response possible. Be sure to record your responses, legibly, on the answer document provided. The standard for each assessment item is referenced above the item.

You may use scratch paper to complete your work. The use of a scientific or graphing calculator may be necessary to solve some assessment items.

**A.CED.1**

1. Two functions are graphed on this coordinate plane. For what values of  $x$  does it appear that  $f(x)$  is greater than  $g(x)$ ?

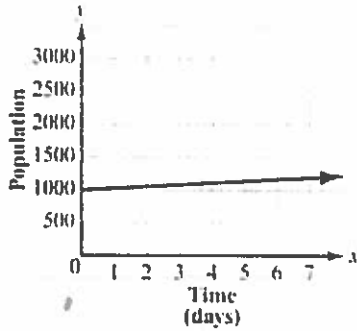


- a.  $2 < x < 5$
- b.  $-1 < x < 1.9$
- c.  $x < 2$  or  $x > 5$
- d.  $x < -1$  or  $x > 1.9$

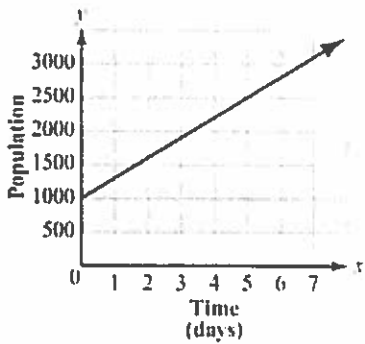
42

A.CED.1

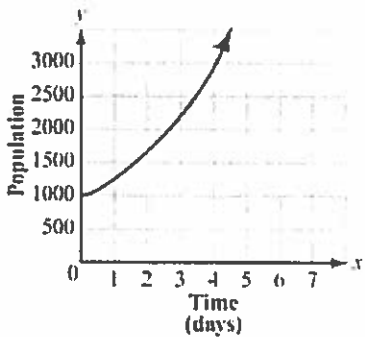
2. A colony of bacteria is increasing at a rate of 30% per day. The colony began with a population of 1000. Which graph best models the population growth of the colony of bacteria?



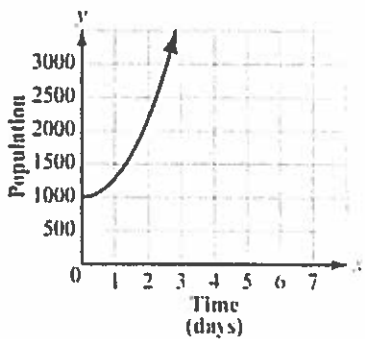
a.



b.



c.

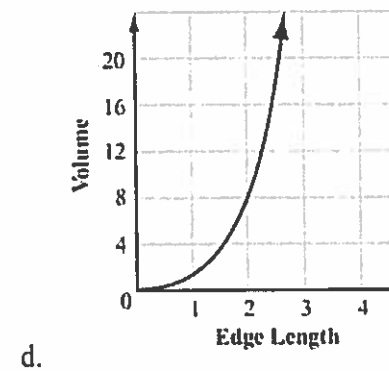
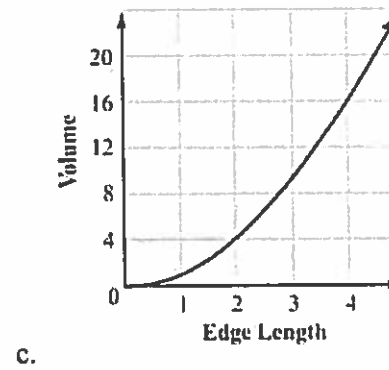
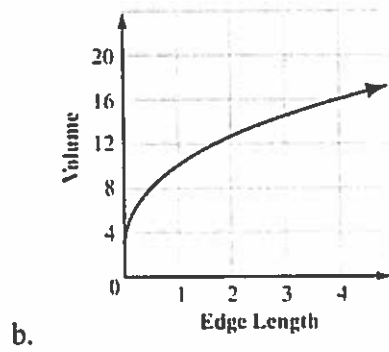
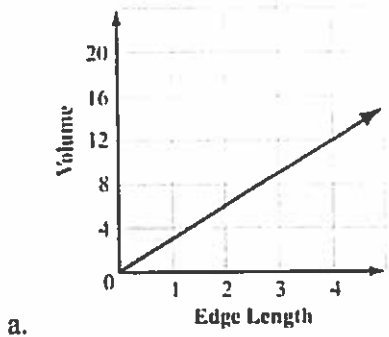


d.



A.CED.2

3. The volume of a cube is a function of the length of its edges. Which graph models this relationship?



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## A.CED.2

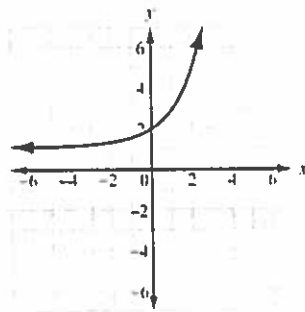
4. Andrew invested \$1000 in his savings account. The interest rate,  $r$ , is compounded annually. Which equation shows the amount,  $A$ , in his account after  $x$  years?
- $A = 1000r^x$
  - $A = 1000(r - 1)^x$
  - $A = 1000(1 + r)^x$
  - $A = 1000(1 - r)^x$

## F.BF.1a

5. Ahmad is trying to visit all 50 states. In 1995 he visited 2 states, in 1996 he visited 3 more states, in 1997 he visited 4 more states, and in 1998 he visited 5 more states. If he continues this pattern, in what year will he visit the 50<sup>th</sup> state?
- 2001
  - 2003
  - 2005
  - 2007

## F.IF.2

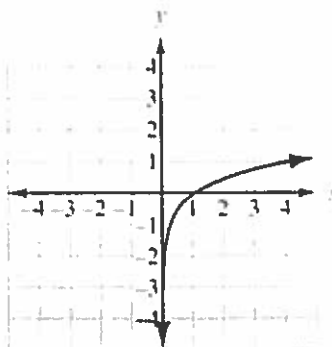
6. The graph of the function  $h(x) = 2^x + 1$  is shown on this coordinate plane.



- The function  $h(x)$  has  $x > 1$  as its domain and all real numbers as its range.
- The function  $h^{-1}(x)$  has  $x > 1$  as its domain and all real numbers as its range.
- The function  $h(x)$  has all real numbers as its domain and  $y > 2$  as its range.
- The function  $h^{-1}(x)$  has all real numbers as its domain and  $y > 2$  as its range.

**F.IF.4**

7. This is a graph of a function.

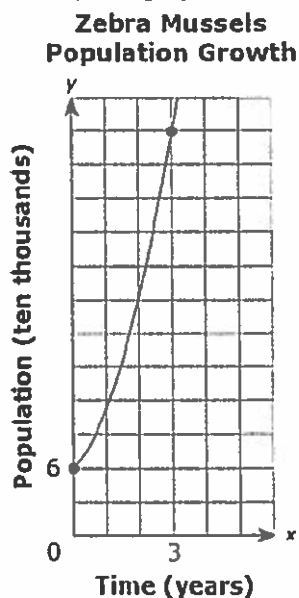


Which statement about the function is correct?

- a. Its domain is  $(-\infty, 0)$ .
- b. Its range is  $(-\infty, 0)$ .
- c. Its domain is  $(-\infty, \infty)$ .
- d. Its range is  $(-\infty, \infty)$ .

**F.BF.4**

8. A team of aquatic biologists estimated that 60,000 zebra mussels were present in a local lake in 1995. The population growth over time is modeled by the graph of the function as shown.



Based on the graph, which is the best estimate for the number of zebra mussels in 1998?

- a. 160,00
- b. 300,000
- c. 360,000
- d. 480,000

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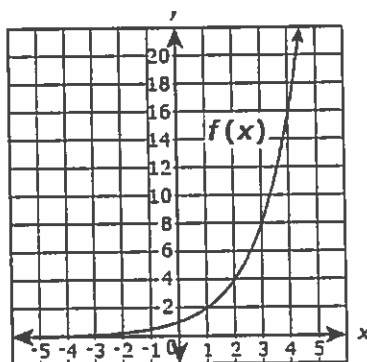
F.BF.1

9. **Constructed Response:** During the first month of a new business, the expenses were \$180 and the revenue was \$15. During each of the next several months, the expenses and the revenue increased as shown in the table. Write an equation that expresses the revenue,  $R$ , as a function of the number of months,  $m$ .

Time (months)	Expenses (dollars)	Revenue (dollars)
1	180	15
2	190	30
3	200	60
4	210	120

F.BF.3

10. **Constructed Response:** The function  $f(x)$  is graphed on the coordinate grid. After transformation  $T$  is performed on  $f(x)$ , the function  $g(x) = 2^{x-1.5}$  is created.



What effect did transformation  $T$  have on the graph  $f(x)$ ? Explain your answer.

F.BF.2

11. **Constructed Response:** Tara earns \$38,000 during the first year at her job. Each year after the first year, she will receive a raise of 5%.

**Part A**

Write the equation of a function,  $S$ , that gives Tara's salary,  $S(x)$ , as a function of the number of years,  $x$ , after she started her job.

**Part B**

If no other conditions change, how many years will it take for Tara's salary to double from her initial salary of \$38,000? Explain your answer.

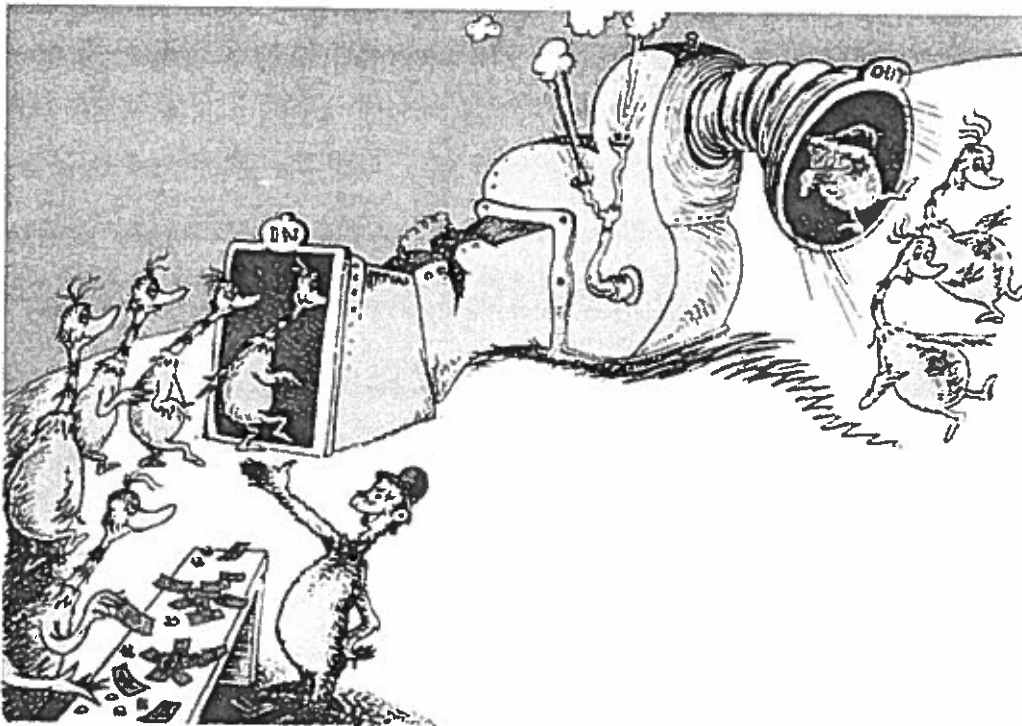
**Part C**

At the end of the first year, Tara's employer decided to award her a \$3,000 bonus in addition to the 5% yearly raise. The bonus will not be included in the salary used to compute Tara's 5% increase the next year.

If the employer follows this practice for the next few years, write a recursive formula that describes her total pay for a given year,  $S(n)$ , in terms of  $S(n - 1)$ , her total pay from the previous year. Include a definition of  $n$  in your formula.

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# Unit $3\frac{1}{2}$ : Functions



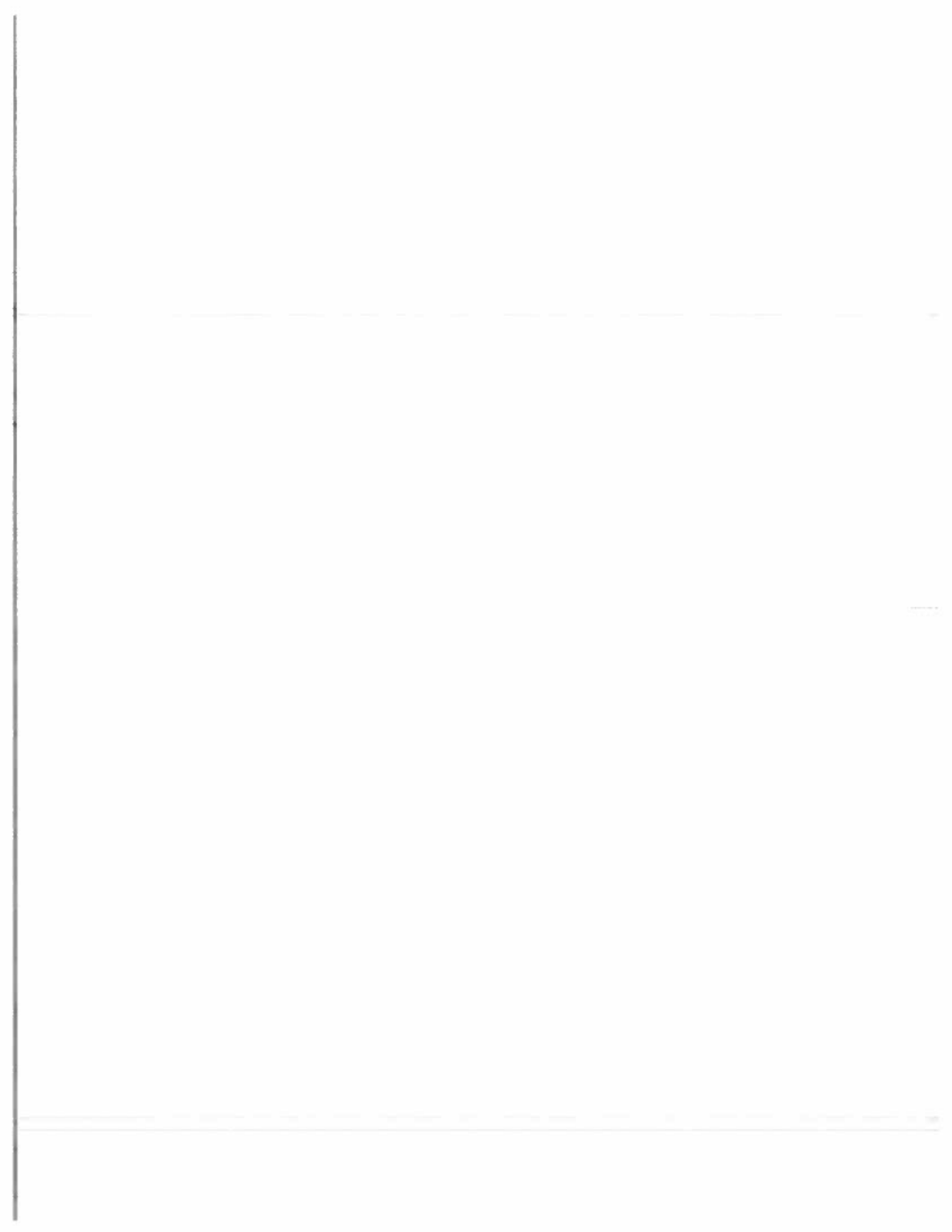
STILVESTER McMONKEY ALBORN'S SINK-BUFF SURETY MACHINE

Dr. Seuss

$$f(x) = \frac{2x+1}{2} \longrightarrow f(3) = \frac{2(3)+1}{2}$$

$$f(3) = \frac{6+1}{2}$$

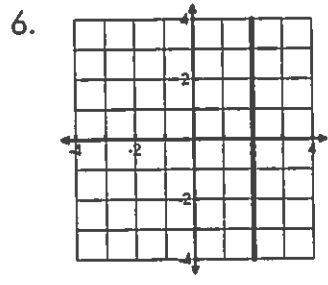
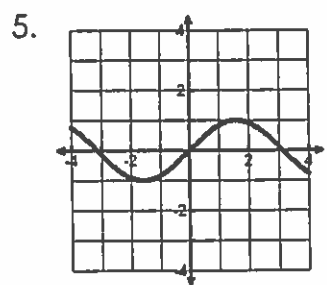
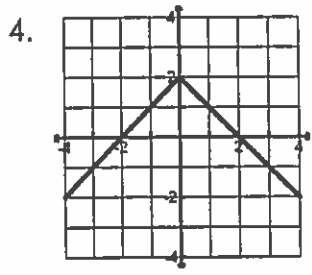
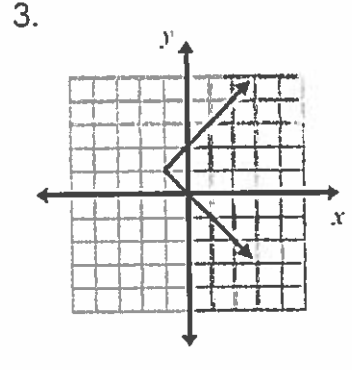
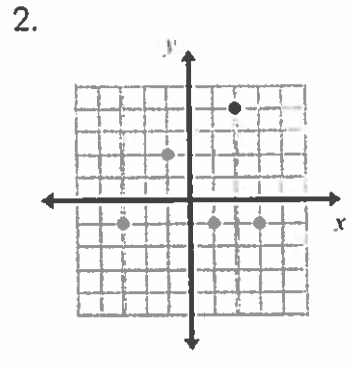
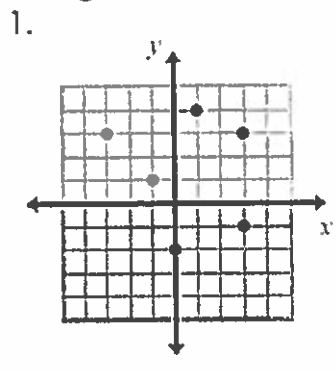
$$f(3) = 3\frac{1}{2}$$



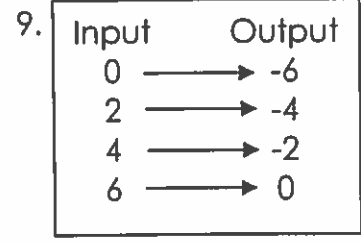
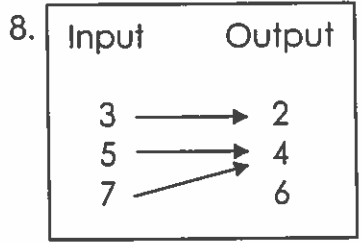
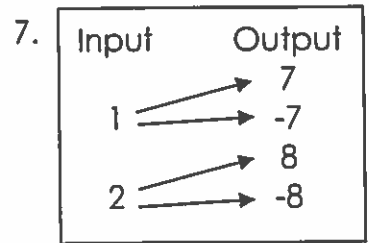


Name: \_\_\_\_\_ Date: \_\_\_\_\_

Decide whether the graph is a function or relation. If it is a function, give the domain and range.



Decide whether the relation is a function. If it is a function, give the domain and the range.



Evaluate the function when  $x = 3$ ,  $x = 0$ , and  $x = -2$ . (3 answers for each problem)

10.  $f(x) = 2x - 5$

11.  $h(x) = 6x + 2$

12.  $g(x) = 2.4x$

---

If  $f(x) = 2x - 3$ ,  $g(x) = \sqrt{x + 5}$ , and  $h(x) = x^2 - 3x + 5$ , find each of the following:

16.  $f(4) =$

17.  $h(-3) =$

18.  $g(7) =$

**Extension:**  $h(g(4)) =$

---

**Combining Functions**

Given the functions  $f(x) = 5x^2 + 3$  and  $g(x) = 2x^2$

19. Find  $g(x) \cdot f(x)$

---

Given the functions  $f(x) = 6x + 8$  and  $g(x) = 5x - 12$

20. Find  $f(x) + g(x)$ .

21. Find  $f(x) - g(x)$ .

---

Given the functions  $f(x) = 3x^2 + 5x - 8$  and  $g(x) = 2x^2 + 4x - 9$

22. Find  $f(x) + g(x)$ .

23. Find  $f(x) - g(x)$ .

---

Given the functions  $f(x) = 4x - 5$  and  $g(x) = 3^x$

24. Find  $f(x) + g(x)$ .

25. Find  $f(x) / g(x)$ .

---

Name: \_\_\_\_\_ Date: \_\_\_\_\_

### Characteristics of Functions

**FUNCTION:**  $F(x) = 5x^2 + 3$

Domain: \_\_\_\_\_

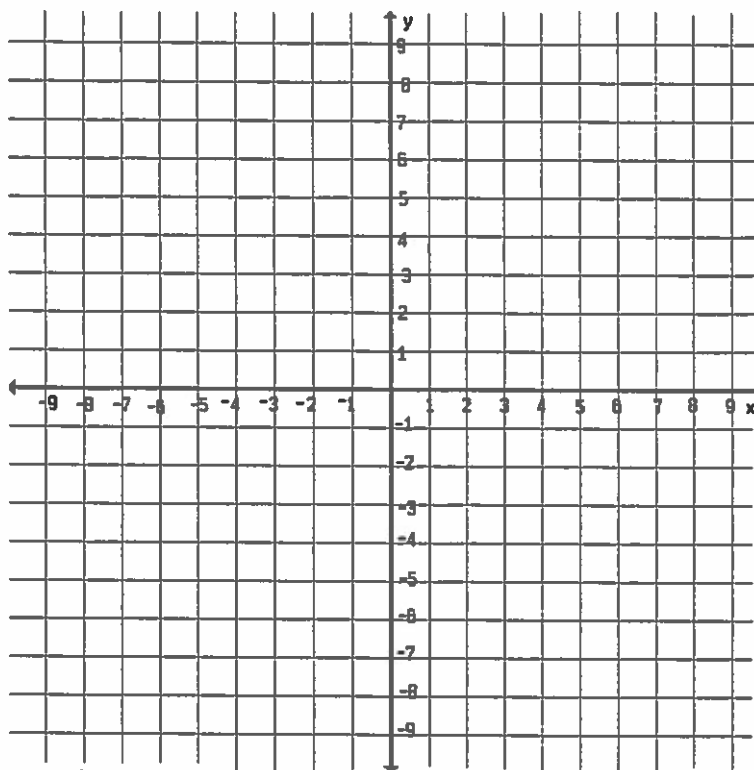
Range: \_\_\_\_\_

Intercepts: \_\_\_\_\_

Max or Min: \_\_\_\_\_

Discrete or Continuous

Increasing or Decreasing



Name: \_\_\_\_\_ Date: \_\_\_\_\_

### Characteristics of Functions

**FUNCTION:**  $f(x) = -\frac{1}{2}(x+2)^2$

Domain: \_\_\_\_\_

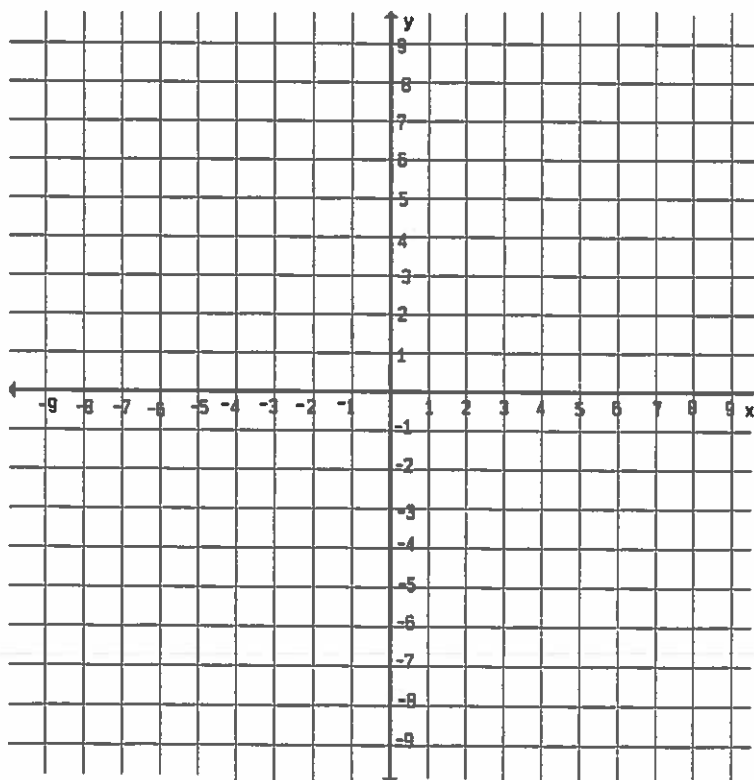
Range: \_\_\_\_\_

Intercepts: \_\_\_\_\_

Max or Min: \_\_\_\_\_

Discrete or Continuous

Increasing or Decreasing



**Topic:**

**Transformations of linear graphs**

**What is it?**

shifting, stretching, shrinking, and reflecting of graphs

**Types:**

**Vertical or Horizontal shift**

**Add outside**  $y = x + 3$   
MOVES \_\_\_\_\_

**Subtract outside**  $y = x - 3$   
MOVES \_\_\_\_\_

**Add inside**  $y = (x + 3)$   
MOVES \_\_\_\_\_

**Subtract inside**  $y = (x - 3)$   
MOVES \_\_\_\_\_

Examples

**Reflection**

**Multiply by negative (-)**  $y = -x$   
Causes the graph to \_\_\_\_\_

**Vertical Stretch or Compress/Shrink**

**Multiply by Fraction (less than 1)**  $y = \frac{1}{4}x$   
Causes the graph to \_\_\_\_\_

**Multiply by integer**  $y = 4x$   
Causes the graph to \_\_\_\_\_

# Topic: Transformations of exponential graphs

What is it?

shifting, stretching, shrinking, and reflecting of graphs

Types:

## Vertical or Horizontal shift

Add outside  $y = 2^x + 3$   
MOVES \_\_\_\_\_

Subtract outside  $y = 2^x - 3$   
MOVES \_\_\_\_\_

Add inside  $y = 2^{(x+3)}$   
MOVES \_\_\_\_\_

Subtract inside  $y = 2^{(x-3)}$   
MOVES \_\_\_\_\_

Examples

## Reflection

Multiply by negative (-)  
 $y = -2^x$   
Causes the graph to \_\_\_\_\_

## Vertical Stretch or Shrink

Multiply by Fraction (less than 1)  
 $y = \frac{1}{4}(2)^x$   
Causes the graph to \_\_\_\_\_

Multiply by integer  
 $y = 4(2)^x$   
Causes the graph to \_\_\_\_\_

**GSE Algebra I**  
**Common Unit Pre/Post Assessment**  
**Unit 5: Comparing and Contrasting Functions**  
**Student Version**

**Directions:**

Today you will be taking the GSE Algebra I, Unit 5 assessment on Comparing and Contrasting Functions.

You will have 60 minutes to complete the assessment.

Do your best work. Read each question carefully. For each selected-response item, indicate the best answer. For each constructed-response item, provide the most detailed and accurate response possible. Be sure to record your responses, legibly, on the answer document provided. The standard for each assessment item is referenced above the item.

You may use scratch paper to complete your work. The use of a scientific or graphing calculator may be necessary to solve some assessment items.

**F.LE.1a**

1. Which table best describes a function modeling exponential decay?

$x$	$f(x)$
1	81
2	27
3	9
4	3

a.

$x$	$f(x)$
1	80
2	70
3	50
4	20

b.

$x$	$f(x)$
1	80
2	76
3	67
4	51

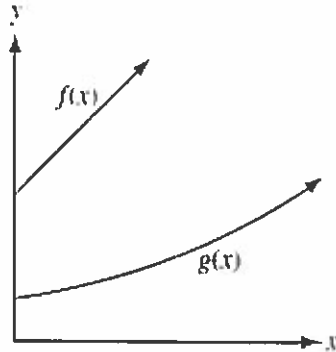
c.

$x$	$f(x)$
1	2
2	4
3	8
4	16

d.

## F.LE.3

2. This coordinate plane shows two functions of  $x$ .
- $f(x)$  is an increasing linear function.
  - $g(x)$  is an increasing exponential function.



Based on the information, which statement is true for all real values of the domain  $x \geq 0$ ?

- $f(x) > g(x)$  for all values in the domain
- $f(x) < g(x)$  for all values in the domain
- $f(x) = g(x)$  for many values in the domain
- $f(x) = g(x)$  for only one value in the domain

## F.IF.9

3. Two linear functions are defined below.

Function 1:  $y = 2x + 3$

Function 2:

$x$	$f(x)$
1	-1
2	2
3	5
4	8

Which of these linear functions has a slope greater than the slope for Function 1 and less than the slope of Function 2?

- $f(x) = 3x + 2$
- $f(x) = 2.5x - 6$
- $f(x) = 2x + 2.5$
- $f(x) = 1.5x + 1$

## F.LE.3

4. As the value of  $x$  increases, which function has the greatest rate of growth?
- $f(x) = x^2 + 7$
  - $g(x) = 2 + 7^x$
  - $h(x) = 7 - x^2$
  - $k(x) = 2^x + 7$

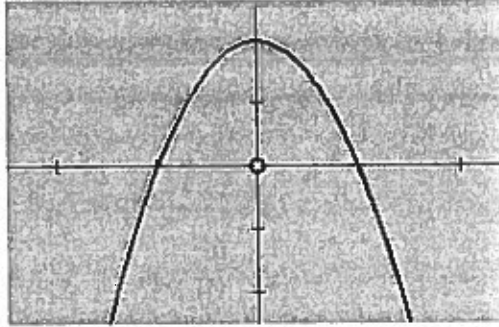
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F.BF.3

5. Which statement is not true of the function  $f(x) = (x + 1)^2 - 9$ ?
- Its  $y$ -intercept is  $(0, -9)$ .
  - It has two  $x$ -intercepts at  $(-4, 0)$  and  $(2, 0)$ .
  - Its minimum value is  $-9$ .
  - It has no minimum.

F.IF.9

6. The graph below represents function  $f$ . A second function,  $g$ , is represented by the equation  $-5x^2 + 2$ . Which of the following is not an accurate comparison of the key features of the functions?



- Both functions have the same  $y$ -intercept  $(0, 2)$ .
- Both of the functions have two  $x$ -intercepts.
- Regarding end behavior, the end of the graph of  $f$  point down and so do the ends of the graph of  $g$ .
- On the portions of the graph where both functions are decreasing,  $f$  is decreasing at a faster rate.

F.IF.5

7. A flying disk is thrown into the air from a height of 25 feet at time  $t = 0$ . The function that models this situation is  $h(t) = -16t^2 + 75t + 25$ , where  $t$  is measured in seconds and  $h$  is the height in feet. What values of  $t$  best describe the times when the disk is flying in the air?
- $0 < t < 5$
  - $0 < t < 25$
  - All real numbers
  - All positive integers

F.IF.6

8. Using the table below, what is the average rate of change of  $f(x)$  over the interval  $-2 \leq f(x) \leq 0$ ?

$x$	$f(x)$
-2	15
-1	9
0	5
1	3
2	3

- 10
- 5
- 5
- 10



## F.IF.5

9. The function  $f(t) = -16t^2 + 64t + 5$  models the height of a ball that was hit into the air, where  $t$  is measured in seconds and  $h$  is the height in feet.

The table represents the height,  $g(t)$ , of a second ball that was thrown into the air.

Time, $t$ (in seconds)	Height, $g(t)$ (in feet)
0	4
1	36
2	36
3	4

Which statement best compares the length of time each ball is in the air?

- The ball represented by  $f(t)$  is in the air for about 5 seconds, and the ball represented by  $g(t)$  is in the air for about 3 seconds.
- The ball represented by  $f(t)$  is in the air for about 3 seconds, and the ball represented by  $g(t)$  is in the air for about 5 seconds.
- The ball represented by  $f(t)$  is in the air for about 3 seconds, and the ball represented by  $g(t)$  is in the air for about 4 seconds.
- The ball represented by  $f(t)$  is in the air for about 4 seconds, and the ball represented by  $g(t)$  is in the air for about 3 seconds.

## F.LE.3

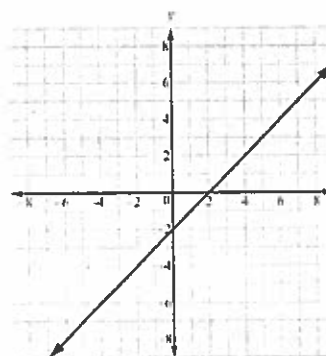
10. Which statement is true about the graphs of exponential functions?

- The graphs of exponential functions never exceed the graphs of linear and quadratic functions
- The graphs of exponential functions always exceed the graphs of linear and quadratic functions
- The graphs of exponential functions eventually exceed the graphs of linear and quadratic functions
- The graphs of exponential functions eventually exceed the graphs of linear functions, but not quadratic functions.

## F.LE.2

11. Which function corresponds to the graph shown to the right?

- $f(x) = x + 1$
- $f(x) = 2x + 1$
- $f(x) = x - 2$
- $f(x) = 3x + 1$



## F.IF.2

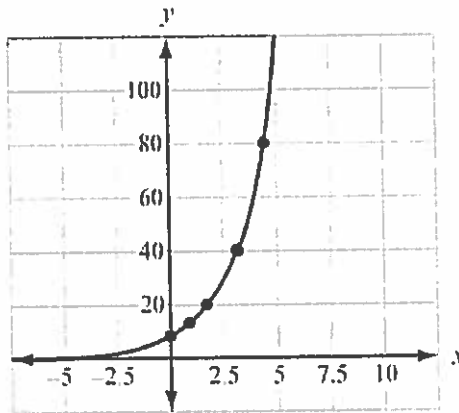
12. A farmer owns a horse that can continuously run an average of 8 miles an hour for up to 7 hours. Let  $y$  be the distance the horse can travel for a given  $x$  amount of time in hours. The horse's progress can be modeled by a function.

50

- a.  $0 \leq x \leq 7$
- b.  $0 \leq y \leq 7$
- c.  $0 \leq x \leq 56$
- d.  $0 \leq y \leq 56$

**F.IF.4**

13. A population of squirrels doubles every year. Initially there were 5 squirrels. A biologist studying the squirrels created a function to model their population growth,  $P(t) = 5(2^t)$  where  $t$  is time. The graph of the function is shown. What is the valid range of the function if it is to correctly model the population?



- a. Any real number
- b. Any whole number greater than 0
- c. Any whole number greater than 5
- d. Any whole number greater than or equal to 5

**F.IF.7**

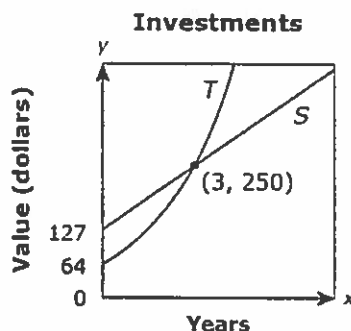
14. The expression  $-x^2 + 70x - 600$  represents a company's profit for selling  $x$  items. For which number(s) of items sold is the company's profit equation to \$0?
- a. 0 items
  - b. 35 items
  - c. 10 items and 60 items
  - d. 20 items and 30 items

**F.IF.1**

15. The points  $(0,1)$ ,  $(1,4)$ ,  $(2,16)$ , and  $(3,64)$  are on the graph of a function. Which equation represents that function?
- a.  $f(x) = 2^x$
  - b.  $f(x) = x^2 + 1$
  - c.  $f(x) = 4^x$
  - d.  $f(x) = 2x + 1$

**F.LE.1**

16. **Constructed Response:** Anthony invested money in two companies at the same time. He invested \$127 in Company S and \$64 in Company T. The growth with Company S was linear, and the growth with Company T was exponential. The graph shows the values of the two investments for the first few years.



**Part A**

The point of intersection of the two graphs is  $(3, 250)$ . Interpret this point in terms of Anthony's two investments. Be specific in your answer.

**Part B**

Write an equation of a linear function,  $S$ , that expresses the amount of money Anthony has in Company S as a function of the number of years,  $x$ , that it has been invested. Show your work.

**Part C**

What does the slope of the line from Part B tell you about the investment?

**Part D**

The exponential function  $T(x) = 64(1.575)^x$  expresses the amount of money Anthony has in Company T as a function of the number of years,  $x$ , that it has been invested. What does the base of the exponent tell you about the investment?

**F.LE.1c**

17. **Constructed Response:** During the first month of a new business, the expenses were \$180 and the revenue was \$15. During each of the next several months, the expenses and the revenue increased as shown in the table.

Time (months)	Expenses (dollars)	Revenue (dollars)
1	180	15
2	190	30
3	200	60
4	210	120

Write an equation that expresses the expenses,  $E$ , as a function of the number of months,  $m$ . Then write an equation that expresses the revenue,  $R$ , as a function of the number of months,  $m$ . Examine the two equations you wrote. Is it possible to determine whether the monthly revenue will ever exceed the monthly expenses? Explain how you know without giving any dollar amounts.

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## Algebra 1 GMAS Practice

1. Which function represents this sequence?

$n$	1	2	3	4	5	...
$a_n$	6	18	54	162	486	...

- A.  $f(n) = 3^{n-1}$
- B.  $f(n) = 6^{n-1}$
- C.  $f(n) = 3(6^{n-1})$
- D.  $f(n) = 6(3^{n-1})$

Solutions:

1.

2.

2. The points (0, 1), (1, 5), (2, 25), and (3, 125) are on the graph of a function. Which equation represents that function?

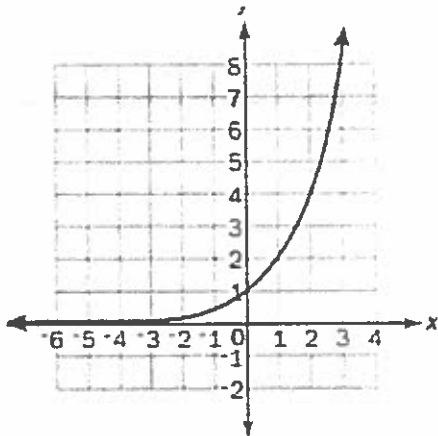
- A.  $f(x) = 2^x$
- B.  $f(x) = 3^x$
- C.  $f(x) = 4^x$
- D.  $f(x) = 5^x$

Which of these is NOT a function?

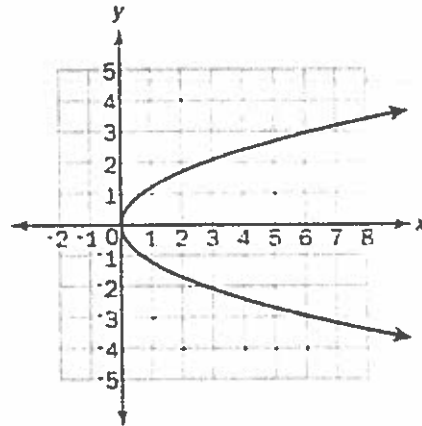
A. (5, 3), (6, 4), (7, 3), (8, 4)

C.  $y = 3x^2$

B.



D.



1. Look at the radical.

$$-8\sqrt{726}$$

What is a rewritten form of the radical?

- A.  $-88\sqrt{6}$
- B.  $-90.75$
- C.  $-986\sqrt{6}$
- D.  $-2,904$

2. Look at the expression.

$$2\sqrt{8} \cdot \sqrt{20}$$

Which of these is equivalent to this expression?

- A.  $2\sqrt{28}$
- B. 5
- C.  $8\sqrt{10}$
- D.  $32\sqrt{10}$

3. Which sum is rational?

- A.  $\pi + 18$
- B.  $\sqrt{25} + 1.75$
- C.  $\sqrt{3} + 5.5$
- D.  $\pi + \sqrt{2}$

4. Which product is irrational?

- A.  $\sqrt{2} \cdot \sqrt{50}$
- B.  $\sqrt{64} \cdot \sqrt{4}$
- C.  $\sqrt{9} \cdot \sqrt{49}$
- D.  $\sqrt{10} \cdot \sqrt{8}$

Solutions:

- 1. A
- 2. C
- 3. B
- 4. D

1. A rectangle has a length of 12 meters and a width of 400 centimeters. What is the perimeter, in cm, of the rectangle?

- A. 824 cm
- B. 1,600 cm
- C. 2,000 cm
- D. 3,200 cm

Correct Answer:

2. Jill swam 200 meters in 2 minutes 42 seconds. If each lap is 50 meters long, which is MOST LIKELY to be her time, in seconds, per lap?

- A. 32 seconds
- B. 40 seconds
- C. 48 seconds
- D. 60 seconds

Correct Answer:

3. For what values of  $x$  is the inequality  $\frac{2}{3} + \frac{x}{3} > 1$  true?

- A.  $x < 1$
- B.  $x > 1$
- C.  $x < 5$
- D.  $x > 5$

Correct Answer:

4. Look at the steps used when solving  $3(x - 2) = 3$  for  $x$ .

$3(x - 2) = 3$	Write the original equation.
$3x - 6 = 3$	Use the Distributive Property.
$3x - 6 + 6 = 3 + 6$	Step 1
$3x = 9$	Step 2
$\frac{3x}{3} = \frac{9}{3}$	Step 3
$x = 3$	Step 4

Which step is the result of combining like terms?

- A. Step 1
- B. Step 2
- C. Step 3
- D. Step 4

1. In which expression is the coefficient of term "n" - 1?

- A.  $3n^2 + 4n - 1$
- B.  $-n^2 + 5n + 4$
- C.  $-2n^2 - n + 5$
- D.  $4n^2 + n - 5$

Correct Answer:

2. The expression  $s^2$  is used to calculate the area of a square, where  $s$  is the side length of the square. What does the expression  $(8x)^2$  represent?

- A. the area of a square with a side length of 8
- B. the area of a square with a side length of 16
- C. the area of a square with a side length of  $4x$
- D. the area of a square with a side length of  $8x$

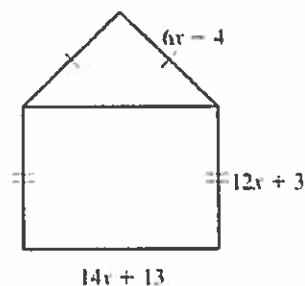
Correct Answer:

1. What is the product of  $7x - 4$  and  $8x + 5$ ?

- A.  $15x + 1$
- B.  $30x + 2$
- C.  $56x^2 + 3x - 20$
- D.  $56x^2 - 3x + 20$

Correct Answer:

2. A model of a house is shown.



3. Which expression has the same value as the expression  $(8x^2 + 2x - 6) - (5x^2 - 3x + 2)$ ?

- A.  $3x^2 - x - 4$
- B.  $3x^2 + 5x - 8$
- C.  $13x^2 - x - 8$
- D.  $13x^2 - 5x - 4$

Correct Answer:

What is the perimeter, in units, of the model?

- A.  $32x + 12$  units
- B.  $46x + 25$  units
- C.  $50x + 11$  units
- D.  $64x + 24$  units

Correct Answer:



1. This equation can be used to find  $h$ , the number of hours it will take Flo and Bryan to mow their lawn.

$$\frac{h}{3} + \frac{h}{6} = 1$$

How many hours will it take them to mow their lawn?

- A. 6 hours
- B. 3 hours
- C. 2 hours
- D. 1 hour

Correct Answer:

2. A ferry boat carries passengers back and forth between two communities on the Peachville River.

- It takes 30 minutes longer for the ferry to make the trip upstream than downstream.
- The ferry's average speed in still water is 15 miles per hour.
- The river's current is usually 5 miles per hour.

This equation can be used to determine how many miles apart the two communities are.

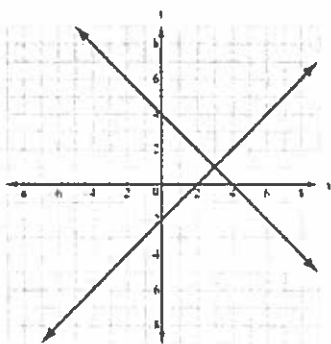
$$\frac{m}{15 - 5} = \frac{m}{15 + 5} + 0.5$$

What is  $m$ , the distance between the two communities?

- A. 0.5 mile
- B. 5 miles
- C. 10 miles
- D. 15 miles

Correct Answer:

1. Two lines are graphed on this coordinate plane.



Which point appears to be a solution of the equations of both lines

- A. (0, -2)
- B. (0, 4)
- C. (2, 0)
- D. (3, 1)

Correct Answer:

2. Based on the tables, at what point do the lines  $y = -x + 5$  and  $y = 2x - 1$  intersect?

$y = -x + 5$	
$x$	$y$
-1	6
0	5
1	4
2	3
3	2

$y = 2x - 1$	
$x$	$y$
-1	-3
0	-1
1	1
2	3
3	5

- A. (1, 1)
- B. (3, 5)
- C. (2, 3)
- D. (3, 2)

Correct Answer:

66

3. Look at the tables of values for two linear functions,  $f(x)$  and  $g(x)$ .

$x$	$f(x)$	$x$	$g(x)$
-1	16	-1	-18
0	7	0	-14
1	4	1	-10
3	-2	3	-2
5	-8	5	6
7	-14	7	14

What is the solution to  $f(x) = g(x)$ ?

Solution:

4. Which ordered pair is a solution of  $3y + 2 = 2x - 5$ ?

- A. (-5, 2)
- B. (0, -5)
- C. (5, 1)
- D. (7, 5)

Explanation of correct answer: The correct answer is choice (C) (5, 1). Also, if the values of  $x$  and  $y$  are substituted into the equation, the statement becomes  $5 = 5$ , which is a true statement. This shows that the ordered pair is a solution of the equation.

5. A manager is comparing the cost of buying baseball caps from two different companies.

- Company X charges a \$50 fee plus \$7 per baseball cap.
- Company Y charges a \$30 fee plus \$9 per baseball cap.

For what number of baseball caps will the cost be the same at both companies?

- A. 10
- B. 20
- C. 40
- D. 100

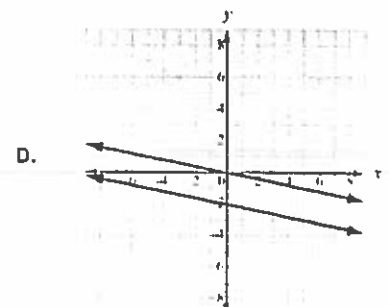
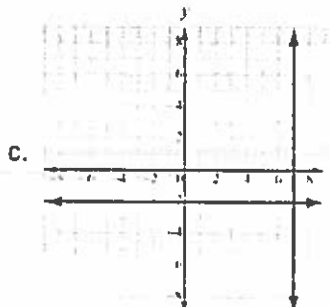
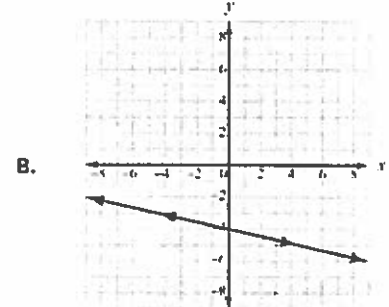
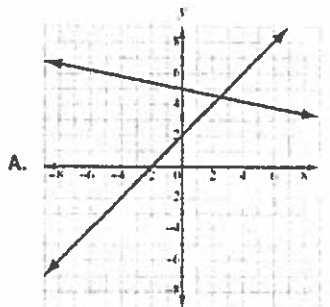
Correct Answer:

6. A shop sells one-pound bags of peanuts for \$2 and three-pound bags of peanuts for \$5. If 9 bags are purchased for a total cost of \$36, how many three-pound bags were purchased?

- A. 3
- B. 6
- C. 9
- D. 18

Correct Answer:

7. Which graph represents a system of linear equations that has multiple common coordinate pairs?



1. Which function represents the sequence?

$n$	1	2	3	4	5	...
$a_n$	3	10	17	24	31	...

- A.  $f(n) = n + 3$   
 B.  $f(n) = 7n - 4$   
 C.  $f(n) = 3n + 7$   
 D.  $f(n) = n + 7$

Correct Answer:

2. Each week, Tim wants to increase the number of sit-ups he does daily by 2 sit-ups. The first week, he does 15 sit-ups each day.

Write an explicit function in the form  $f(n) = mn + b$  to represent the number of sit-ups,  $f(n)$ , Tim does daily in week  $n$ .

Solution:

1. Look at the sequence in this table.

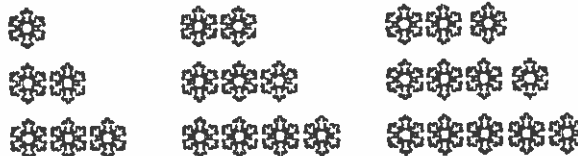
$n$	1	2	3	4	5	...
$a_n$	-1	1	3	5	7	...

Which function represents the sequence?

- A.  $a_n = a_{n-1} + 1$   
 B.  $a_n = a_{n-1} + 2$   
 C.  $a_n = 2a_{n-1} - 1$   
 D.  $a_n = 2a_{n-1} - 3$

Correct Answer:

2. Consider this pattern.



Which function represents the sequence that represents the pattern?

- A.  $a_n = a_{n-1} - 3$   
 B.  $a_n = a_{n-1} + 3$   
 C.  $a_n = 3a_{n-1} - 3$   
 D.  $a_n = 3a_{n-1} + 3$

Correct Answer:

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3. Which function is modeled in this table?

$x$	$f(x)$
1	8
2	11
3	14
4	17

- A.  $f(x) = x + 7$
- B.  $f(x) = x + 9$
- C.  $f(x) = 2x + 5$
- D.  $f(x) = 3x + 5$

Correct Answer:

4. Which explicit formula describes the pattern in this table?

$d$	$C$
2	6.28
3	9.42
5	15.70
10	31.40

- A.  $d = 3.14 \times C$
- B.  $3.14 \times C = d$
- C.  $31.4 \times 10 = C$
- D.  $C = 3.14 \times d$

Correct Answer:

5. If  $f(12) = 4(12) - 20$ , which function gives  $f(x)$ ?

- A.  $f(x) = 4x$
- B.  $f(x) = 12x$
- C.  $f(x) = 4x - 20$
- D.  $f(x) = 12x - 20$

Correct Answer:

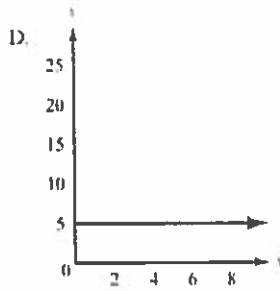
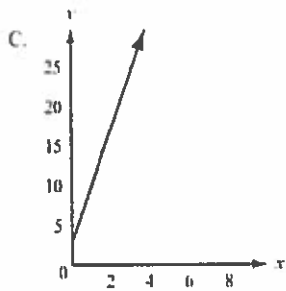
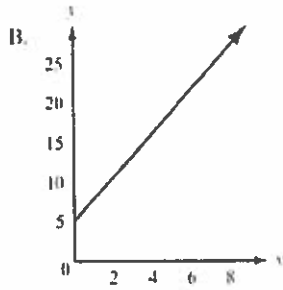
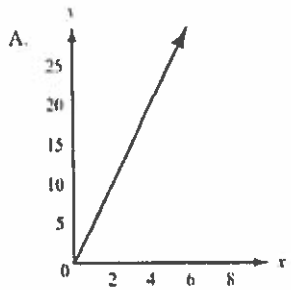
1. A wild horse runs at a rate of 8 miles an hour for 6 hours. Let  $y$  be the distance, in miles, the horse travels for a given amount of time,  $x$ , in hours. This situation can be modeled by a function.

Which of these describes the domain of the function?

- A.  $0 \leq x \leq 6$
- B.  $0 \leq y \leq 6$
- C.  $0 \leq x \leq 48$
- D.  $0 \leq y \leq 48$

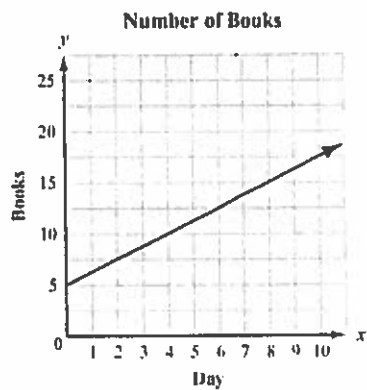
Correct Answer:

1. To rent a canoe, the cost is \$3 for the oars and life preserver, plus \$5 an hour for the canoe. Which graph models the cost of renting a canoe?



Correct Answer:

2. Juan and Patti decided to see who could read more books in a month. They began to keep track after Patti had already read 5 books that month. This graph shows the number of books Patti read for the next 10 days and the rate at which she will read for the rest of the month.



If Juan does not read any books before day 4 and he starts reading at the same rate as Patti for the rest of the month, how many books will he have read by day 12?

- A. 5
- B. 10
- C. 15
- D. 20

Correct Answer:

1. Which expression is equivalent to  $121x^2 - 64y^2$ ?

- A.  $(11x - 16y)(11x + 16y)$
- B.  $(11x - 16y)(11x - 16y)$
- C.  $(11x + 8y)(11x + 8y)$
- D.  $(11x + 8y)(11x - 8y)$

Correct Answer:

2. What is a common factor for the expression  $24x^2 + 16x + 144$ ?

- A. 16
- B.  $8x$
- C.  $3x^2 + 2x + 18$
- D.  $8(x - 2)(3x^2 + 9)$

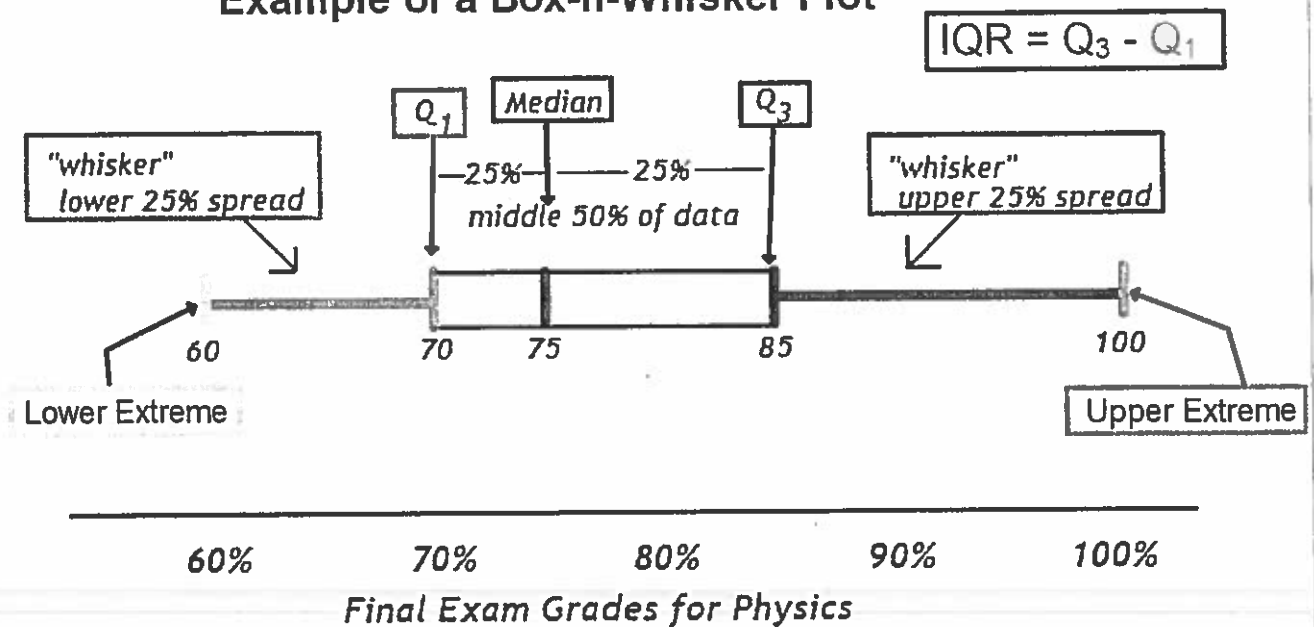
Correct Answer:

3. Which of these shows the complete factorization of  $6x^2y^2 - 9xy - 42$ ?

- A.  $3(2xy^2 - 7)(xy^2 + 2)$
- B.  $(3xy + 6)(2xy - 7)$
- C.  $3(2xy - 7)(xy + 2)$
- D.  $(3xy^2 + 6)(2xy^2 - 7)$

Correct Answer:

### Example of a Box-n-Whisker Plot



1. What are the zeros of the function represented by the quadratic expression  $2x^2 + x - 3$ ?

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

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

C.  $x = -1$  and  $x = \frac{2}{3}$

D.  $x = -1$  and  $x = -\frac{3}{2}$

Correct Answer: A

3. Which of these is the result of completing the square for the expression  $x^2 + 8x - 30$ ?

A.  $(x + 4)^2 - 30$

B.  $(x + 4)^2 - 46$

C.  $(x + 8)^2 - 30$

D.  $(x + 8)^2 - 94$

Correct Answer: B

2. What is the vertex of the graph of  $f(x) = x^2 + 10x - 9$ ?

A. (5, 66)

B. (5, -9)

C. (-5, -9)

D. (-5, -34)

Correct Answer: D

4. The expression  $-x^2 + 70x - 600$  represents a company's profit for selling  $x$  items. For which number(s) of items sold is the company's profit equal to \$0?

A. 0 items

B. 35 items

C. 10 items and 60 items

D. 20 items and 30 items

Correct Answer: C

1. A garden measuring 8 feet by 12 feet will have a walkway around it. The walkway has a uniform width, and the area covered by the garden and the walkway is 192 square feet. What is the width of the walkway?

A. 2 feet

B. 3.5 feet

C. 4 feet

D. 6 feet

Correct Answer: A

2. The formula for the area of a circle is  $A = \pi r^2$ . Which equation shows the formula in terms of  $r$ ?

A.  $r = \frac{2A}{\pi}$

B.  $r = \frac{\sqrt{A}}{\pi}$

C.  $r = \sqrt{\frac{A}{\pi}}$

D.  $r = \frac{A}{2\pi}$

Correct Answer: C

1. What are the solutions to the equation  $2x^2 - 2x - 12 = 0$ ?

- A.  $x = -4, x = 3$
- B.  $x = -3, x = 4$
- C.  $x = -2, x = 3$
- D.  $x = -6, x = 2$

Correct Answer: C

2. What are the solutions to the equation  $6x^2 - x - 40 = 0$ ?

- A.  $x = -\frac{8}{3}, x = -\frac{5}{2}$
- B.  $x = -\frac{8}{3}, x = \frac{5}{2}$
- C.  $x = \frac{5}{2}, x = \frac{8}{3}$
- D.  $x = -\frac{5}{2}, x = \frac{8}{3}$

Correct Answer: D

3. What are the solutions to the equation  $x^2 - 5x = 14$ ?

- A.  $x = -7, x = -2$
- B.  $x = -14, x = -1$
- C.  $x = -2, x = 7$
- D.  $x = -1, x = 14$

Correct Answer: C

4. An object is thrown in the air with an initial velocity of 5 m/s from a height of 9 m. The equation  $h(t) = -4.9t^2 + 5t + 9$  models the height of the object in meters after  $t$  seconds.

About how many seconds does it take for the object to hit the ground? Round your answer to the nearest tenth of a second.

- A. 0.940 second
- B. 1.50 seconds
- C. 2.00 seconds
- D. 9.00 seconds

Correct Answer: C

1. What explicit expression can be used to find the next term in this sequence?

2, 8, 18, 32, 50, ...

- A.  $2n$
- B.  $2n + 6$
- C.  $2n^2$
- D.  $2n^2 + 1$

Correct Answer: C

2. The function  $s(t) = vt + h - 0.5at^2$  represents the height of an object,  $s$ , from the ground after the time,  $t$ , when the object is thrown with an initial velocity of  $v$  at an initial height of  $h$  and where  $a$  is the acceleration due to gravity (32 feet per second squared).

A baseball player hits a baseball 4 feet above the ground with an initial velocity of 80 feet per second. About how long will it take the baseball to hit the ground?

- A. 2 seconds
- B. 3 seconds
- C. 4 seconds
- D. 5 seconds

Correct Answer: D

3. A café's annual income depends on  $x$ , the number of customers. The function  $I(x) = 4x^2 - 20x$  describes the café's total annual income. The function  $C(x) = 2x^2 + 5$  describes the total amount the café spends in a year. The café's annual profit,  $P(x)$ , is the difference between the annual income and the amount spent in a year.

Which function describes  $P(x)$ ?

- A.  $P(x) = 2x^2 - 20x - 5$
- B.  $P(x) = 4x^2 - 20x^2$
- C.  $P(x) = 6x^2 - 20x + 5$
- D.  $P(x) = 8x^4 - 40x^3 - 20x^2 - 100x$

Correct Answer: C



1. Which statement BEST describes the graph of  $f(x + 6)$ ?

- A. The graph of  $f(x)$  is shifted up 6 units.
- B. The graph of  $f(x)$  is shifted left 6 units.
- C. The graph of  $f(x)$  is shifted right 6 units.
- D. The graph of  $f(x)$  is shifted down 6 units.

Correct Answer: B

2. Which of these is an even function?

- A.  $f(x) = 5x^2 - x$
- B.  $f(x) = 3x^3 + x$
- C.  $f(x) = 6x^2 - 8$
- D.  $f(x) = 4x^3 + 2x^2$

Correct Answer: C

3. Which statement BEST describes how the graph of  $g(x) = -3x^2$  compares to the graph of  $f(x) = x^2$ ?

- A. The graph of  $g(x)$  is a vertical stretch of  $f(x)$  by a factor of 3.
- B. The graph of  $g(x)$  is a reflection of  $f(x)$  across the  $x$ -axis.
- C. The graph of  $g(x)$  is a vertical shrink of  $f(x)$  by a factor of  $\frac{1}{3}$  and a reflection across the  $x$ -axis.
- D. The graph of  $g(x)$  is a vertical stretch of  $f(x)$  by a factor of 3 and a reflection across the  $x$ -axis.

Correct Answer: D

1. A flying disk is thrown into the air from a height of 25 feet at time  $t = 0$ . The function that models this situation is  $h(t) = -16t^2 + 75t + 25$ , where  $t$  is measured in seconds and  $h$  is the height in feet. What values of  $t$  best describe the times when the disk is flying in the air?

- A.  $0 < t < 5$
- B.  $0 < t < 25$
- C. all real numbers
- D. all positive integers

Correct Answer: A

2. Use this table to answer the question.

$x$	$f(x)$
-2	15
-1	9
0	5
1	3
2	3

What is the average rate of change of  $f(x)$  over the interval  $-2 \leq f(x) \leq 0$ ?

- A. -10
- B. -5
- C. 5
- D. 10

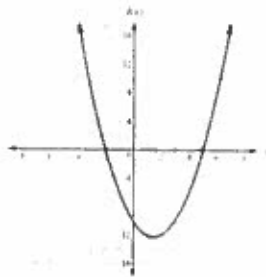
Correct Answer: B

3. What is the end behavior of the graph of  $f(x) = -0.25x^2 - 2x + 1$ ?

- A. As  $x$  increases,  $f(x)$  increases.  
As  $x$  decreases,  $f(x)$  decreases.
- B. As  $x$  increases,  $f(x)$  decreases.  
As  $x$  decreases,  $f(x)$  decreases.
- C. As  $x$  increases,  $f(x)$  increases.  
As  $x$  decreases,  $f(x)$  increases.
- D. As  $x$  increases,  $f(x)$  decreases.  
As  $x$  decreases,  $f(x)$  increases.

Correct Answer: B

1. Use this graph to answer the question.



Which function is shown in the graph?

- A.  $f(x) = x^2 - 3x - 10$
- B.  $f(x) = x^2 + 3x - 10$
- C.  $f(x) = x^2 + x - 12$
- D.  $f(x) = x^2 - 5x - 8$

Correct Answer: A

2. The function  $f(t) = -16t^2 + 64t + 5$  models the height of a ball that was hit into the air, where  $t$  is measured in seconds and  $h$  is the height in feet. This table represents the height,  $g(t)$ , of a second ball that was thrown into the air.

Time, $t$ (in seconds)	Height, $g(t)$ (in feet)
0	4
1	36
2	36
3	4

Which statement BEST compares the length of time each ball is in the air?

- A. The ball represented by  $f(t)$  is in the air for about 5 seconds, and the ball represented by  $g(t)$  is in the air for about 3 seconds.
- B. The ball represented by  $f(t)$  is in the air for about 3 seconds, and the ball represented by  $g(t)$  is in the air for about 5 seconds.
- C. The ball represented by  $f(t)$  is in the air for about 3 seconds, and the ball represented by  $g(t)$  is in the air for about 4 seconds.
- D. The ball represented by  $f(t)$  is in the air for about 4 seconds, and the ball represented by  $g(t)$  is in the air for about 3 seconds.

Correct Answer: D

1. A certain population of bacteria has an average growth rate of 2%. The formula for the growth of the bacteria's population is  $A = P_0 \cdot 1.02^t$ , where  $P_0$  is the original population and  $t$  is the time in hours.

If you begin with 200 bacteria, about how many bacteria will there be after 100 hours?

- A. 7
- B. 272
- C. 1.476
- D. 20,000

Correct Answer: C

1. Which function represents this sequence?

$n$	1	2	3	4	5	...
$a_n$	6	18	54	162	486	...

- A.  $f(n) = 3^{n-1}$
- B.  $f(n) = 6^{n-1}$
- C.  $f(n) = 3(6^{n-1})$
- D.  $f(n) = 6(3^{n-1})$

Correct Answer: D

2. The points (0, 1), (1, 5), (2, 25), and (3, 125) are on the graph of a function. Which equation represents that function?

- A.  $f(x) = 2^x$
- B.  $f(x) = 3^x$
- C.  $f(x) = 4^x$
- D.  $f(x) = 5^x$

Correct Answer: D

1. Which function shows the function  $f(x) = 3^x$  being translated 5 units to the left?

- A.  $f(x) = 3^x - 5$
- B.  $f(x) = 3^{x+5}$
- C.  $f(x) = 3^{x-5}$
- D.  $f(x) = 3^x + 5$

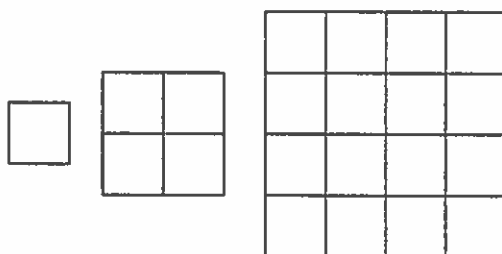
Correct Answer: B

2. Which function shows the function  $f(x) = 3^x$  being translated 5 units down?

- A.  $f(x) = 3^x - 5$
- B.  $f(x) = 3^{x+5}$
- C.  $f(x) = 3^{x-5}$
- D.  $f(x) = 3^x + 5$

Correct Answer: A

1. Consider this pattern.



Which function represents the sequence that represents the pattern?

- A.  $a_n = (4)^{n-1}$
- B.  $a_n = (4)^{2n-1}$
- C.  $a_n = (a_n)(4)^{n-1}$
- D.  $a_n = (a_n)^4$

Correct Answer: A

2. Which function is modeled in this table?

x	f(x)
1	1000
2	800
3	640
4	512

- A.  $1,000(0.80)^x$
- B.  $1,000(0.20)^x$
- C.  $1,000(0.80)^x$
- D.  $1,000(0.20)^x$

Correct Answer: C

3. Which explicit formula describes the pattern in this table?

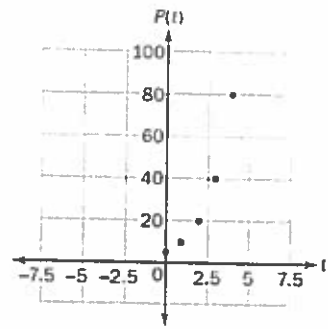
d	C
0	1
1	6
2	36
3	216

4. If  $f(12) = 100(0.50)^{12}$ , which expression gives  $f(x)$ ?

- A.  $f(x) = 12^x$
- B.  $f(x) = 100^x$
- C.  $f(x) = 100(x)^{12}$
- D.  $f(x) = 100(12)^x$

- A.  $C = 6d$
- B.  $C = d + 6$
- C.  $C = 6^d$
- D.  $C = d^6$

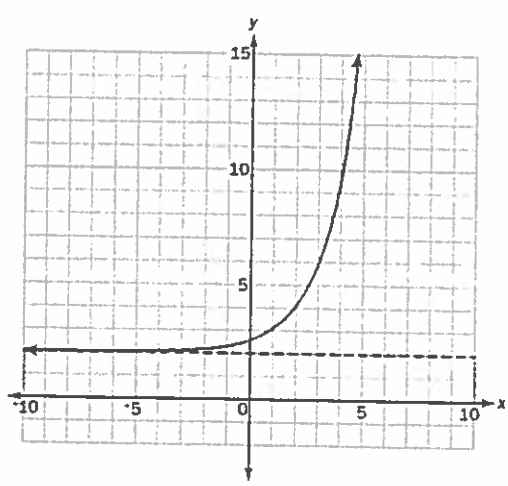
1. A population of squirrels doubles every year. Initially, there were 5 squirrels. A biologist studying the squirrels created a function to model their population growth:  $P(t) = 5(2^t)$ , where  $t$  is the time in years. The graph of the function is shown.



- What is the range of the function?
- A. any real number
  - B. any whole number greater than 0
  - C. any whole number greater than 5
  - D. any whole number greater than or equal to 5

Correct Answer: D

1. Look at the graph.

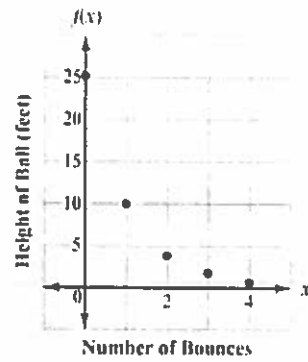


Which equation represents this graph?

- A.  $y = 2^{(x+1)} - 2$
- B.  $y = 2^{(x-1)} + 2$
- C.  $y = 2^{(x+2)} - 1$
- D.  $y = 2^{(x-2)} + 1$

Correct Answer: B

2. The function graphed on this coordinate grid shows  $f(x)$ , the height of a dropped ball in feet after its  $x$ th bounce.

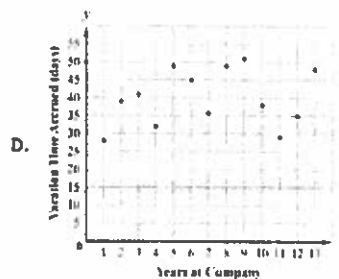
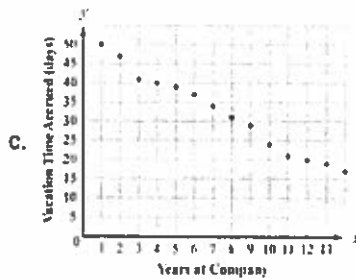
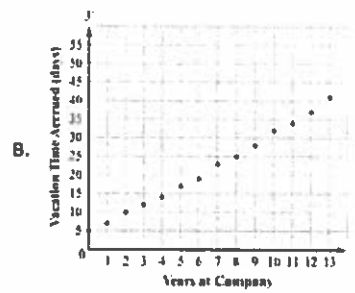
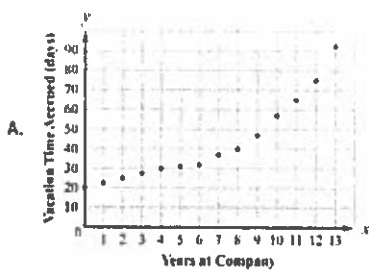


On which bounce was the height of the ball 10 feet?

- A. bounce 1
- B. bounce 2
- C. bounce 3
- D. bounce 4

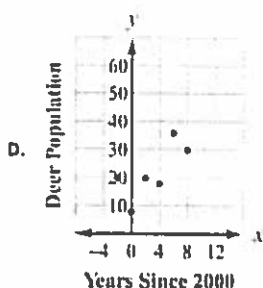
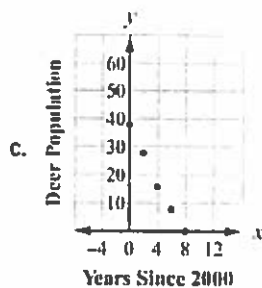
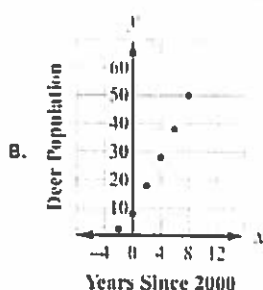
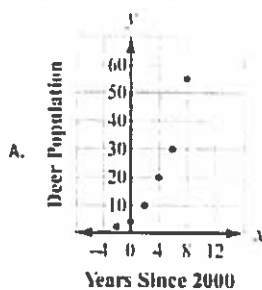
Correct Answer: A

1. Which scatter plot BEST represents a model of linear growth?



Correct Answer: B

2. Which scatter plot BEST represents a model of exponential growth?



Correct Answer: A

3. Which table represents an exponential function?

A. 

x	0	1	2	3	4
y	5	6	7	8	9

B. 

x	0	1	2	3	4
y	0	22	44	66	88

C. 

x	0	1	2	3	4
y	5	13	21	29	37

D. 

x	0	1	2	3	4
y	0	3	9	27	81

Correct Answer: D

4. A table of values is shown for  $f(x)$  and  $g(x)$ .

x	$f(x)$
0	0
1	1
2	4
3	9
4	16
5	25

x	$g(x)$
0	-2
1	-1
2	1
3	5
4	13
5	29

Which statement compares the graphs of  $f(x)$  and  $g(x)$  over the interval  $[0, 5]$ ?

- A. The graph of  $f(x)$  always exceeds the graph of  $g(x)$  over the interval  $[0, 5]$ .
- B. The graph of  $g(x)$  always exceeds the graph of  $f(x)$  over the interval  $[0, 5]$ .
- C. The graph of  $g(x)$  exceeds the graph of  $f(x)$  over the interval  $[0, 4]$ , the graphs intersect at a point between 4 and 5, and then the graph of  $f(x)$  exceeds the graph of  $g(x)$ .
- D. The graph of  $f(x)$  exceeds the graph of  $g(x)$  over the interval  $[0, 4]$ , the graphs intersect at a point between 4 and 5, and then the graph of  $g(x)$  exceeds the graph of  $f(x)$ .

Correct Answer: D

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5. Which statement is true about the graphs of exponential functions?

- A. The graphs of exponential functions never exceed the graphs of linear and quadratic functions.
- B. The graphs of exponential functions always exceed the graphs of linear and quadratic functions.
- C. The graphs of exponential functions eventually exceed the graphs of linear and quadratic functions.
- D. The graphs of exponential functions eventually exceed the graphs of linear functions but not quadratic functions.

Correct Answer: C

6. Which statement BEST describes the comparison of the function values for  $f(x)$  and  $g(x)$ ?

$x$	$f(x)$	$g(x)$
0	0	-10
1	2	-9
2	4	-6
3	6	-1
4	8	6

- A. The values of  $f(x)$  will always exceed the values of  $g(x)$ .
- B. The values of  $g(x)$  will always exceed the values of  $f(x)$ .
- C. The values of  $f(x)$  exceed the values of  $g(x)$  over the interval  $[0, 5]$ .
- D. The values of  $g(x)$  begin to exceed the values of  $f(x)$  within the interval  $[4, 5]$ .

Correct Answer: D

1. If the parent function is  $f(x) = mx + b$ , what is the value of the parameter  $m$  for the line passing through the points  $(-2, 7)$  and  $(4, 3)$ ?

- A. -9
- B.  $-\frac{3}{2}$
- C. -2
- D.  $-\frac{2}{3}$

Correct Answer: D

2. Consider this function for cell duplication. The cells duplicate every minute.

$$f(x) = 75(2)^x$$

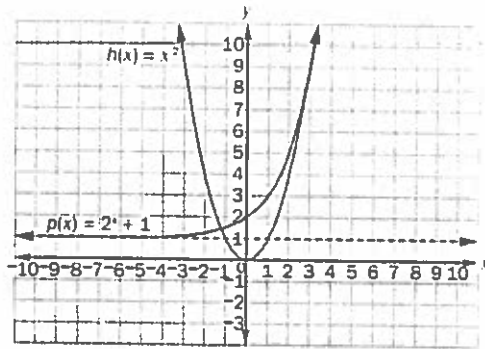
Describe the parameters of this function.

Solution:

Seventy-five is the initial number of cells. The 2 indicates that the number of cells doubles every minute.



1. Look at the graph of the functions  $h(x)$  and  $p(x)$ .



Which transformations of  $h(x)$  and  $p(x)$  translate each function so both pass through the point  $(0, 1)$ ?

- A.  $h(x - 1) = (x - 1)^2$  and  $p(x + 1) = 2^{(x+1)} + 1$   
 B.  $h(x + 1) = (x + 1)^2$  and  $p(x - 1) = 2^{(x-1)} + 1$   
 C.  $h(x) - 1 = x^2 - 1$  and  $p(x) + 1 = 2^x + 1$   
 D.  $h(x) + 1 = x^2 + 1$  and  $p(x) - 1 = 2^x - 1$

Correct Answer: D

2. Look at the functions  $f(x)$  and  $g(x)$ .

$$f(x) = x^2$$

$$g(x) = 2^x + 3$$

Which transformation of  $f(x)$  makes  $f(x) < g(x)$ ?

- A.  $f(-x)$   
 B.  $-f(x)$   
 C.  $\frac{1}{2}f(x)$   
 D.  $2f(x)$

Correct Answer: B

1. Which function is modeled in this table?

$x$	$f(x)$
1	8
2	40
3	200
4	1,000

- A.  $f(x) = x + 7$   
 B.  $f(x) = 5x + 8$   
 C.  $f(x) = (8)^x$   
 D.  $f(x) = \frac{8}{5}(5)^x$

Correct Answer: D

2. If  $f(12) = 4(12) - 20$ , which function gives  $f(x)$ ?

- A.  $f(x) = 4x^2 - 20$   
 B.  $f(x) = 4^x - 20$   
 C.  $f(x) = 4x - 20$   
 D.  $f(x) = 4x^2 + 12x - 20$

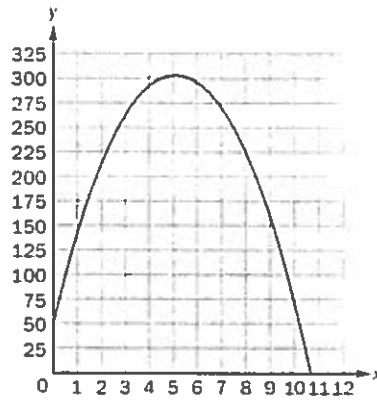
Correct Answer: C

3. Which function has a range of  $f(x) \leq \frac{3}{4}$ ?

- A.  $f(x) = \frac{3}{4}x + 5$   
 B.  $f(x) = -x^2 + \frac{3}{4}$   
 C.  $f(x) = x^2 - \frac{3}{4}$   
 D.  $f(x) = \frac{3}{4} - 5x$

Correct Answer: B

2. The graph shows the height,  $y$ , in meters, of a rocket above sea level in terms of the time,  $t$ , in seconds, since it was launched. The rocket landed at sea level.



What does the x-intercept represent in this situation?

- A. the height from which the rocket was launched
- B. the time it took the rocket to return to the ground
- C. the total distance the rocket flew while it was in flight
- D. the time it took the rocket to reach the highest point in its flight

Correct Answer: B

1. This table shows the average low temperature, in °F, recorded in Macon, GA, and Charlotte, NC, over a six-day period.

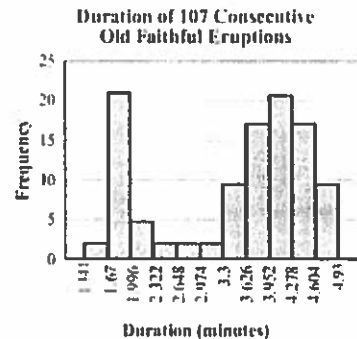
Day	1	2	3	4	5	6
Temperature in Macon, GA (°F)	71	72	66	69	71	73
Temperature in Charlotte, NC (°F)	69	64	68	74	71	75

Which conclusion can be drawn from the data?

- A. The interquartile range of the temperatures is the same for both cities.
- B. The lower quartile for the temperatures in Macon is higher than the lower quartile for the temperatures in Charlotte.
- C. The mean and median temperature in Macon are higher than the mean and median temperature in Charlotte.
- D. The upper quartile for the temperatures in Macon is higher than the upper quartile for the temperatures in Charlotte.

Correct Answer: C

6. This histogram shows the frequency distribution of duration times for 107 consecutive eruptions of the Old Faithful geyser. The duration of an eruption is the length of time, in minutes, from the beginning of the spewing of water until it stops. What is the BEST description for the distribution?



5. Peter went bowling every week. For this data, what is the BEST description of the distribution?

- A. The minimum value is the same as the maximum value.
- B. The lower quartile is the same as the upper quartile.
- C. The mean is the same as the median.
- D. The mode is the same as the range.

Correct Answer: C

What is the BEST description of the distribution?

- A. Peter received a perfect score.
  - B. Peter had one perfect score.
  - C. Peter did not receive a perfect score.
  - D. Peter had one perfect score and one perfect game.
- Correct Answer: B

Correct Answer: A

1. This table shows the average low temperature, in °F, recorded in Macon, GA, and Charlotte, NC, over a six-day period.

Day	1	2	3	4	5	6
Temperature in Macon, GA (°F)	71	72	66	69	71	73
Temperature in Charlotte, NC (°F)	69	64	68	74	71	75

Which conclusion can be drawn from the data?

- A. The interquartile range of the temperatures is the same for both cities.
- B. The lower quartile for the temperatures in Macon is less than the lower quartile for the temperatures in Charlotte.
- C. The mean and median temperatures in Macon were higher than the mean and median temperatures in Charlotte.
- D. The upper quartile for the temperatures in Charlotte was less than the upper quartile for the temperatures in Macon.

Correct Answer: C

2. A school was having a coat drive for a local shelter. A teacher determined the median number of coats collected per class and the interquartile range of the number of coats collected per class for the freshmen and for the sophomores.

- The freshmen collected a median number of coats per class of 10, and the interquartile range was 6.
- The sophomores collected a median number of coats per class of 10, and the interquartile range was 4.

Which range of numbers includes the third quartile of coats collected for both freshmen and sophomore classes?

- A. 4 to 14
- B. 6 to 14
- C. 10 to 16
- D. 12 to 15

Correct Answer: C

3. A reading teacher recorded the number of pages read in an hour by each of her students. The numbers are shown below.

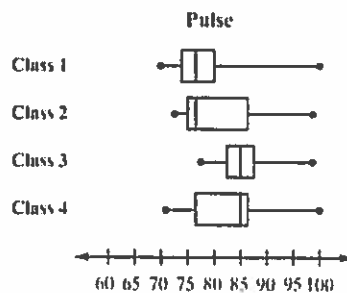
44, 49, 39, 43, 50, 44, 45, 49, 51

For this data, which summary statistic is NOT correct?

- A. The minimum is 39.
- B. The lower quartile is 44.
- C. The median is 45.
- D. The maximum is 51.

Correct Answer: B

4. A science teacher recorded the pulse of each of the students in her classes after the students had climbed a set of stairs. She displayed the results, by class, using the box plots shown.



Which class generally had the highest pulse after climbing the stairs?

- A. Class 1
- B. Class 2
- C. Class 3
- D. Class 4

Correct Answer: C

5. Peter went bowling, Monday to Friday, two weeks in a row. He only bowled one game each time he went. He kept track of his scores below.

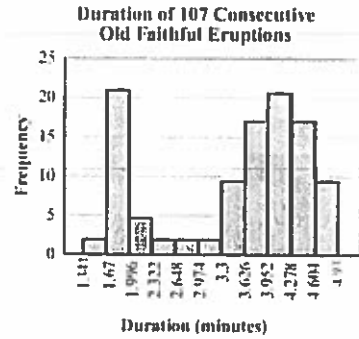
Week 1: 70, 70, 70, 73, 75  
 Week 2: 72, 64, 73, 73, 75

What is the BEST explanation for why Peter's Week 2 mean score was lower than his Week 1 mean score?

- A. Peter received the same score three times in Week 1.
- B. Peter had one very low score in Week 2.
- C. Peter did not beat his high score from Week 1 in Week 2.
- D. Peter had one very high score in Week 1.

Correct Answer: B

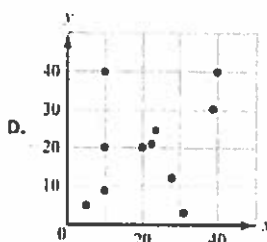
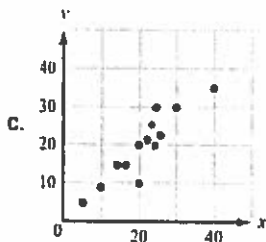
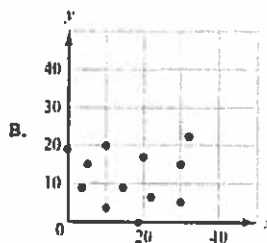
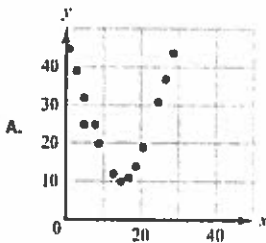
6. This histogram shows the frequency distribution of duration times for 107 consecutive eruptions of the Old Faithful geyser. The duration of an eruption is the length of time, in minutes, from the beginning of the spew of water until it stops. What is the BEST description for the distribution?



- A. bimodal
- B. uniform
- C. multiple outlier
- D. skewed to the right

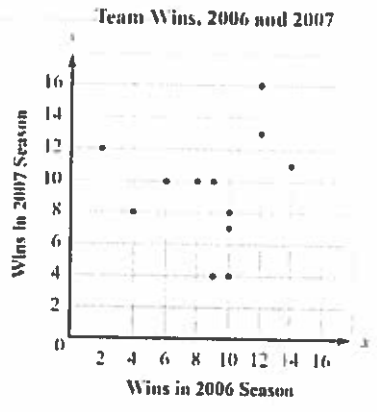
Correct Answer: A

1. Which graph MOST clearly displays a set of data for which a quadratic function is the model of best fit?



Correct Answer: A

2. This graph plots the number of wins in the 2006 season and in the 2007 season for a sample of professional football teams.

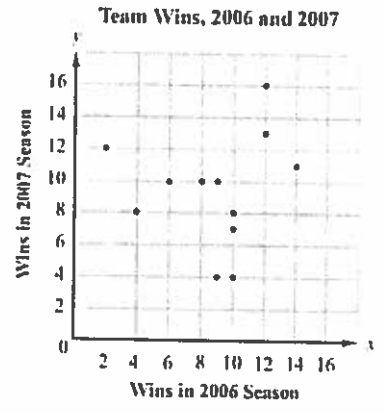


Which equation BEST represents a line that matches the trend of the data?

- A.  $y = x + 2$
- B.  $y = x + 7$
- C.  $y = \frac{3}{5}x + 1$
- D.  $y = \frac{3}{5}x + 5$

Correct Answer: D

1. This graph plots the number of wins in the 2006 season and in the 2007 season for a sample of professional football teams.



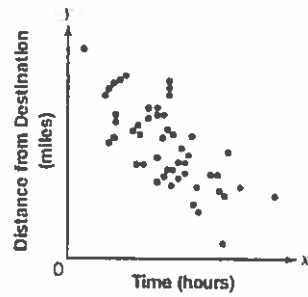
Based on the regression model, what is the predicted number of 2007 wins for a team that won 5 games in 2006?

- A. 4
- B. 7
- C. 8
- D. 12

Correct Answer: C

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2. Which BEST describes the correlation of the two variables shown in the scatter plot?



- A. weak positive
- B. strong positive
- C. weak negative
- D. strong negative

Correct Answer: D

3. Which of these statements is an example of causation?

- A. When the weather becomes warmer, more meat is purchased at the supermarket.
- B. More people go to the mall when students go back to school.
- C. The greater the number of new television shows, the fewer the number of moviegoers.
- D. After operating costs are paid at a toy shop, as more toys are sold, more money is made.

Correct Answer: D

4. To rent a carpet cleaner at the hardware store, there is a set fee and an hourly rate. The rental cost,  $c$ , can be determined using this equation when the carpet cleaner is rented for  $h$  hours.

$$c = 25 + 3h$$

Which of these is the hourly rate?

- A. 3
- B.  $3h$
- C. 25
- D.  $25h$

Correct Answer: A