

Algebra Common Core Review

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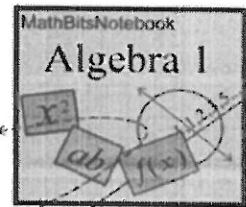
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Algebraic Expressions

Name _____

Directions: Choose the best answer as an algebraic expression for each verbal statement.

- | | |
|---|-----------|
| 1. Four more than six times a number.
[1] $6 + 4n$ [2] $4 + 6n$ [3] $6(4n)$ [4] $4(6n)$ | 1. _____ |
| 2. The product of twenty and a number.
[1] $20 + n$ [2] $20 - n$ [3] $20n$ [4] $20/n$ | 2. _____ |
| 3. The sum of triple a number and the product of four and five.
[1] $3n(4 \cdot 5)$ [2] $3n(4 + 5)$ [3] $(3 + n) \cdot (4 \cdot 5)$ [4] $3n + 4 \cdot 5$ | 3. _____ |
| 4. Twelve less than the product of seven and a number.
[1] $7n - 12$ [2] $12 - 7n$ [3] $7 + n - 12$ [4] $12 - (7 + n)$ | 4. _____ |
| 5. The number of inches in m feet.
[1] $6m$ [2] $12m$ [3] $24m$ [4] $36m$ | 5. _____ |
| 6. Fifteen less than a number divided by 8.
[1] $\frac{n}{8} - 15$ [2] $8n - 15$ [3] $15 - \frac{n}{8}$ [4] $15 - 8n$ | 6. _____ |
| 7. Ian has 67 baseball cards. If he buys c cards each week for w weeks, what is the total number of cards he will have?
[1] $67cw$ [2] $67 + cw$ [3] $67c + w$ [4] $67 + c + w$ | 7. _____ |
| 8. The perimeter of a square with a side of $x + 3$.
[1] $x^2 + 9$ [2] $x^2 + 6x + 9$ [3] $4x + 12$ [4] $4x + 3$ | 8. _____ |
| 9. Colin has 3 more CDs than Angela. Harley has twice as many CDs as Colin. If n represents the number of CDs owned by Angela, express the CDs owned by Harley.
[1] $2n + 3$ [2] $2(n + 3)$ [3] $3(n + 2)$ [4] $2 + (n + 3)$ | 9. _____ |
| 10. Two numbers are consecutive even integers. If the smaller number is $a + 8$, express the larger number.
[1] $a + 10$ [2] $a + 9$ [3] $2(a + 8)$ [4] $a + 6$ | 10. _____ |

MATHCING POLYNOMIALS

Name _____

Part 1 – Sum and Difference

- $(4 + 2x) - (3x - x^2 + 6)$
- $(-x + 1) + (2x - 3)$
- $(6x^2 - 3x - 1) - (x^2 - 5x - 6)$
- $(4x - 2) - (2x - 1)$
- $(2x^3 + x + 4) - (2x^3 - x^2 + 2x - 1)$
- $(3x + 2) - (2x - 4)$
- $(3x^2 + 2x + 5) + (2x^2 + 2)$
- $x + (x - 3)$
- $(x^3 + x^2 + x + 1) + (-x^3 - 2x^2 - 4x - 4)$
- $(x^2 + 2x) + (3 - 3x)$

Part 2 - Product

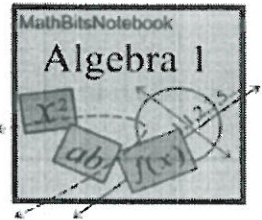
- $8x^2 - 8x + 2$
- $(x - 2)(x - 3)$
- $(x + 3)^2$
- $x^2 + 5x + 6$
- $2x(2x^2 - 2x - 1)$
- $(2x + 1)(2x + 1)$
- $4x^2 - 1$
- $(4x + 1)(2x - 1)$
- $x(4x^2 + 4x + 1)$
- $(x^2 + 2)(x^2 - 2)$

- $(x + 3)(x + 2)$
- $4x^2 + 4x + 1$
- $4x^3 + 4x^2 + x$
- $(4x - 2)(2x - 1)$
- $x^2 - 5x + 6$
- $8x^2 - 2x - 1$
- $(2x + 1)(2x - 1)$
- $x^2 + 6x + 9$
- $4x^3 - 4x^2 - 2x$
- $x^4 - 4$

Applied Polynomials

Name _____

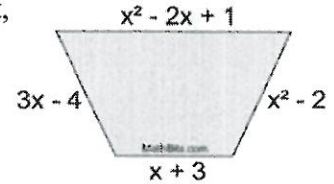
Directions: Choose the best answer to each question. Please show your work!



1. Find an expression for the perimeter of the quadrilateral shown at the right, in terms of x .

- [1] $2x^2 + 2x - 2$
 [3] $2x^2 + 6x + 10$

- [2] $2x^2 - 1$
 [4] $2x^2 + 6x - 2$



2. The height reached by a model rocket launched straight up into the air from a starting height s (feet) off the ground, at a velocity v (feet per second) after time t (seconds) is modeled by the polynomial $-16t^2 + vt + s$. Find the height reached by the model rocket after 8 seconds, if launched from a 1 foot launch pad at a velocity of 184 feet per second.

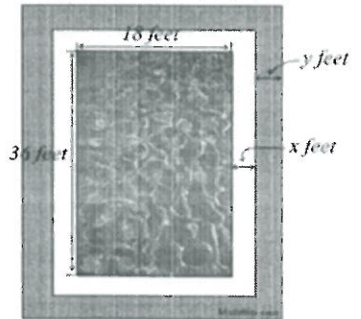
- [1] 448 feet [2] 449 feet [3] 456 feet [4] 1345 feet

3. A rectangular solid (a closed box) is to be covered with a decorative paper. If three of the surface areas of the faces of the box are $48ab \text{ in}^2$, $32ab \text{ in}^2$, and $96ab \text{ in}^2$, write a polynomial that expresses the total surface area of the box, in terms of ab .

- [1] $176ab \text{ in}^2$ [2] $208ab \text{ in}^2$ [3] $352ab \text{ in}^2$ [4] $384ab \text{ in}^2$

4. A new 18 ft. by 36 ft. swimming pool is being surrounded by a concrete side walk (x ft. wide all around) and a planting area (y ft. wide all around). Express the amount of fencing needed to enclose this new pool addition (the pool, the sidewalk and the planting area), in terms of x and y .

- [1] $54 + 4x + 4y$
 [2] $108 + 8x + 8y$
 [3] $54 + 2x + 2y$
 [4] $108 + 4x + 4y$



5. The side of a game cube is represented by $x - 4$. Express the volume of the cube, in terms of x .

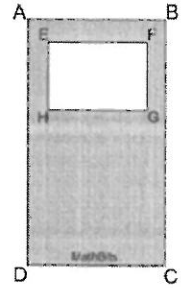
- [1] $x^2 - 8x + 16$ cubic units [2] $x^3 - 12x^2 + 48x - 64$ cubic units
 [3] $x^3 - 12x^2 - 16x - 64$ cubic units [4] $x^3 + 12x^2 + 48x + 64$ cubic units

6. The glass in a picture frame measures 8 in. by 10 in. The border of the frame is a consistent x inches in width. Express the area of the frame's border, in terms of x .

- [1] $4x^2 + 36x + 80 \text{ in}^2$
 [2] $x^2 + 18x + 80 \text{ in}^2$
 [3] $4x^2 + 36x \text{ in}^2$
 [4] $x^2 + 18x \text{ in}^2$



7. The area of rectangle $ABCD$ is $2x^2 + 17x + 30$ square units. The area of rectangle $EFGH$ is $x^2 - x - 6$ square units. If $EFGH$ is cut out of $ABCD$, express the area, in square units, of the shaded region which will be left (in terms of x).



- [1] $x^2 + 16x + 24$
 [2] $x^2 + 18x + 36$
 [3] $3x^2 + 16x + 24$
 [4] $x^2 + 17x + 36$

8. The length of a rectangular billboard is three feet less than twice its width, w . Express the area of the billboard in square feet (in terms of w).

- [1] $3w - 2w^2$ [2] $2w^2 - 3$ [3] $2w^2 - 3w$ [4] $3 + 2w^2$

9. The ages of three friends in a band are represented by three consecutive even integers. If the youngest age is represented by a , express the sum of the ages of the friends, in terms of a .

- [1] $3a + 3$ [2] $3a + 6$ [3] $3a + 12$ [4] $a^2 + 3a + 2$

10. The area of a parallelogram is $10x^2 + 16x - 8$ square units. A circle has a radius of x units. A right triangle has legs of x units and $x - 1$ units. Express the total area, in square units, of all three shapes (in terms of x and π).

- [1] $\frac{21\pi}{2}x^2 + \frac{31}{2}x - 8$ [2] $(11\pi)x^2 + 15x - 8$
 [3] $\left(\frac{21}{2} + \pi\right)x^2 + \frac{31}{2}x - 8$ [4] $(11 + \pi)x^2 + 15x - 8$

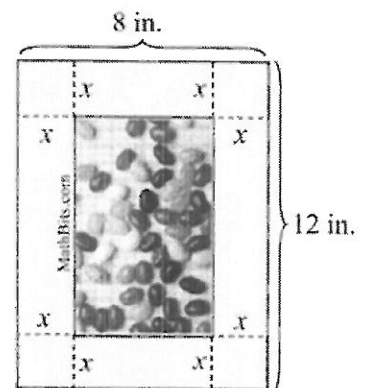
11. The area of a circle is expressed as $9\pi x^2$ square units. Express, in terms of x , the diameter of the circle.

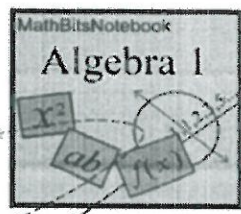
- [1] $9x^2$ [2] $3x$ [3] $6x$ [4] $3x^2$

12. Mrs. Smith is using 8 in. by 12 in. sheets of construction paper to make jelly bean baskets for her second grade students. She cuts congruent squares from each corner of the paper, and folds up the sides to create the open basket.

Express the volume of the basket, in terms of x .

- [1] $4x^2 - 40x + 96$
 [2] $4x^3 + 40x^2 + 96x$
 [3] $4x^2 + 40x + 96$
 [4] $4x^3 - 40x^2 + 96x$





Factoring Mixed Practice

Name _____

Directions: Circle the correct answer to these factoring questions.

1. Factor completely: $x^2 - 49$

- [1] $(x + 7)(x + 7)$ [2] $(x - 7)(x - 7)$
[3] $(x + 7)(x - 7)$ [4] $(x - 7)^2$

2. Factor completely: $6x^2 - 15x - 9$

- [1] $(2x + 1)(3x - 9)$ [2] $(2x - 1)(3x - 9)$
[3] $3(x + 3)(2x - 1)$ [4] $3(2x + 1)(x - 3)$

3. Factor completely: $a^3b - 49ab^3$

- [1] $a^3b^3(a + b)(a - b)$
[2] $a^3b(a + 7b)(a - 7b)$
[3] $ab(a + 7b)(a - 7b)$
[4] $a(a^2b + 7b)(a - 7b^2)$

4. Factor completely: $4m^2 - 24m + 36$

- [1] $4(m - 3)^2$ [2] $4(m - 3)(m + 3)$
[3] $4(m + 3)^2$ [4] $(2m - 3)(2m + 3)$

5. Factor completely: $-2p^3 + 4p^2 + 14p$

- [1] $-2p(p^2 + 2p - 7)$ [2] $2p(p^2 - 2p + 7)$
[3] $-2p(p + 2)(p - 7)$ [4] $-2p(p^2 - 2p - 7)$

6. Factor completely: $x^4 - 81$

- [1] $(x^2 + 9)(x^2 - 9)$
[2] $(x - 3)(x + 3)(x^2 + 9)$
[3] $(x^2 - 9)^2$
[4] $(x - 3)^2(x^2 + 9)$

7. Factor completely:

$$(a + 2)(a + 3) + (a - 1)(a + 3)$$

- [1] $(a + 3)(2a - 1)$ [2] $(2a + 1)(a + 3)$
[3] $(a + 3)(a^2 + a - 2)$ [4] $(a - 2)(a + 3)$

8. Factor completely: $\frac{1}{25} - y^2$

- [1] $\left(\frac{1}{5} - y\right)\left(\frac{1}{5} - y\right)$ [2] $\left(\frac{1}{5} + y\right)\left(\frac{1}{5} - y\right)$
[3] $\left(\frac{1}{5} + y\right)\left(\frac{1}{5} + y\right)$ [4] $(5 - y)(5 + y)$

9. Factor completely: $49 - 36x^2y^2$

- [1] $(7 + 6xy)(7 + 6xy)$
[2] $(7 - 6xy)(7 - 6xy)$
[3] $(7 + 6xy)(7 - 6xy)$
[4] $(7 + 4xy)(7 - 9xy)$

10. Factor completely:

$$2(y + 4)^2 + 5(y + 4) - 12$$

- [1] $(2y - 3)(y + 4)$ [2] $(2y + 3)(y - 4)$
[3] $(2y + 5)(y + 8)$ [4] $(2y - 5)(y - 8)$

Factoring by Grouping

Name _____

Directions: Solve the following problems using factoring by grouping. Be sure to show your work.

1. $3x(x-2) + 4(x-2)$

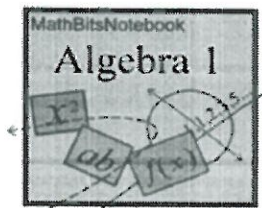
2. $x^2 + 5x - 6$

3. $w^2 + 4w + 3$

4. $6r^2 + r - 12$

5. $2a^2 - 5a - 12$

6. $8x^2 - 20x - 12$



Algebraic Equations

Name _____

Directions: Answer these questions pertaining to algebraic equations.

1. A recipe calls for three times as many blueberries (b) as strawberries (s). Which choice represents this situation?

[1] $s = 3b$ [2] $b = 3s$ [3] sb [4] $s + b$

2. Express the total weight, (p), of a filled animal watering pail, if the pail weighs 12 pounds and the water weighs 8.3 pounds per gallon? [Let gallons = g .]

[1] $p = (8.3)(12)$ [2] $p = 8.3g - 12$
[3] $p = 8.3g + 12$ [4] $p = 12g + 8.3$

3. Carl is thinking of a number. He states that twice the number decreased by six is twenty-four. Which choice can be used to find Carl's number?

[1] $2n + 6 = 24$ [2] $2(n - 6) = 24$
[3] $2(n + 6) = 24$ [4] $2n - 6 = 24$

4. A formula defines a value (v) to be one-half of the sum of three consecutive integers. Which choice represents this situation? [Let x = the first integer.]

[1] $v = 0.5(3x)$ [2] $v = 0.5(x + x+1 + x+2)$
[3] $v = 0.5(x + 3)$ [4] $v = 0.5(x + x+2 + x+4)$

5. The "Bulbs On the Bay" holiday drive-through attraction charges \$12 per car plus \$1 for each individual, (p), in the car. Which choice represents the total cost (c) per car?

[1] $c = p + 12$ [2] $c = 12(p + 1)$ [3] $c = 12p + 1$ [4] $c = 1 \cdot (12p)$

6. A cell phone charges \$65 for the phone and \$24 a month for the service. Which choice represents the cost (c) of the phone for the first m months?

[1] $c = 12m + 89$ [2] $c = (24m + 65)/12$
[3] $c = 24m - 65$ [4] $c = 24m + 65$

1. _____

2. _____

3. _____

4. _____

5. _____

6. _____

7. At the mall, a soda costs \$1.95 (s), a burger costs \$3.20 (b), and chips cost \$2.10 (c). Gelato is an Italian form of ice cream. A gelato booth sells small gelato cones for \$2.95 each (g).

a. Carlos buys a burger, a soda and chips for himself and each of his friends (f). Which choice represents his total cost (t), without tax ?

[1] $t = f(b + s + c)$

[2] $t = (f + 1)(b + s + c)$

[3] $t = f + 1(b + s + c)$

[4] $t = f(b + s + c)$

7a. _____

b. Two of Carlos' friends do not want chips. Which choice will amend the answer to part a to reflect this change in the total cost?

[1] $t = f(b + s + c - 2)$

[2] $t = f(b + s + c) - 2c$

[3] $t = (f + 1)(b + s - 2c)$

[4] $t = (f + 1)(b + s + c) - 2c$

7b. _____

c. Carlos' friend Amanda, says she will pay for the herself and each of the friends to have gelato cone. Three of the friends do not want a cone. Which choice represents Amanda's total charge (ch), without tax?

[1] $ch = g(f - 2)$

[2] $ch = (f + 1)g - 3$

[3] $ch = g(f - 3)$

[4] $ch = (f + 1)(g - 3)$

7c. _____

Working with Equations

Name _____

Solve the following equations for x . When you are finished, ADD all of the answers and place the sum in the box at the bottom of the page. Tear off and hand in.



1. $5(x-2) + 2(x+4) = 26$

2. $-3 = 7 - 2x$

3. $-3(2x+1) + 4x = 11$

4. $\frac{x}{7} + x = 8$

5. $\frac{3}{2} + \frac{x}{10} = \frac{1}{5}$

6. $6x - 8 + 2x = -6 + 9x$

7. $(x^2 + 2x - 5) - (3x + 2) = x^2 - 1$

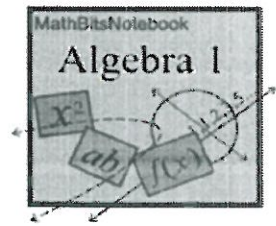
8. $\frac{x}{3} + \frac{x}{4} = 7$



Name _____

The answers add to →

Literal Equations Practice



Name _____

Directions: Please show your work!

M

1. If $k = am + 3mx$, express the value of m in terms of a , k and x .

A

2. If $ba - cd = b$, solve for a .

T

3. If $s = \frac{2x+t}{r}$, express t in terms of r , s and x .

H

4. The volume of a pyramid is given by $V = \frac{1}{3}Bh$.
What is h expressed in terms of B and V ?

R

5. For the equation $\frac{r}{3} + t = w$, express r in terms of t and w .

O

6. If $P = Q^2 \cdot O$, express O in terms of P and Q .

G

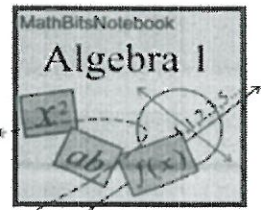
7. Given: $F = \frac{9}{5}C + 32$. Solve for C .

K

8. A formula is expressed as $D = a(2 + kt)$. Express k in terms of D , a and t .

S

9. If $A = C(1 - S^2)$, express S in terms of A and C .



Practice with Graphing Linear Equations

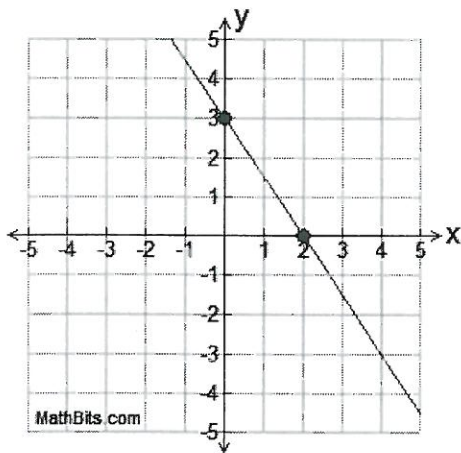
Name _____

Directions: These questions pertain to slopes and graphs of lines. Show work!

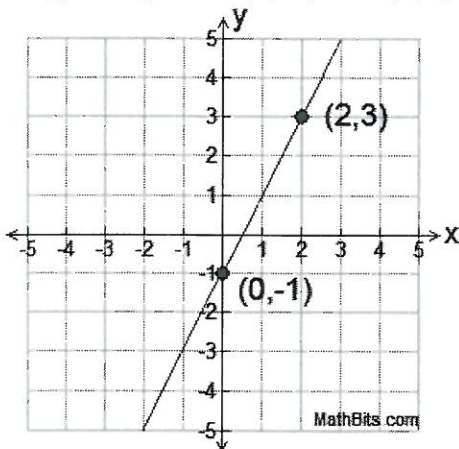
1. Find the slope (m) and y -intercept (b) for $y = 4x - 8$.

2. What is the slope of the line shown in the graph below?

3. What is the equation of the line shown in the graph below?



4. What is the slope of the line passing through the points $(0, -1)$ and $(2, 3)$?



5. Write the equation which has a slope of -2 and a y -intercept of 5 .

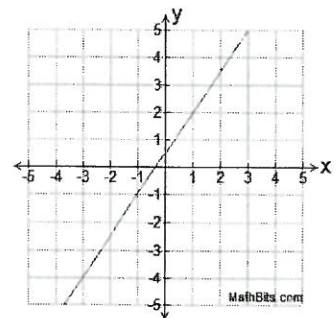
6. Circle the chart which belongs with the graph shown at the right.

x	-3	-1	1	3
y	-3	-1	2	4

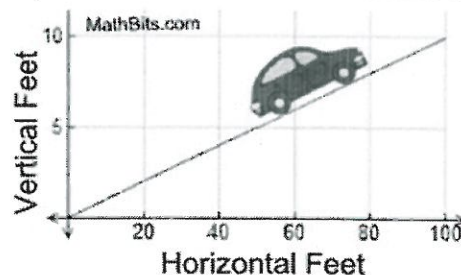
x	-3	-1	1	3
y	-4	-1	2	5

x	-3	-1	1	3
y	-4	-1	1	5

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



7. Omar's garage is 10 feet above, and 100 feet back, from the road in front of his home.



a. What is the slope of his driveway?

b. Write an equation that can be used to model Omar's driveway.

c. If Omar places a pole light at a distance of 40 horizontal feet back from the road, how far above the road will the light be placed (in feet)?

Applications of Quadratic Equations

Name _____

Directions: Solve the following questions using quadratic equations. Please show all work.

1. Two pirate ships leave the same port at the same time. The first ship travels due North at a constant speed while the second ship travels due East at a constant speed. After one hour, the ships are 25 miles apart. The ship traveling North travels 5 mph faster than the ship traveling East. Find the speed of each ship in miles per hour.

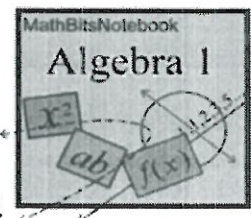


2. A rectangular cartoon photograph is taped to a Wanted Poster. The length of the photograph is 3 inches more than twice its width. If the area of the photograph is 27 square inches, what are the dimensions of the photograph?



3. A rectangular frame is placed around a water-color painting. The width of the frame is consistent around the painting. The dimensions of the painting are 24 inches by 18 inches. What is the width of the frame if the area of the frame is 400 square inches?





Quadratic Graph Practice

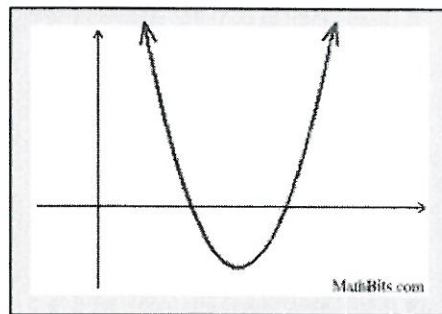
Name _____

Directions: Solve the following problems. Check with a graphing calculator, if needed.

- Consider the equation $y = x^2 - x - 6$. Answer the following questions, stating how you arrived at your answer.
 - Determine whether the parabola opens upward or downward.
 - Find the y -intercept.
 - Find the x -intercepts, if any.
 - Find the equation of the axis of symmetry.
 - Sketch the graph.
- Given a quadratic function, which choice explains the meaning of the zeros graphically.
 - When factored, $f(x) = (x - p)(x - q)$ where p and q correspond to the y -intercepts.
 - When factored, $f(x) = (x - p)(x - q)$ where p and q correspond to the x -intercepts.
 - When factored, $f(x) = (x - p)(x - q)$ where p and q correspond to the turning points.
 - When factored, $f(x) = (x - p)(x - q)$ where p and q correspond to the axis of symmetry.

3. Which of the following equations could describe the function seen in the graph at the right? (Choose all that apply!)

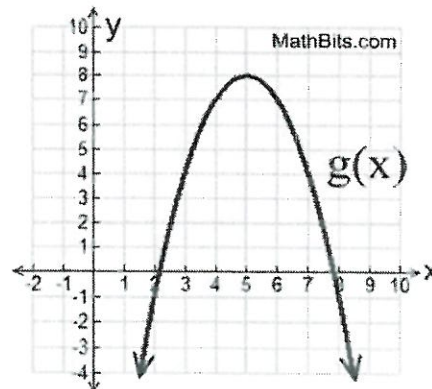
- $y = (x + 2)(x - 5)$
- $y = -2x^2 + 4x - 1$
- $y = (x - 6)(x - 10)$
- $y = (x + 5)^2 + 4$
- $y = (x - 8)^2 - 6$
- $y = (15 - x)(10 - x)$
- $y = (-x + 3)(x - 5)$



4. The equation for function $f(x)$, and the graph of parabolic function $g(x)$ are shown. Which function has the larger maximum?

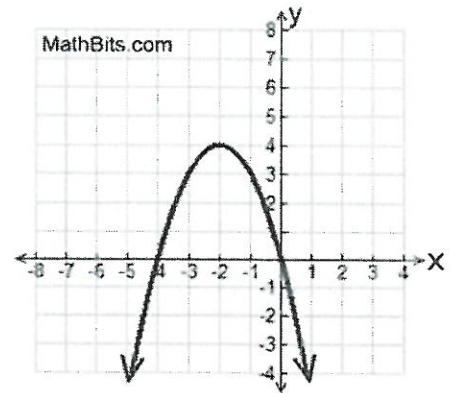
- $f(x)$
- $g(x)$

$$f(x) = -(x - 4)^2 + 5$$



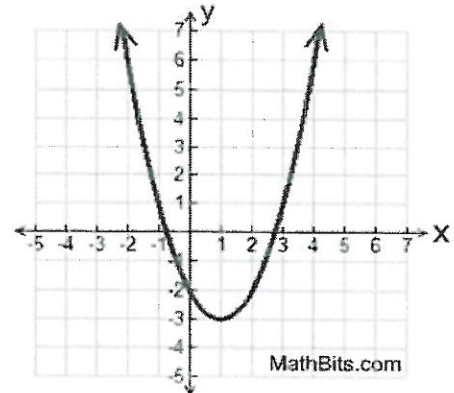
5. What is the equation of the axis of symmetry for this parabola?

- [1] $x = 2$ [2] $y = 4$
 [3] $x = -2$ [4] $y = -2$



6. Which of the following statements is NOT true for the parabola seen in the graph?

- [1] The axis of symmetry is $x = 1$.
 [2] The vertex is $(1, -3)$.
 [3] The "a" coefficient is positive.
 [4] The parabola has two positive roots.

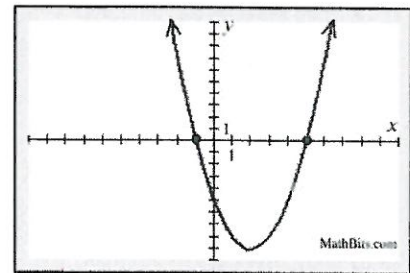


7. What is the equation of the axis of symmetry of the graph: $y = 3x^2 + 6x - 1$?

- [1] $x = 2$ [2] $x = -1$ [3] $x = 1$ [4] $x = -2$

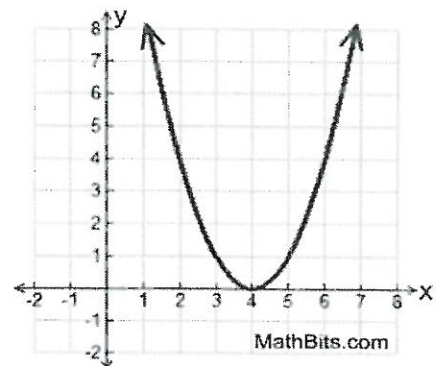
8. Which equation could be the equation of the graphed parabola?

- [1] $y = -x^2 - 4x - 5$ [2] $y = -x^2 + 4x - 5$
 [3] $y = x^2 - 4x - 5$ [4] $y = x^2 + 4x - 5$



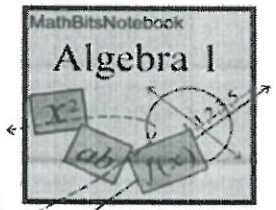
9. What are the roots of the graphed parabola at the right, assuming the roots to be integers?

- [1] $x = \pm 2$ [2] $x = \pm 4$
 [3] $x = 2; x = 2$ [4] $x = 4; x = 4$



10. What is the vertex, or turning point, of the parabola $y = 4x^2 - 6x + 1$?

- [1] $\left(-\frac{3}{2}, 1\right)$ [2] $\left(\frac{3}{2}, -17\right)$ [3] $\left(\frac{3}{4}, -3\frac{1}{4}\right)$ [4] $\left(-\frac{3}{4}, 3\frac{1}{4}\right)$



Quadratic Formula Practice

Name _____

Directions: Solve the follow equations, for the indicated variable, using the quadratic formula. It is possible that some of these problems can also be solved by factoring, but for right now, we are practicing the quadratic formula.

1. Solve using the quadratic formula: $x^2 - 2x - 24 = 0$

- [1] $x = -6; x = 4$ [2] $x = 4; x = 6$ [3] $x = 6; x = -4$ [4] $x = -4; x = -6$

2. Solve using the quadratic formula: $m^2 = 20 - 4m$

- [1] $2 \pm 2\sqrt{6}$ [2] $-2 \pm 2\sqrt{6}$ [3] $-2 \pm 4\sqrt{6}$ [4] $2 \pm 4\sqrt{6}$

3. Solve using the quadratic formula: $x^2 + \frac{1}{3}x + \frac{5}{6} = 0$

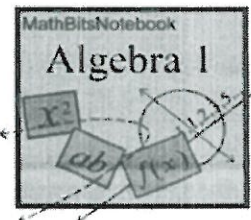
- [1] $\frac{-1 \pm \sqrt{29}}{6}$ [2] $\frac{1 \pm i\sqrt{29}}{6}$ [3] $\frac{-2 \pm \sqrt{29}}{6}$ [4] $\frac{-1 \pm i\sqrt{29}}{6}$

4. Given $y = 16x^2 - 8x$. Find all real values of x for which $y = -1$.

- [1] $\frac{-1}{4}$ [2] $\frac{1}{4}$ [3] $\frac{-1 \pm \sqrt{2}}{4}$ [4] $\frac{1 \pm \sqrt{2}}{4}$

5. Solve using the quadratic formula: $3r(3r + 1) = 2$

- [1] $x = \left\{ \frac{-2}{3}, \frac{1}{3} \right\}$ [2] $x = \left\{ \frac{2}{3}, \frac{1}{3} \right\}$ [3] $x = \frac{-1 \pm \sqrt{7}}{6}$ [4] $x = \frac{1 \pm \sqrt{7}}{6}$



Completing the Square Practice

Name _____

Directions: Be sure to show your work!

1. What value needs to be placed in the box to complete the square? $x^2 - 12x + \square$
[1] 6 [2] 36 [3] -6 [4] -36

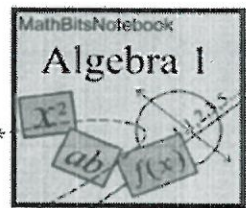
2. Solve by completing the square:
 $x^2 + 8x + 15 = 0$

3. Solve by completing the square:
 $x^2 - 6x = -2$

4. Solve by completing the square:
 $2x^2 + 18x + 4 = 0$

5. Solve by completing the square:
 $x^2 + 2x + 5 = 0$

6. If $x^2 + 2 - 6x = 0$ is solved by completing the square, an intermediate step would be:
[1] $(x + 3)^2 = 7$ [2] $(x - 3)^2 = 11$
[3] $(x - 3)^2 = 7$ [4] $(x - 6)^2 = 34$



Solving Rational Equations

Name _____

Directions: Solve carefully! Choose the best answer. Show work!

1. Solve for a : $\frac{a^2}{144} = \frac{4}{9}$

- 1) $a = \pm 64$ 2) $a = \pm 16$ 3) $a = \pm 8$ 4) $a = \pm 4$

2. Solve for x : $\frac{1}{3}(5 - 3(x - 2)) = \frac{1}{6}(x + 1)$

- 1) $x = \frac{3}{7}$ 2) $x = -\frac{3}{7}$ 3) $x = 3$ 4) $x = -3$

3. Solve for m : $\frac{4}{7m} = \frac{1}{14}$

- 1) $m = \frac{7}{4}$ 2) $m = 2$ 3) $m = 4$ 4) $m = 8$

4. Solve for x : $6 + \frac{x}{5} = \frac{x}{10} + 9$

- 1) $x = 10$ 2) $x = 20$ 3) $x = 30$ 4) $x = 40$

5. Solve for x : $\frac{x-1}{6} = \frac{x+2}{5}$

- 1) $x = 7$ 2) $x = -7$ 3) $x = 17$ 4) $x = -17$

6. Solve for x : $\frac{1}{2}(8 - 3x) = \frac{1}{5}(3 - 6x)$

- 1) $x = \frac{34}{3}$ 2) $x = \frac{46}{27}$ 3) $x = 11$ 4) $x = -11$

7. Solve for x : $7x + 8 = \frac{11}{5} - 2x$

- 1) $x = \frac{-29}{25}$ 2) $x = \frac{-29}{45}$ 3) $x = \frac{51}{25}$ 4) $x = \frac{51}{45}$

8. Solve for x : $\frac{x}{x+3} = 4$

- 1) $x = -\frac{12}{5}$ 2) $x = \frac{12}{5}$ 3) $x = -4$ 4) $x = 4$

9. Solve for x : $\frac{3x}{4} + \frac{1}{2} = \frac{2x-3}{4}$

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

10. Solve for w : $w + \frac{w}{5} - \frac{w}{4} = 19$

- 1) $w = 1$ 2) $w = 2$ 3) $w = 10$ 4) $w = 20$

11. Solve for a : $1 - \frac{4}{a} = \frac{1}{2}$

- 1) $a = 4$ 2) $a = 2$ 3) $a = 4$ 4) $a = 8$

12. Solve for m : $\frac{1}{2} + \frac{2}{m} = \frac{5}{2m}$

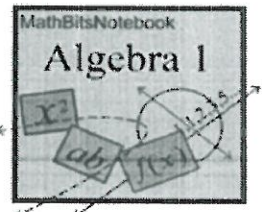
- 1) $m = 1$ 2) $m = -1$ 3) $m = 9$ 4) $m = -9$

13. Solve for x : $\frac{x^2}{x-6} = \frac{36}{x-6}$

- 1) $x = 6$ 2) $x = -6$ 3) $x = \pm 6$ 4) $x = \pm 12$

14. Solve for x : $x + \frac{6}{x} = -7$

- 1) $x = -1$ 2) $x = 6$ 3) $x = -6, -1$ 4) $x = 1, 6$



Solving Inequalities

Name _____

Directions: Solve for the designated variable. Please show work!

1. Solve: $5x - 3 > 12$

2. Solve: $3(2 + m) \geq 15$

3. Solve: $2(5 - x) \geq 14$

4. Solve: $-6x - 9 \leq 3$

5. Solve: $\frac{a-1}{3} \geq -4$

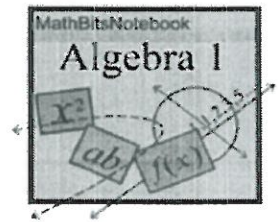
6. Solve: $2 \leq -4 - 3x < 11$

7. Solve: $\frac{m}{5} \geq -\frac{2}{3}$

8. Solve: $3(x + 3) > 4(x - 4)$

9. Solve: $\frac{-x}{3} + 1 < \frac{-3x}{5}$

10. Solve: $\frac{x}{3} + 4 \neq 7$



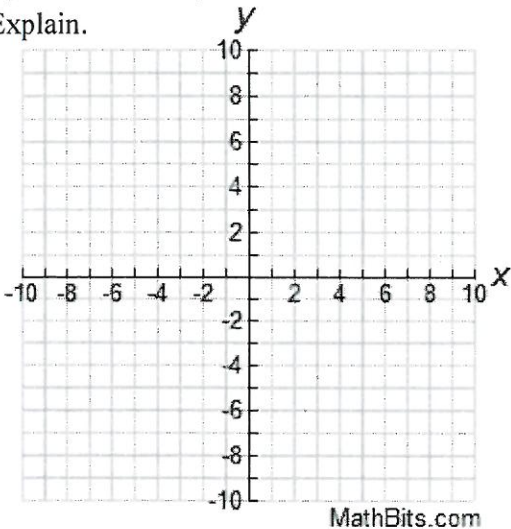
Graphing Inequalities

Name _____

Directions: Please show work! Do not use your calculator.

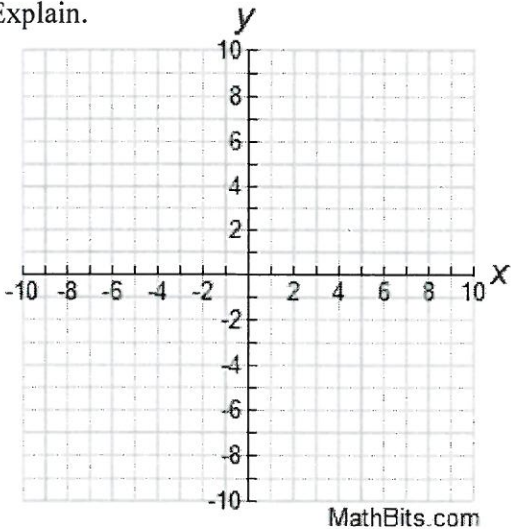
1. a.) Graph: $y \leq x - 5$

- b.) Is the point $(-4, 3)$ in the solution set?
 - c.) Is the boundary line drawn solid or dashed?
- Explain.



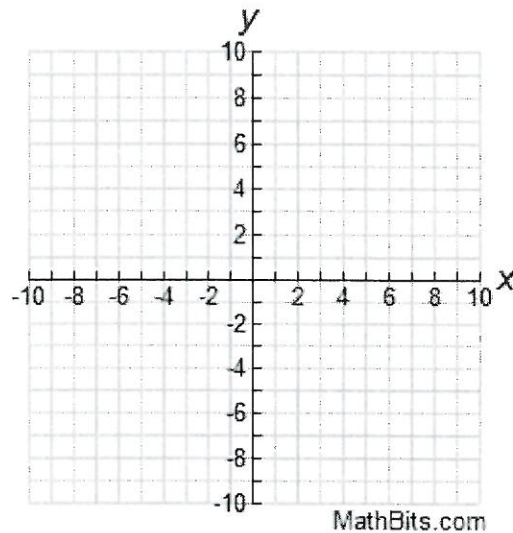
2. a.) Graph: $y > 3x + 1$

- b.) Is the point $(-5, -2)$ in the solution set?
 - c.) Is the boundary line drawn solid or dashed?
- Explain.



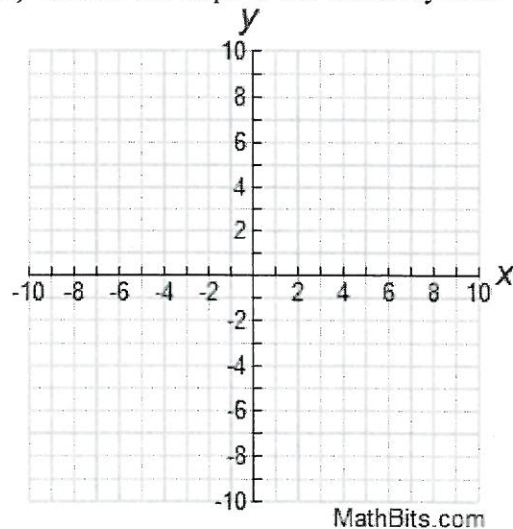
3. a.) Graph: $2y > -x - 4$

- b.) Is the point $(0, -2)$ in the solution set? Explain.



4. a.) Graph: $-4x < 16$

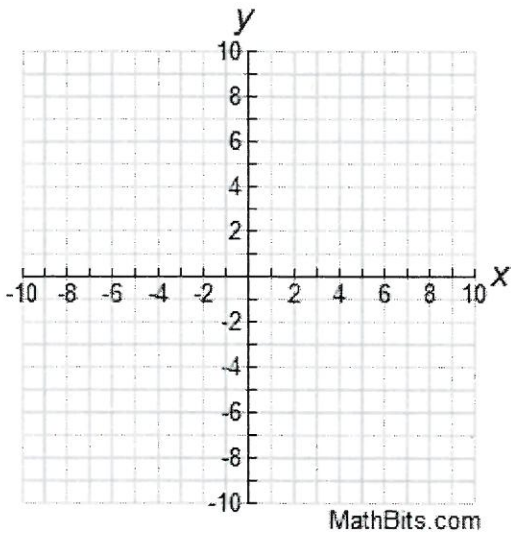
- b.) Is the point $(4, 16)$ in the solution set?
- c.) What is the slope of the boundary line?



5. a.) Graph: $4x - 3y > 9$

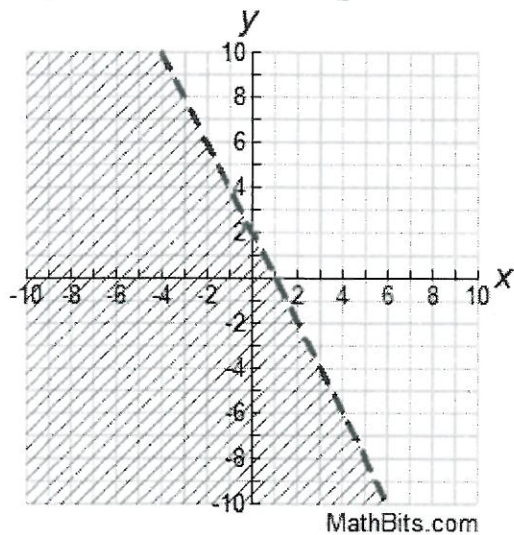
b.) Is the point $(2, -2)$ in the solution set?

c.) Which quadrant contains no solutions to this inequality?

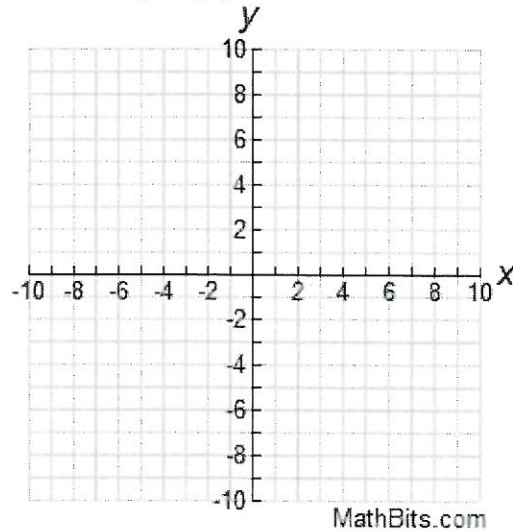


6. Which inequality is represented by the graph shown below?

- 1) $y < 2x + 2$ 2) $y < -2x + 2$
 3) $y < \frac{1}{2}x + 2$ 4) $y < -\frac{1}{2}x + 2$



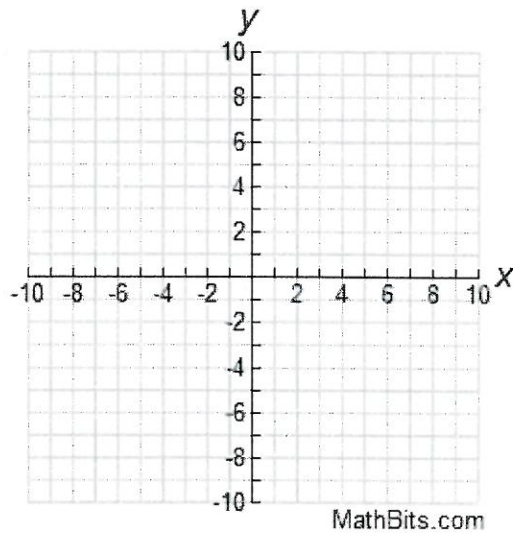
7. Which quadrant will be completely shaded by the graph of the inequality $y < 3x$?



8. a.) Graph: $4(x + y) - 5(2x + y) < 6$

b.) Is the point $(-22, 10)$ in the solution set?

c.) What is the slope of the boundary line?



Solving with All Methods

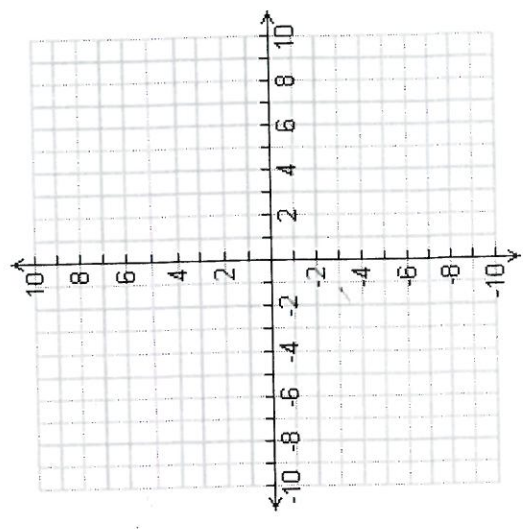
$$\begin{aligned} 2x + 3y &= 12 \\ 4x &= 10 + y \end{aligned}$$

Name _____

Solve by Elimination (Add/Subtract)

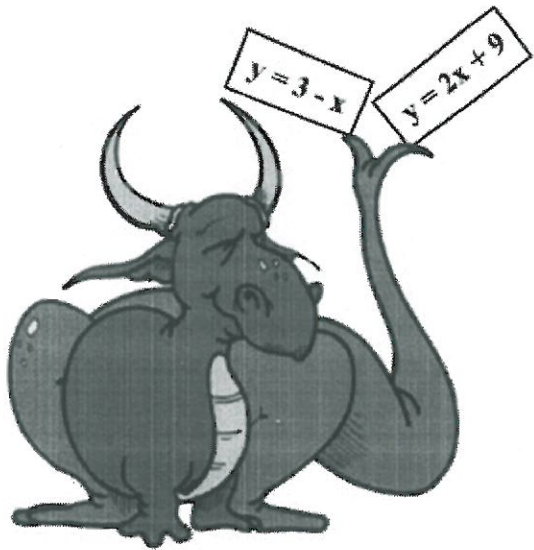
Solve by Substitution

Solve by Graphing



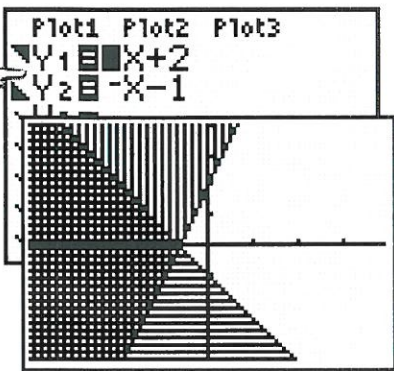
The Systems Adventures of Grover

Name _____



Directions: Solve the following problems using systems of equations. Please show all work.

1. Grover (seen at the left) has two equations whose common solution represents the coordinate location of a buried bone. What are the coordinates of the location of the bone?
2. The quarry in which Grover lives is rectangular in shape. If the quarry's length is three times its width and its perimeter is 32 miles, what are the dimensions of the quarry?
3. The sum of Grover's age and that of his friend Harold is 180 years. Thirty years ago, Grover was 3 times as old as Harold was then. How old are Grover and Harold?
4. Grover decides to swim downstream to search for new bones. He can swim 30 miles downstream in 3 hours. To return home, swimming against the current, takes Grover 5 hours. What is Grover's swimming speed in still water and what is the speed of the stream's current?
5. On a foraging trip, Grover dug up 7 bones and caught 4 fish in 49 minutes. Harold, working at the same speed as Grover, dug up 5 bones and caught 2 fish in 29 minutes. Under these conditions, how long does it take to dig up a bone, and how long does it take to catch a fish?

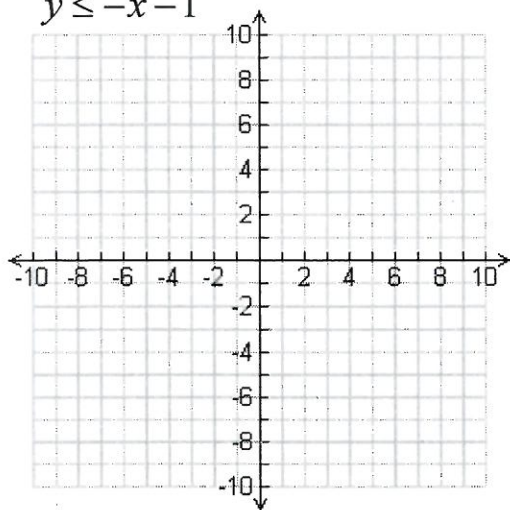


Graphing Systems of Inequalities

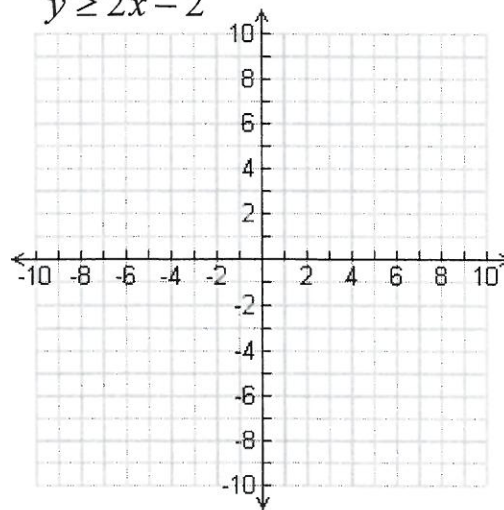
Name _____

Using the graphing calculator, sketch these systems of inequalities and label the solution set with the letter S.

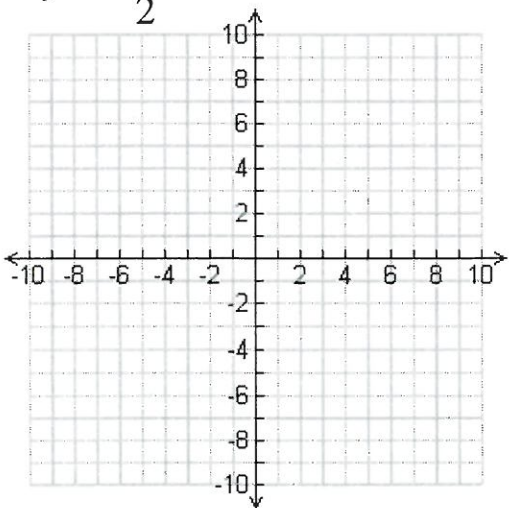
1. $y \geq 2x + 2$
 $y \leq -x - 1$



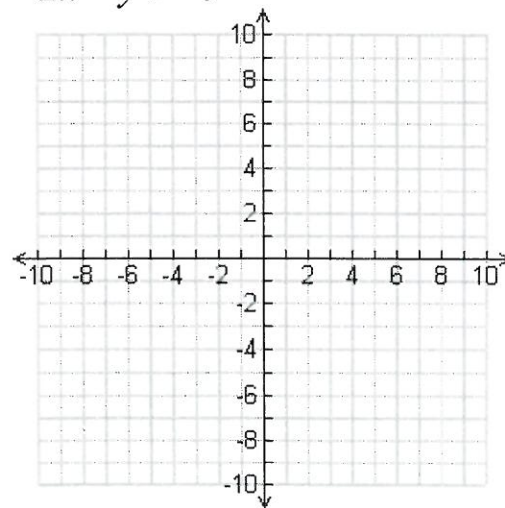
2. $y \leq -3x + 1$
 $y \geq 2x - 2$



3. $y < 5x - 3$
 $y > -\frac{1}{2}x + 2$



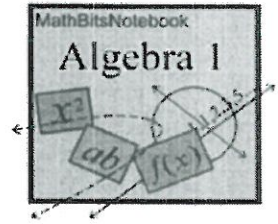
4. $x + y \leq 3$
 $2x - y > -9$



Applied Use of Systems

Name _____

Directions: *Show your work!*

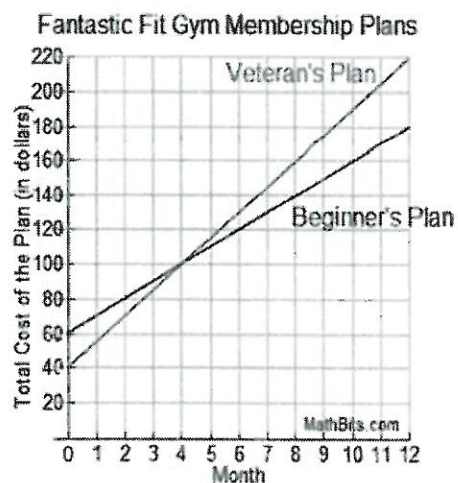


1. The Have-a-Heart Shelter has 5 fewer dogs than the Long Point Shelter. Together the shelters have 53 dogs. How many dogs are in each shelter?

2. The Pizza Shop sells hot wings in two order sizes: regular order and jumbo order. Three regular orders and four jumbo orders cost \$64.50. Four regular orders and three jumbo orders cost \$61.50. Find the cost of one order of each order size.

3. Homer is kayaking on the Mud River. He travels at an average speed of 3.75 miles per hour when paddling with the current and 2.25 miles per hour when paddling against the current. Find the speed of the kayak when paddling in still water and the speed of the current.

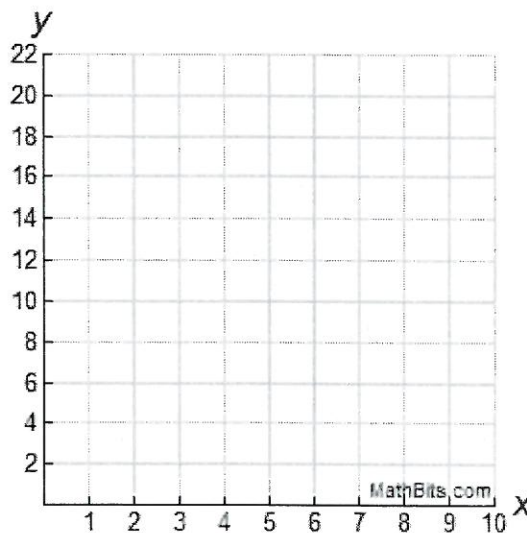
4. The Fantastic Fit Gym offers two different membership plans. Each plan includes an initial membership fee plus a monthly charge for one year. The graph at the right shows the cost of the beginner's plan and the veteran's plan, for one year.



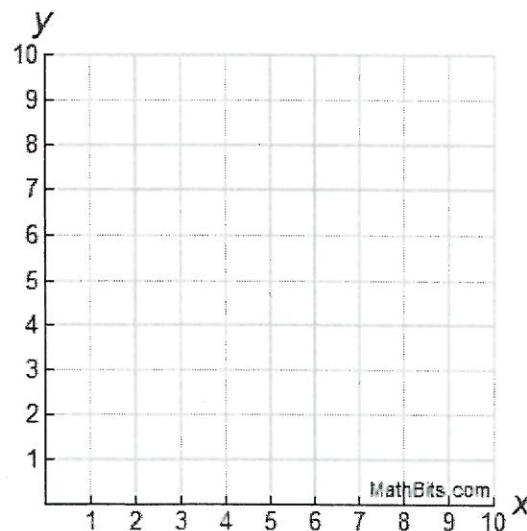
- What is the membership fee for the beginner's plan?
- In what month is the total cost for both plans the same?
- What are the monthly charges for both plans?
- Write equations to represent both plans.

5. A rocket is launched from the ground and follows a parabolic path represented by the equation $y = -x^2 + 9x$. At the same time, a Frisbee is thrown from a window at a height of 16 feet and follows a straight path to the ground represented by $y = -x + 16$.

- Graph the equations that represent the paths of the rocket and the Frisbee on the same axes.
- Find the coordinates of the point(s) where the paths intersect.
- Will the rocket and the Frisbee hit the ground at the same time? Explain.

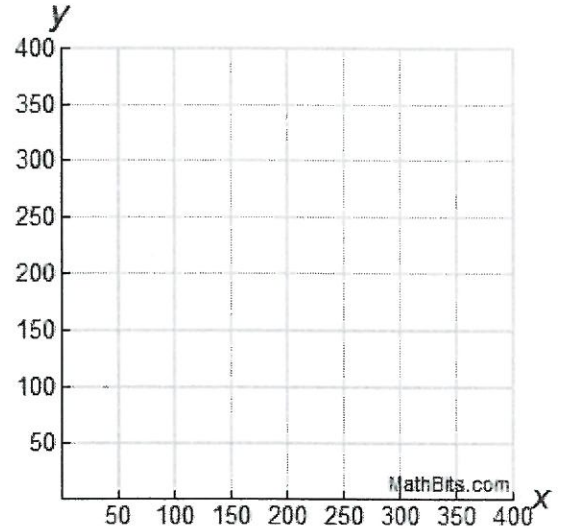


6. Kyle works part-time for a local contractor. He makes \$8 an hour if he works with the plumber, and \$12 an hour if he works with the mason. Kyle cannot work more than 10 hours per week. Graph the two inequalities that represent how many hours Kyle needs to work at each job if he plans to earn at least \$100 per week. Label the solution set with the letter **S**.



7. A skateboard company produces a wooden board and a polymer board. Surveys show that consumer demand will support the production of at least 200 wooden board and 150 polymer boards each day. Machinery limitations, however, will restrict production to no more than 300 wooden boards and 270 polymer board per day. Each wooden board yields a profit of \$4, and each polymer board yields a profit of \$6.

The company has a contract which requires the shipping of at least 380 boards per day. Find the number of each style of board which should be made daily to maximize the profits?



8. Northwest crows drop shellfish onto rocks from various heights to break open the shells. A crow drops a shellfish from a height of 20 feet. The function $y = -16x^2 + 20$ (where x is time in seconds) represents the distance, y , in feet, the shellfish is from the rocks.

a. A nearby scavenger bird sees the shellfish dropping and attempts to grab the fish before it hits the rocks by flying along a path represented by the function $y = -2x + 6$. Is it possible for the scavenger bird to grab the shellfish before it hits the rocks? Explain.

b. Assuming the scavenger bird does not grab the shellfish, when will the shellfish hit the rocks (to the nearest hundredth of a second)?

