

# EOC Questions - Equations and Linear Functions

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

1. If  $8x = -4(x + 3)$  then  $x$  equals:

[A] -1  $8x = -4x - 12$   
 $+4x \quad +4x$   
 $12x = -12$   
 $\frac{12x}{12} = \frac{-12}{12}$   
 $x = -1$

[B] 1  
 [C]  $\frac{3}{4}$   
 [D]  $\frac{1}{4}$

2. Solve for  $x$ :  $9x^2 - c = d$

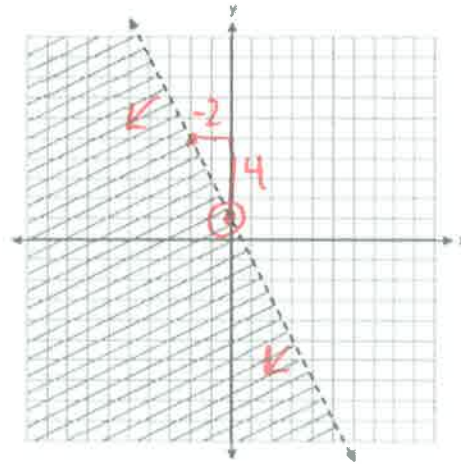
[A]  $x = \frac{\sqrt{d+c}}{3}$   
 $9x^2 - c = d$   
 $+c \quad +c$   
 $9x^2 = d+c$   
 $\frac{9x^2}{9} = \frac{d+c}{9}$   
 $\sqrt{x^2} = \sqrt{\frac{d+c}{9}}$   
 $x = \sqrt{\frac{d+c}{9}}$   
 $x = \frac{\sqrt{d+c}}{3}$

[B]  $x = 2\frac{d+c}{9}$   
 [C]  $x = \frac{-9dc}{2}$   
 [D]  $x = \sqrt{9cd}$

3. Which inequality is represented by the graph at the right?

- [A]  $y < -2x + 1$   
 [B]  $y < 2x + 1$   
 [C]  $y < -\frac{1}{2}x + 1$   
 [D]  $y < \frac{1}{2}x + 1$

$y < -2x + 1$



$\frac{4}{-2} = -2 = m$   
 $b = 1$

4. Jared can run 520 yards in one minute. How fast does he run in feet per second?

- [A] 12      [B] 26      [C] 1560      [D] 16

$\frac{520 \text{ yd}}{1 \text{ min}} = \frac{1 \text{ min}}{60 \text{ sec}} \cdot \frac{3 \text{ ft}}{1 \text{ yd}}$   
 $\frac{1560 \text{ ft}}{60 \text{ s}} = \frac{26 \text{ ft}}{\text{s}}$

5. There are three consecutive integers such that the sum of the two smallest integers is 17 less than three times the largest. What is the smallest integer?

- [A] 5      [B] 7      [C] 12      [D] 6

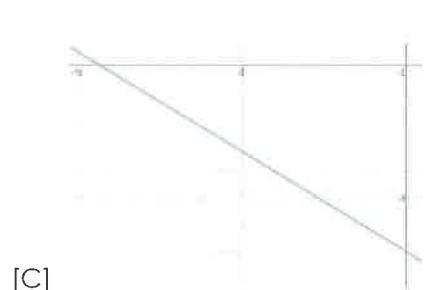
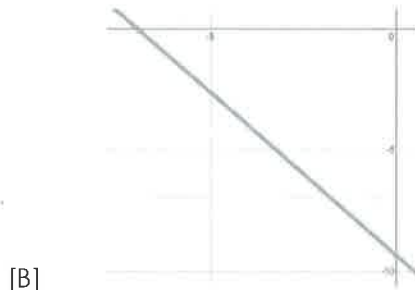
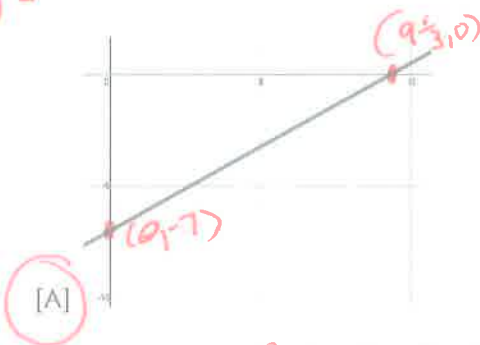
$x + x + 1 = 3(x + 2) - 17$   
 $2x + 1 = 3x + 6 - 17$   
 $2x + 1 = 3x - 11$   
 $-2x + 11 = -2x + 11 \quad 12 = x$

6. Which expression is equivalent to:  $(2x^{-6}y^4z^8)^{-4}$

- [A]  $16x^{24}y^{16}z^{32}$       [B]  $16x^{-10}z^{-4}$       [C]  $\frac{x^{24}}{2y^{16}z^{32}}$       [D]  $\frac{x^{24}}{16y^{16}z^{32}}$

$\frac{1}{(2x^{-6}y^4z^8)^4}$   
 $\frac{1}{2^4 x^{24} y^{16} z^{32}}$

7. Which graph below displays the equation  $3x - 4y = 28$



$3x - 4(0) = 28$   
 $\frac{3x}{3} = \frac{28}{3}$   
 $x = 9\frac{1}{3}$

$3(0) - 4y = 28$   
 $-4y = 28$   
 $\frac{-4y}{-4} = \frac{28}{-4}$   
 $y = -7$        $(0, -7)$

8. Compare the slope of  $f(x) = -2x + 3$  and the slope of the chart of  $g(x)$  below:  $m = -2$

x	2	4	6	8
g(x)	-8	-2	4	10

$m = \frac{6}{2} = 3$

$-2 - 3$  or  $3 - (-2) = 5$

What is the positive difference between the slopes of  $f(x)$  and  $g(x)$ ?

- [A] 1      [B] 5      [C] 8      [D] 17

9. Gregory teaches martial arts. He charges a one-time processing fee of \$5.00 and the cost of the classes is shown below. Let  $x$  represent the number of classes and  $y$  represent the cost of classes.

Number of Classes, $x$	0	1	2	3	4
Cost of Classes(not including processing fee), $y$	3	\$15.00	\$27.00	\$39.00	\$51.00

$y = 12x + 3 + 5$  one-time fee

$y = 12x + 8$   
 $y = 12(10) + 8$   
 $y = 128$

Based on this information, what will it cost to take 10 classes?

- [A] \$123      [B] \$128      [C] \$118      [D] \$153

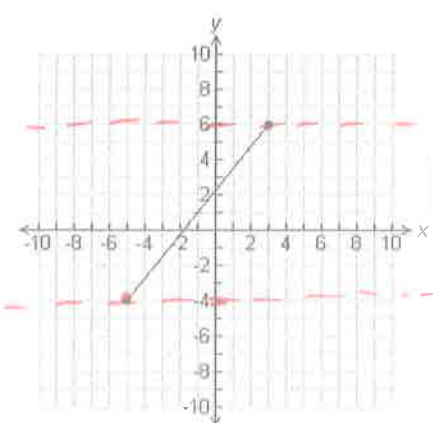
10. Jerami is going to deposit an equal amount of money into a checking account each month until he has saved \$2,000. The amount of money,  $y$ , in the account after  $x$  months can be modeled by the equation  $y = 35x + 250$ .

What does the slope of the graph of the equation represent?

$y = 35x + 250$   
 amount dep. each month      starting amt

- [A] The amount of money deposited monthly  
 [B] The amount of money originally in the account  
 [C] The number of months it would take to earn \$250  
 [D] The number of months it would take to reach \$2,000

11. Find the range of the function represented in the graph.



- [A] The range consists of values from -5 to 3.  
 [B] The range consists of values from -4 to 6.  
 [C] The range consists of values from -5 to 6.  
 [D] The range consists of values from -4 to 3.

12. Which equation represents the line passing through the points (3, 2) and (-9, 6)?

- [A]  $x - 3y = 9$   
 [B]  $x + 3y = 9$   
 [C]  $3x - y = -9$   
 [D]  $3x + y = 9$

$m = \frac{-9(12) - 3(-3)}{6 - 2} = \frac{-108 + 9}{4} = \frac{-99}{4}$  (Incorrect calculation shown)

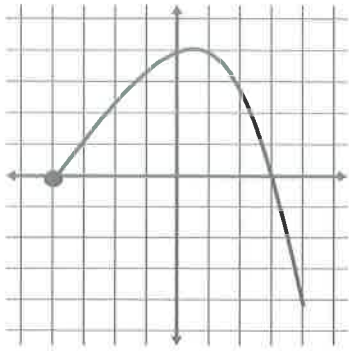
$m = \frac{-4}{12} = -\frac{1}{3}$

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

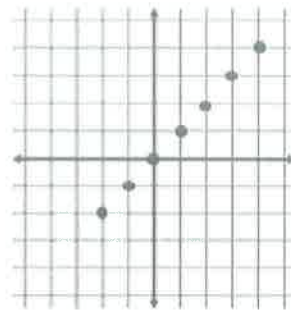
or  $2 = 3(-\frac{1}{3}) + b$   
 $2 = -1 + b$   
 $3 = b$   
 $x + 3y = 9$

13. What is the domain of the graphs?

Domain:  $x \geq -4$



Domain:  $\{-2, -1, 0, 1, 2, 3, 4\}$



14. What is the equation of the line that is parallel to  $-4x + 3y = 5$  and passes through  $(7.5, 4)$ ?

$$\begin{aligned} -4x + 3y &= 5 \\ +4x & \quad +4x \\ \hline 3y &= \frac{4x + 5}{3} \\ y &= \frac{4}{3}x + \frac{5}{3} \\ m &= \frac{4}{3} \end{aligned}$$

$\parallel$  to  $\frac{4}{3}$  would be  $\frac{4}{3}$

$$\begin{aligned} y &= mx + b \\ 4 &= \frac{4}{3}(7.5) + b \\ 4 &= \frac{4}{3} \left( \frac{15}{2} \right) + b \\ 4 &= 6 + b \\ -6 & \quad -6 \\ \hline -2 &= b \end{aligned}$$

$$y = \frac{4}{3}x - 2$$

15. Write the equation of the line that is perpendicular to  $10x + 5y = 8$  and passes through  $(6, 17)$ .

$$\begin{aligned} 10x + 5y &= 8 \\ -10x & \quad -10x \\ \hline 5y &= \frac{-10x + 8}{5} \\ y &= \frac{-10}{5}x + \frac{8}{5} \\ y &= -2x + \frac{8}{5} \\ m &= -\frac{2}{1} \end{aligned}$$

$\perp$  to  $-\frac{2}{1}$  would be  $\frac{1}{2}$

$$\begin{aligned} y &= mx + b \\ 17 &= \frac{1}{2}(6) + b \\ 17 &= 3 + b \\ -3 & \quad -3 \\ \hline 14 &= b \end{aligned}$$

$$y = \frac{1}{2}x + 14$$

# Exponential Functions and Exponents

1. Which is a simplified form of  $\frac{1}{3}(12xy^3)(6xy^6)$ ?

A.  $8xy^{18}$

B.  $8x^2y^9$

C.  $24xy^{18}$

D.  $24x^2y^9$

2. Simplify the expression:  $\left(\frac{24m^{-2}n^4}{16m^3n^{-5}}\right)^{-2} = \left(\frac{2m^3n^{-5}}{3m^{-2}n^4}\right)^2 = \frac{4m^6n^{-10}}{9m^{-4}n^8} = \frac{4m^6m^4}{9n^{10}n^8} = \frac{4m^{10}}{9n^{18}}$

3. Which of the following is **not true** regarding the function  $y = 2^x$ :
- a. The function is an exponential function
  - b. The function has a domain of all real numbers
  - c. As the value of  $x$  gets very large the value of  $y$  gets close to zero
  - d. As the value of  $x$  increases by one the value double

4. If a student deposits \$1500 in the bank and earns an annual interest rate of 8% how much will he have after 15 years?  $y = 1500(1 + 0.08)^{15}$   $y = \$4,758.25$

5. Which of the following is true for  $y = .5(3)^x$ :

- a. The function shows exponential growth.
- b. The function shows exponential decay.
- c. The function is a linear function.
- d. The  $y$  intercept is 3.

6. The population of Asheville in 2014 was estimated to be 24,000 people with an annual rate of increase (growth) of about 2.4%. Which function would give you the estimated total population,  $y$ , of Asheville in 2021?

[A]  $y = 24000(1 + 2.4)^7$

[C]  $y = 24000(1 + .024)^7$

[B]  $y = 24000(1 + 2.4)^{21}$

[D]  $y = 24000(1 + .24)^{21}$

7. Matt bought a new car at a cost of \$28,000. The car depreciates approximately 15% of its value each year. Which function would give you the estimated value of the car,  $y$ , after  $t$  years?

[A]  $y = 28000(.15)^t$

[B]  $y = 28000(1.15)^t$

[C]  $y = 28000(.85)^t$

[D]  $y = 28000(1.015)^t$

8. Kelly plans to put her graduation money into an account and leave it there for 4 years while she goes to college. She receives \$900 in graduation money that she puts into an account earning 4.25% interest annually. How much will be in Kelly's account at the end of four years?

- [A] \$1,052.87    [B] \$1,063.03    [C] \$3,711.09    [D] \$293,628.5

$$y = 900(1 + 0.0425)^4$$

9. Maggie recorded the population for two different cities in North Carolina. The results are shown in the table below

Time (years)	City 1, NC	City 2, NC
2008	950	150
2010	1,248	299
2012	1,551	598
2014	1,862	1196

*+298*  
*+303*  
*+311*  
*\*1.99*  
*\*2*  
*\*2*

Which statement best describes her data?

- [A] Both cities' population changed at a constant rate.  
 [B] Both cities' population changed at an exponential rate.  
 [C] City 1 increased its population at a constant rate, and City 2 increased its population at an exponential rate.  
 [D] City 1 increased its population at an exponential rate, and City 2 increased its population.

10. What is the rate of growth for the function  $f(t) = 5(2.5)^t$ ?

- A. 1.5%  
 B. 2.5%  
 [C] 150%  
 D. 250%

$$f(t) = a(1+r)^t$$

$$1+r = 2.5$$

$$\frac{-1}{r} = \frac{-1}{1.5}$$

11. What is the largest integer value of  $x$  such that the value of  $f(x) = x^2 - 6x + 40$  exceeds the value of  $g(x) = 2(1.5)^x$ ?

- a. 6    [b. 8]    c. 10    d. 12

12. The function  $f(x) = 1.69(1.03)^x$  models the value of an investment, in thousands, after  $x$  years. What is the yearly interest rate the investment is earning? What is the initial investment?

3%

1.69

# EOC REVIEW HOMEWORK – QUADRATICS AND POLYNOMIALS

1. Factor:  $x^2 + 15x - 54$

A  $(x - 9)(x + 6)$

B  $(x + 9)(x - 6)$

**C**  $(x - 3)(x + 18)$

D  $(x + 3)(x - 18)$

$\begin{array}{r|l} -54 & 15 \\ 9 & -6 \\ \hline 3 & x \\ & -3 \end{array}$   $\begin{array}{c} x \\ \hline x^2 \\ \hline -54 \end{array}$

$(x+18)(x-3)$

2. Factor the quadratic trinomial  $64m^2 - 81n^2$ .

a.  $(8m - 9n)(8m + 9n)$

b.  $(8m + 9n)(8m + 9n)$

c.  $(8m - 9n)(8m - 9n)$

d.  $(8m - 9ni)(8m + 9ni)$

$(8m-9n)(8m+9n)$

$\begin{array}{c} 8m \cdot 9n \\ 8m \cdot 64m^2 \\ -9n \cdot \phantom{64m^2} \\ \hline -81n^2 \end{array}$

3. Add:  $(3x^2 + 4x - 1) + (-2x^2 - x + 3)$

A  $x^2 + 3x - 4$

**B**  $x^2 + 3x + 2$

C  $5x^2 + 4x + 2$

D  $5x^2 + 5x + 4$

$x^2 + 3x + 2$

4.  $(x - k)(y - k) =$

F  $xy - k^2$

G  $xy + k^2$

**H**  $xy - xk - ky + k^2$

J  $xy + xk + ky - k^2$

$\begin{array}{c} x-k \\ \hline y \quad \begin{array}{c|c} xy & -yk \\ \hline -xk & +k^2 \end{array} \end{array}$

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

A  $6x^7 - x^2 + 5x$

B  $6x^{12} - x^2 + 5x$

**C**  $6x^7 - 2x^6 + 10x^5$

D  $6x^{12} - 2x^8 + 10x^4$

$6x^7 - 2x^6 + 10x^5$

6. Which values of  $x$  make the equation true?

$x^2 + x - 12 = 0$

F -6 and 2

**G** -4 and 3

H -3 and 4

J -2 and 6

$\begin{array}{c} x \quad 4 \\ \hline x \quad \begin{array}{c|c} x^2 & 4x \\ \hline -3 & -12 \end{array} \end{array}$

$\begin{array}{r|l} -12 & 1 \\ 4 & -3 \\ \hline & 1 \end{array}$  ✓

$(x+4)=0$   
 $x=-4$

$(x-3)=0$   
 $x=3$

7. The height of a flare fired from a gun can be described by:  $h = -16t^2 + 60t$  where  $t$  is the time in seconds and  $h$  is the height in feet. How long will it take for the flare to reach 36 feet? *calc. table*

a. .75 seconds

b. 1 second

c. 1.5 seconds

d. 3 seconds  $y = -16x^2 + 60x$   
 $36 = -16x^2 + 60x$

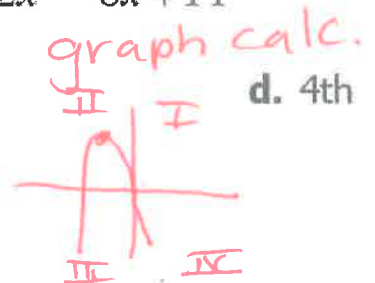
8. Which quadrant contains the vertex of the following:  $f(x) = -2x^2 - 8x + 11$

a. 1st

b. 2nd

c. 3rd

d. 4th



9. How many solutions are there to the equation:  $-3x^2 + 27 = 0$

a. 0

b. 1

c. 2

d. Infinite

$\frac{-3x^2 + 27 = 0}{-3} \quad \frac{+27}{-3} \quad \frac{=0}{-3}$

10. What is the range for the function  $f(x) = x^2 + 4x$ ? *hint: find the vertex.*

$\frac{1}{2}$  b/w 0 & -4 is -2

$x = -2 \quad y = (-2)^2 + 4(-2) = 4 - 8 = -4$   
 $x(x+4) \quad x=0 \quad x+4=0 \quad x=-4$

$x^2 - 9 = 0$   
 $(x+3)(x-3) = 0$   
 $x+3=0 \quad x-3=0$   
 $x=-3 \quad x=3$

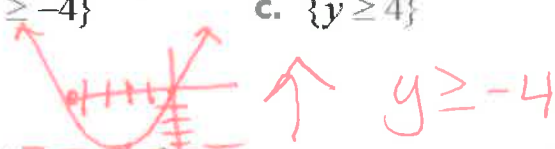
a.  $\{y \leq -4\}$

b.  $\{y \geq -4\}$

c.  $\{y \geq 4\}$

d.  $\{\text{all real numbers}\}$

*range = y values*



11. What is the range for the function  $f(x) = -2x^2 + 5$  for the domain  $D = \{x > 5\}$

a.  $R = \{y > -55\}$

b.  $R = \{y > -45\}$

c.  $R = \{y < 55\}$

d.  $R = \{y < -45\}$

*table x greater than 5*

$5 \mid -45$   
 $6 \mid -51$   
 $7 \mid -59$

*-45 or smaller*

12.  $h = -16t^2 + s$

$h$  = height in which it hits its target = 0 feet

$s$  = initial height at which jump occurs = 64 feet

Farmer Brown had a silo that was 64 feet high. He joined a circus and started jumping from the top of his silo into the pond below. How many seconds did it take him to hit the water 64 feet below?

a.  $t = +/- 2$  seconds

b.  $t = -2$  seconds

c.  $t = 2$  seconds

d.  $t \sim 2.3$  seconds

$-16t^2 + 64 = 0$   
 $-16(t^2 - 4) = 0$   
 $-16(t+2)(t-2) = 0$

$t = -2, 2$   
*real life*

1. What is the Next and Now that describes the sequence?  $-3, 1, 5, 9, \dots$

- a.  $NEXT = NOW \cdot (-3)$
- b.  $NEXT = NOW - 3$
- c.  $NEXT = NOW + 3$
- d.  $NEXT = NOW + 4$**

$-3, 1, 5, 9, \dots$   
 $+4 +4 +4$   
 $+4$

2. Define the explicit form given table of a carnival game:

Number (n) of balls thrown	Total cost
0	\$3.50
1	\$5.00
2	\$6.50
3	\$8.00
4	\$9.50

- a.  $C = 5n$
- b.  $C = 5 + (n - 1) \cdot (1.50)$**
- c.  $C = 2n + 5$
- d.  $C = 1.5n + 5$

$5 + 1.50n - 1.50$   
 $1.50n + 3.50$

$y = 3.50 + 1.50x$

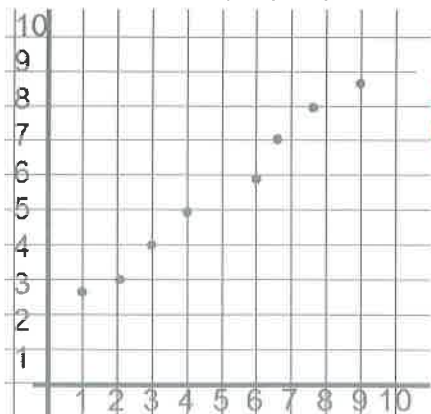
3. Given the two way table, choose which statement below is **false**.

	Number of siblings			total
	0	1	2	
Girls	5	10	12	27
Boys	7	13	9	29
total	12	23	21	56

- a. The number of boys in the survey is more than the number of students with two siblings.
- b. Ten percent of students that are girls have one sibling.  $\frac{10}{27} = 37\%$
- c. The percent of only children that are boys is about 58%.  $\frac{7}{12} = 58\%$**
- d. The percent of girls in the survey is about 48%.  $\frac{27}{56} \approx 48\%$

$b = 27 \quad 2 = 21$

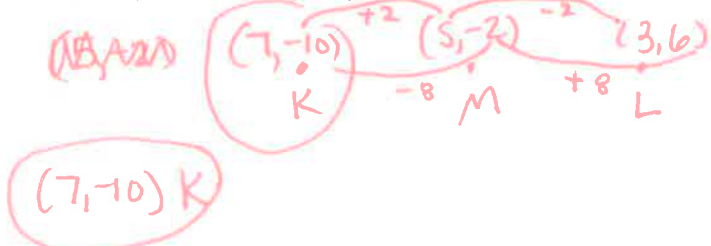
4. What statement properly describes that scatter plot below?



- a. The graph displays a strong negative correlation.
- b. The graph displays a strong positive correlation.**
- c. The graph displays a weak negative correlation.
- d. The graph displays a weak positive correlation.

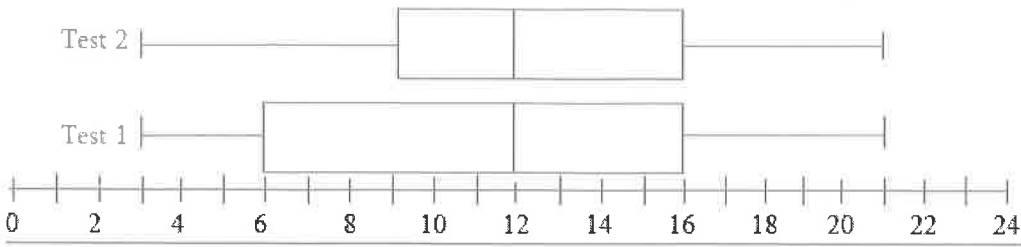
5. M is the midpoint of KL. M is at (5, -2) and L is at (3, 6). What are the coordinates of K?

$\frac{x+3}{2} = 5 \quad \frac{y+6}{2} = -2$   
 $x+3 = 10 \quad y+6 = -4$   
 $x = 7 \quad y = -10$





6. What statement is NOT true comparing the two box and whisker plots?



- a. Both Box and Whisker plots have a minimum at 3.
- b. The median of Test one is 12.
- c. The first quartile of Test 1 is higher than the first quartile of Test 2.
- d. The third quartiles are the same for both graphs.

7. What is the approximate perimeter of the triangle with the given vertices A(-1, 3), B(3, 1), and C(1, -3).

- a. 15 units
  - b. 18 units
  - c. 20 units
  - d. 25 units
- $\overline{AB} \quad d = \sqrt{(-1-3)^2 + (3-1)^2} \approx 4.5$   
 $\overline{BC} \quad d = \sqrt{(3-1)^2 + (1-3)^2} \approx 4.5$   
 $\overline{CA} \quad d = \sqrt{(1-1)^2 + (-3-3)^2} \approx 6.3$   
 $4.5 + 4.5 + 6.3 \approx 15.3$

8. If B is the midpoint between points A(1, 4) and C(3, 8) and E is the midpoint between points D(3, -1) and F(5, 1) what is the approximate distance of BE?

- a. 4 units
  - b. 5 units
  - c. 6 units
  - d. 7 units
- $\overline{B} \quad \left(\frac{1+3}{2}, \frac{4+8}{2}\right) \quad \overline{E} \quad \left(\frac{3+5}{2}, \frac{-1+1}{2}\right)$   
 $(2, 6) \quad (4, 0)$   
 $d = \sqrt{(2-4)^2 + (6-0)^2}$   
 $d \approx 6.3$

9.

The formula below illustrates how to calculate body mass index (B), using weight (w) and height (h).

$$B = \frac{703w}{h^2}$$

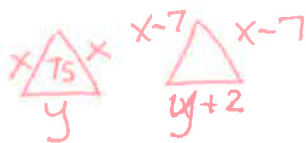
Which of the following shows this equation correctly solved for w?

- A.  $w = Bh^2 - 703$
  - B.  $w = B + h^2 - 703$
  - C.  $w = \frac{Bh^2}{703}$
  - D.  $w = \frac{703B}{h^2}$
- $h^2(B) = \left(\frac{703w}{h^2}\right) h^2$   
 $Bh^2 = \frac{703w}{703}$   
 $\frac{Bh^2}{703} = w$

10. A data set contains only one outlier. Which statistical measure will MOST LIKELY remain the same if the outlier is removed?

- a. Mean
- b. Mode
- c. Range
- d. Standard Deviation

# EOC Review: Systems



$$x-7 = y+2 \quad 2x+y=75$$

$$x = y+9 \quad 2(y+9)+y=75$$

$$2y+18+y=75$$

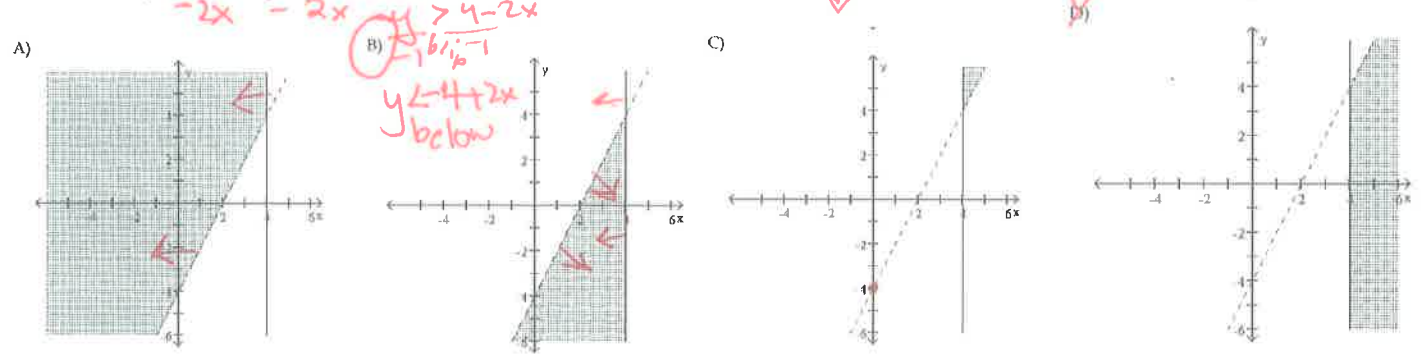
$$3y+18=75$$

$$3y=57$$

$$y=19$$

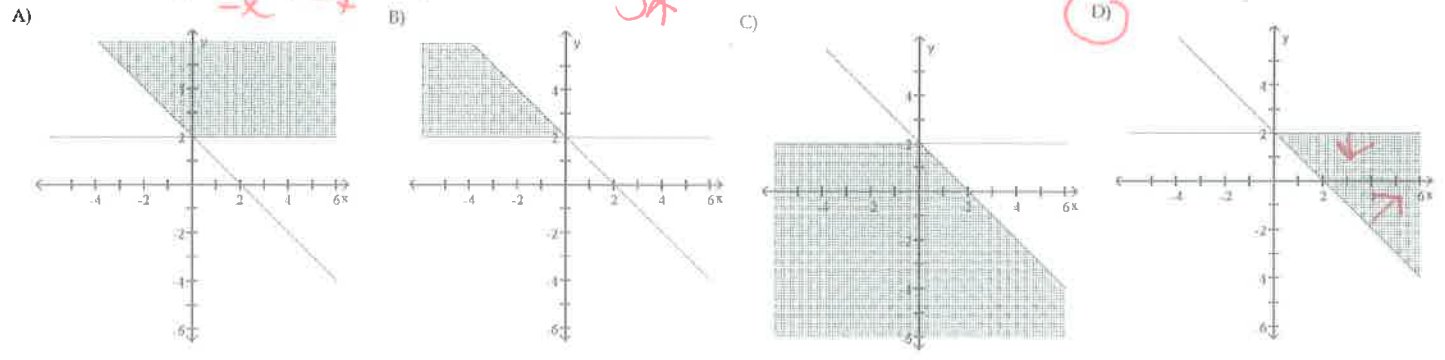
- The perimeter of a triangle is 75 cm. The triangle is isosceles now, but if its base were lengthened by 2 cm and each leg were shortened by 7 cm, it would be equilateral. Find the length of the base of the original triangle.  
 A) 21 cm      B) 18 cm      **C) 19 cm**      D) 28 cm
- A sum of money amounting to \$3.70 consists of dimes and quarters. If there are 19 coins in all, how many are quarters?  
 A) 12 quarters      B) 9 quarters      C) 7 quarters      **D) 17 quarters**
- During the 1998-1999 Little League season, the Tigers played 40 games. They won 18 more games than they lost. How many games did they win that season?  
 A) 31 games      B) 26 games      C) 29 games      D) 11 games

4. Graph  $2x - y > 4$  and  $x \leq 4$



5. Graph  $x + y \geq 2$  and  $y \leq 2 - x$

$$y \geq 2 - x$$



6. Select the coordinate point that is a solution to this system of equations.

$$4(2x+y=7)$$

$$3x-4y=5$$

$$+ \quad 3x-4y=5$$

$$8x+4y=28$$

$$\hline 11x = 33$$

$$x = 3$$

$$2(3)+y=7$$

$$6+y=7$$

$$-6 \quad y=-6$$

$$y=1$$

$$(3,1)$$

- (-1,9)
- (-3,-1)
- (7,4)
- (3,1)**

7.

Solve this system of equations:  $x = 2y - 8$   
 $4x + y = 13$

- (2,-5)
- (-2,5)
- (2,5)**
- (-2,-5)

$$4(2y-8)+y=13$$

$$8y-32+y=13$$

$$9y-32=13$$

$$9y=45$$

$$y=5$$

$$x=2(5)-8$$

$$x=10-8$$

$$x=2$$