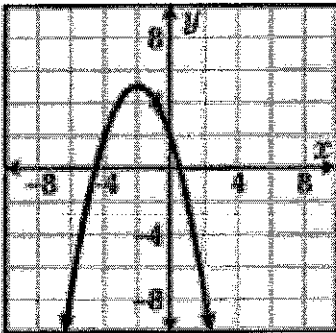


Math I EOC Parallel Problems

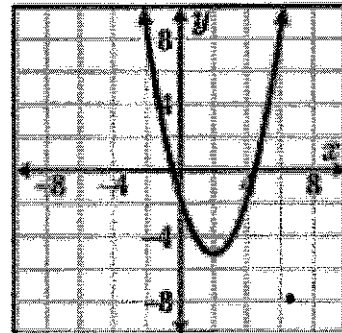
For exercises #1-15, the use of a calculator is prohibited.

1.) Which choice is the graph of $f(x) = (x + 2)^2 - 5$?

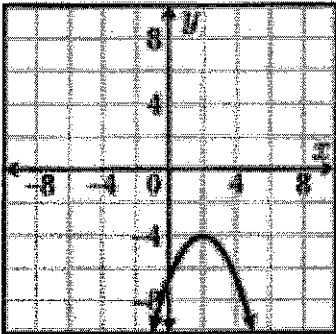
~~A~~



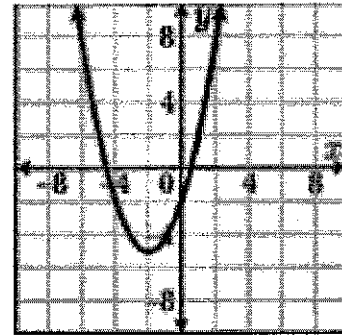
B.
 $(x+2)(x+2) - 5$
 $x^2 + 4x - 1$
 Positive a-value
 A.O.S.
 $\frac{-b}{2a} = \frac{-4}{2(1)} = -2$



~~C~~



D.



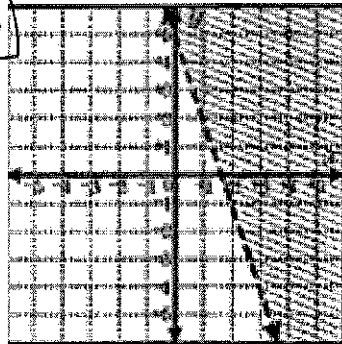
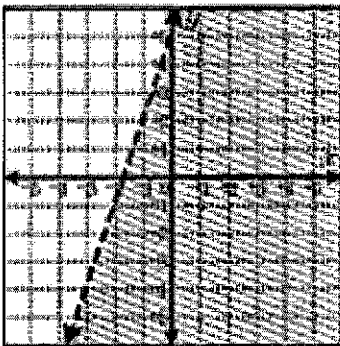
2.) In which graph does the shaded region represent the solution set for the inequality shown below?

$-3x - y < -5$
 $-y < 3x - 5$

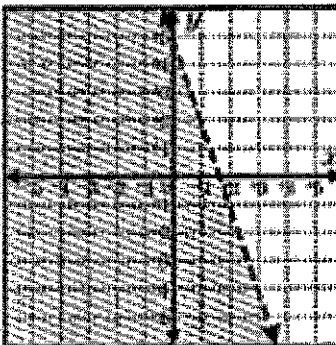
$y > -3x + 5$

Look at
 shading, slope
 and
 y-intercept

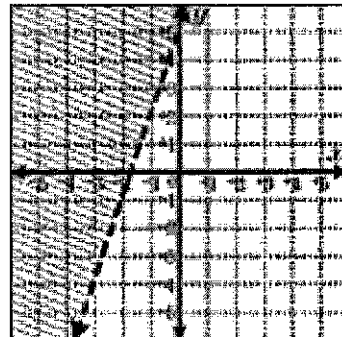
~~A~~



~~C~~



~~D~~



3.) Which expression is equivalent to

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

- A. $3x^2 - 4$ B. $3x^2 - 11x - 4$

- C. $6x^2 - 13x - 4$ D. $6x^2 - 11x - 4$

4.) A line, $y = mx + b$, passes through the point (8,1) and is perpendicular to $y = -\frac{1}{2}x + 3$. What is the value of b ?

$m = 2$ (8,1)
 $y - 1 = 2(x - 8)$
 $y - 1 = 2x - 16$
 $\quad +1 \quad \quad +1$
 $y = 2x - 15$

5.) Two functions are shown below.

$f(x) = 2^x$
 $g(x) = 16 - 2x$

4

For what positive integer, x , will the value of $f(x)$ first exceed the value of $g(x)$?

	$f(x)$	$g(x)$
1	2	14
2	4	12
3	8	10
4	16	8

	$f(x)$	$g(x)$
5	32	6
6	64	4
7	128	2
8	256	0
9	512	-2

6.) A company models its net income, in thousands of dollars, with the function $f(x) = 4n^2 - 15n - 25$, where n is the number of units of product sold. How many units of its product does the company need to sell in order of the net income to equal \$0?

$4n^2 - 15n - 25 = 0$ $Ac = \frac{-100}{-20 \mid 5}$
 $(4n^2 - 20n + 5n - 25)$
 $4n(n - 5) + 5(n - 5)$
 $(4n + 5)(n - 5)$ **5 units**
 $n = -5/4 \quad n = 5$

7.) Michael has a jar of dimes and nickels. There are 152 dimes and nickels in the jar that total \$11. If d represents the number of dimes and n represents the number of nickels, which system of equations below represents the situation?

- A. $\begin{cases} d+n=11 \\ 0.05d+0.10n=152 \end{cases}$
 B. $\begin{cases} d+n=11 \\ 0.10d+0.05n=152 \end{cases}$
 C. $\begin{cases} d+n=152 \\ 0.05d+0.10n=11 \end{cases}$
 D. $\begin{cases} d+n=152 \\ 0.10d+0.05n=11 \end{cases}$

8.) The function $f(x) = -3.5x + 8$ models the length of a sparkler x seconds after it is lit. What is the meaning of the y-intercept of the function?

- A. the initial length of the sparkler
 B. the final length of the sparkler
 C. the rate at which the sparkler is burning
 D. the amount of time it will take the sparkler to burn

9.) The total cost, in dollars, of membership in a fitness center is given by the function $c(m) = 30m + 20$, where m is the number of months a person is a member. In dollars, how much is the cost of a membership for half a year?

6 months
 $30(6) + 20$
 $180 + 20 = \mathbf{\$200}$

10.) Water is being pumped into a 12-foot cylindrical tank at a constant rate.

- The depth of the water is increasing linearly.
- At ~~2:00~~ pm, the water depth was 4.3 feet.
- At ~~4:30~~ pm, the water depth was 7.8 feet.

2.5 (0, 4.3) (2.5, 7.8)
 What will the depth of the water be at ~~5:00~~ pm?
 $\frac{7.8 - 4.3}{2.5 - 0} = \frac{3.5}{2.5} = \frac{7}{5}$ $y = \frac{7}{5}(x) + 4.3$

$y = \frac{7}{5}x + 4.3$ plug in 3 for x **8.5 ft**

11.) Samuel is buying hamburger meat and hot dogs for a class picnic.

- He can spend up to \$100.
- The hamburger meat costs \$3.29 per pound, and a package of hot dogs costs \$2.89.
- Samuel wants to buy at least 10 pounds of hamburger meat and at least 10 packages of hot dogs.

Which system of inequalities models the constraints on the number of pounds of hamburger meat, x and number of packages of hot dogs, y , Samuel can buy?

A. $3.29x + 2.89y \leq 100$
 $x \geq 10$
 $y \geq 10$

~~B. $3.29x + 2.89y < 100$
 $x > 10$
 $y > 10$~~

C. $3.29x + 2.89y \leq 100$
 $x + y \geq 10$

~~D. $3.29x + 2.89y < 100$
 $x + y > 10$~~

12.) A company uses the formula $T = 581s + 150p$ to determine the total cost to purchase s computers and p printers. Which formula can be used to determine the number of computers purchased, given the total cost T and the number of printers purchased?

A. $s = \frac{T}{581} - 150p$
 $T = 581s + 150p$
 $-150p$
 $\frac{581s}{581} = \frac{T-150p}{581}$
 $s = \frac{T-150p}{581}$
 B. $s = \frac{T-150p}{581}$
 C. $s = T - 150p - 581$
 D. $s = T - \frac{150p}{581}$

13.) What is the value of the negative zero of the function, f , defined by $f(x) = x^2 - 36$?

$x^2 - 36$
 $(x+6)(x-6)$
 $x+6=0$ $x-6=0$
 $x=-6$ $x=6$

14.) What is the value of y in the system of equations shown below?

$2x - y = -24$
 $-2(x + 2y = -2)$
 $\frac{2x - y = -24}{-2x - 4y = 4}$
 $-5y = -20$
 $y = 4$

15.) What is the value of the larger zero of the function $f(x) = 4x^2 + 8x - 12$?

$4(x^2 + 2x - 3)$
 $4(x^2 + 3x)(-x-3)$
 $4x(x+3) - 1(x+3)$
 $4(x-1)(x+3)$
 $x-1=0$ $x+3=0$
 $x=1$ $x=-3$

This is the end of the calculator inactive released items.



For exercises 16 – 50, the use of a calculator is permitted.

$\bar{x} = 8.2$ $Med = 9$ $\bar{x} = 7.6$
 $Med = 8.5$

16.) A statistician collected the following data to explore the relationship between two variables, x and y .

X	1.7	2.3	3.6	5.5	8.4	9.6
Y	10	18.2	18.5	20	15.9	19.3

The statistician performed a linear regression and plotted the residuals.

- Based on the residual plot, the statistician decided to exclude one data point.
- The statistician then performed linear regression on the set of remaining data points.
- The result of the new linear model fit the remaining data more closely than the original model to fit the original data.

What data point did the statistician exclude? *Largest residual*

- A. (1.7, 10) - 5.26 B. (3.6, 18.5) 2.29
 C. (5.5, 20) 2.86 D. (8.4, 15.9) - 2.67

17.) A set of nine data points is shown below.

8, 11, 12, 10, 9, 7, 5, 3, 9

Which statement is true if a tenth data point of 2 is added to the data set?

- A. The mean and median will both increase.
 B. The mean will increase and the median will decrease.
 C. The mean will increase and the median will remain the same.
 D. The mean and median will both decrease.

18.) What is the distance, in units, between the y -intercept of $f(x) = x^2 + 12x - 11$ and the y -intercept of the linear function that passes through the points shown in the table below?

	0	-5	-2
$f(x)$			
y -incept	-11	-3	-2
$g(x)$			
$b = -5$			
	-3	1	4
	-5	5	8
	-9	13	6
	-12	19	

4m = -2
6

19.) What is the value of x in the equation shown below?

$$3(x - 8) - 5 = 9(x + 2) + 1$$

$$3x - 24 - 5 = 9x + 18 + 1$$

$$3x - 29 = 9x + 19$$

$$-9x + 29 = 9x + 19$$

$$-6x = 48$$

$$\frac{-6x}{-6} = \frac{48}{-6}$$

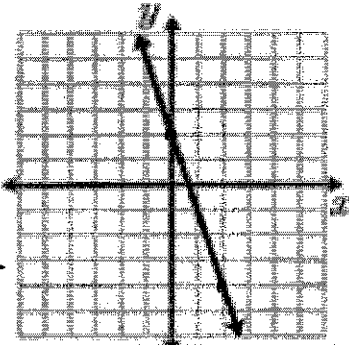
$$x = -8$$

20.) This is a paper/pencil copy of an online technology enhanced item. Three systems of equations are shown below. Please (click and drag) the choice that describes the number of solutions of each system into the appropriate column in the table below.

one solution	no solution	infinitely many solutions
--------------	-------------	---------------------------

$\begin{aligned} -2(2x + 2y &= 16) \\ -4x - 4y &= -32 \\ 4x + 3y &= 27 \\ -y &= -5 \\ y &= 5 \end{aligned}$	$\begin{aligned} -2(2x + 2y &= 8) \\ -4x - 4y &= -16 \\ 4x + 4y &= 16 \\ 0 &= 0 \end{aligned}$
	$\begin{aligned} 2x + 3y &= 12 \\ -2x + 3y &= 18 \\ 0 &= -6 \end{aligned}$

21.) What is the equation of the line parallel to the line shown in the diagram that passes through the point $(-2, -4)$?



$$y + 4 = 3(x + 2)$$

$$y + 4 = -3x + 6$$

$$\frac{+4}{-4} \quad \frac{-6}{-4}$$

$$y = -3x + 10$$

$m = -3$

$$3x + y = 10 \quad -3x - y = 10 \quad 3x + y = -10$$

A. $x + 3y = -14$ B. $x - 3y = 10$

C. $3x + y = -10$ D. $3x - y = -2$

22.) A club began with three members. Each month, each member brought one new member. Which function can be used to determine the number of members x months after the club began?

A. $f(x) = 2x + 3$

B. $f(x) = 3x + 1$

C. $f(x) = 1.5(2)^x$

D. $f(x) = 3(2)^x$

23.) Clara and Michelle's parents started saving for college in 1998.

- Clara's college fund can be modeled by the function $f(x) = 500x + 2,500$ and
- Michelle's college fund can be modeled by the function $g(x) = 2500(1.1)^x$, where x is the number of years since 1998.

About what year will Michelle's college fund first exceed Clara's college fund?

(on back) 2013

24.) Two stores have movies to rent.

- The first store charges a \$12 per month membership fee plus \$2.50 per movie rented.
- The second store has no membership fee but charges \$4.50 per movie rented.

What is the minimum number of movies a person would need to rent in a month for the first store to be a better deal?

7 movies

25.) Karen has two dogs. The larger dog weighs 1.4 pounds more than the smaller dog. The combined weight of the two dogs is 12.6 pounds. What is the weight, in pounds, of the larger dog?

$x = \text{smaller dog}$ $y = \text{larger dog}$

$$y = x + 1.4 \quad x + x + 1.4 = 12.6$$

$$x + y = 12.6 \quad 2x + 1.4 = 12.6$$

$$2x = 11.2$$

$$x = 5.6$$

$$y = 5.6 + 1.4$$

7 lbs

26.) Select all of the scenarios best modeled by exponential functions:

- A. the height of a rocket x seconds after it is launched from a 20-foot tall platform *Quad.*
- B. the amount of a radioactive element that decreases by half every x 10-year periods *Decay*
- C. the total population of a town that has change 2% every x years *Growth*
- D. the total price paid for x shirts that are on sale for half off *Linear*

23 $f(x) = 500x + 2500$

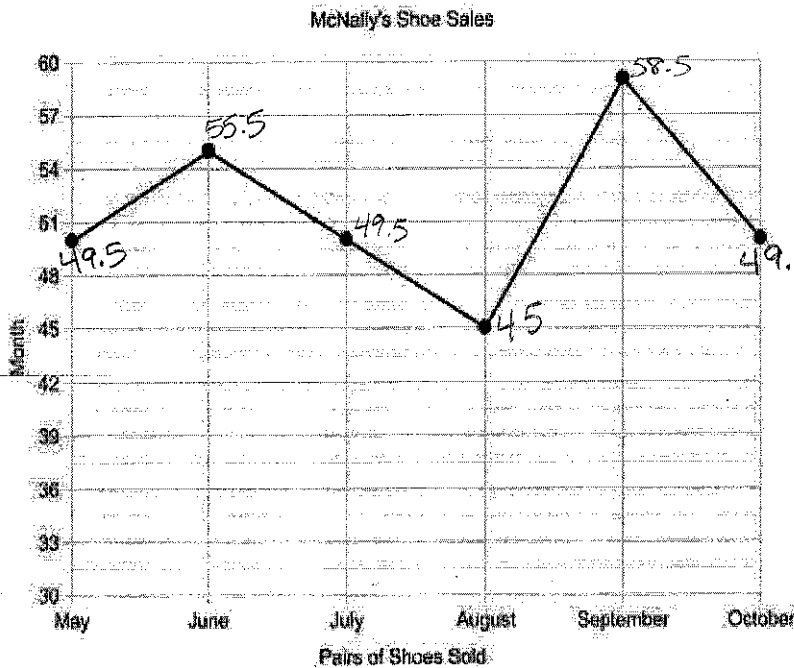
$g(x) = 2500(1.1)^x$

	$f(x)$	$g(x)$
1999(1)	3000	2750
2000(2)	3500	3025
2001(3)	4000	3327.50
2002(4)	4500	3660.25
2003(5)	5000	4026.28
2004(6)	5500	4428.90
2005(7)	6000	4871.79
2006(8)	6500	5358.97
2007(9)	7000	5894.87
2008(10)	7500	6484.36
2009(11)	8000	7132.79
2010(12)	8500	7846.07
2011(13)	9000	8630.68
2012(14)	9500	9493.75
2013(15)	10000	10443.12

24

	$y = 2.50x + 12$	$y = 4.50x$
1	14.50	4.50
2	17.00	9.00
3	19.50	13.50
4	22.00	18.00
5	24.50	22.50
6	27.00	27.00
7	29.50	31.50
8	32.00	36.00
9	34.50	40.50
10	37.00	45.00

27. McNally's Shoe Company recorded their sales per month. During which interval was the average rate of change the greatest?



- A. May to June 6
- B. July to August -4.5
- C. August to September 13.5
- D. September to October -9

28.) The function $a(n) = 3n + 2$ represents the value of the n th term in a sequence. What is the sum of the 1st and 4th terms of the sequence?

$$a(1) = 3(1) + 2 = 5$$

$$a(4) = 3(4) + 2 = 14$$

$$5 + 14 = 19$$

29.) The width of a rectangle is $\frac{3}{4}$ its length. The perimeter of the rectangle is 42 ft. What is the area, in feet, of the rectangle?

$$\frac{3}{4}l = \frac{3}{4}l$$

$$\frac{7}{2}l = 42$$

$$l = 12$$

$$A = lw$$

$$A = 12(9)$$

$$A = 108 \text{ ft}^2$$

length = 12
width = 9

30.) Two functions are shown below.

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

$$g(x) = -x + 1$$

Identify the point(s) at which the graphs of the two functions intersect.

$$(-3, 4)$$

$$(1, 0)$$

Amount of insecticide (in pounds)	Damage inflicted by chinch bugs (in sq ft)
8	1350
20	1100
60	375
42	700
35	850
70	200
47	650

31.) Edna owns seven lots in a small development community. An outbreak of lawn-eating insects called chinch bugs forces her to spread insecticide granules. Deciding to conduct an experiment, Edna spreads different amounts of insecticide on each lot, and records the results after 2 weeks in the table as shown.

What is the meaning of the y-intercept of the linear best fit equation for the data?

- A. The expected damage if there is no bug intervention is 1517 ft².
- B. The expected damage if there is no bug intervention is 1487 ft².
- C. The expected damage if there is no bug intervention is 80.4 ft².

32.) The choices below are data sets. In the choices, w is a constant. Each choice has the same mean. Which choice has lowest standard deviation?

- A. $w-2, w-1, w, w, w+1, w+2$ 1.29
 B. $w-2, w-2, w, w, w+2, w+2$ 1.63
 C. $w-3, w-1, w, w, w+1, w+3$ 1.83
 D. $w-3, w, w, w, w+3$ 1.89

33.) Justin earned scores of 85, 92, and 95 on his science tests. What does he need to earn on his next science test to have an average of 93%?

- A. 93
 C. 85

B. 100
 D. 96

$$\frac{272+x}{4} = 93$$

$$X = 100$$

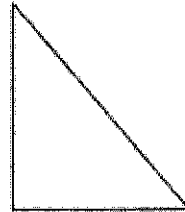
34.) The perimeter of the triangle below is $7xy^2 + 10x - 2y$. Find the length of the missing side.

$$7xy^2 + 10x - 2y$$

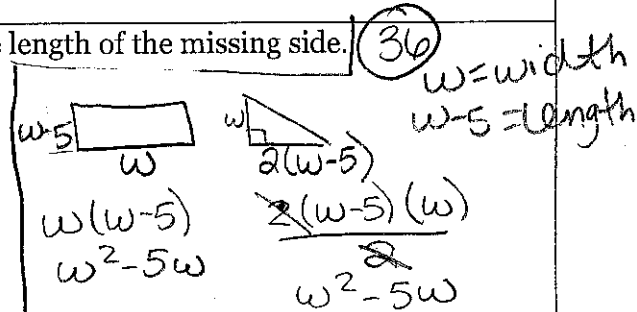
$$-5xy^2 - 3x$$

$$2xy^2 + 7x - 2y$$

$3xy^2$



$2xy^2 + 3x$



35.) What are the solutions of the equation?

$$5r^2 - 44r + 120 = -30 + 11r$$

$$5r^2 - 55r + 150 = 0$$

$$5(r^2 - 11r + 30) = 0$$

$$5(r^2 - 6r)(r - 5) = 0$$

$$5r(r-6) - 5(r-5) = 0$$

$$5(r-5)(r-6) = 0$$

$$r-5=0 \quad r-6=0$$

$r=5$
 $r=6$

36.) David has a rectangle and a right triangle.

- The length of the rectangle is 5 less than its width.
- The length of the shorter leg of the triangle is equal to the rectangle's width.
- The length of the longer leg of the triangle is twice the length of the rectangle.

Write a function, $f(w)$, that represents the combined area of the rectangle and triangle.

$$w^2 - 5w + w^2 - 5w$$

$$2w^2 - 10w$$

37.) The table below shows the number of hours 7 students studied for a math test and the grade each student earned on the test.

Student	Hours Studied (x)	Test Grade (y)
Mary	2.00	84
Jonathan	1.75	86
Susan	2.00	88
Terry	3.00	94
Patrick	3.50	95
Amanda	3.50	93
Darius	2.25	89

How does Mary's test score compare to the score predicted using the linear best-fit model of data for a student who studied 2 hours?
 resid of -2.893 Predicted is higher

- A. Mary scored about 2 points lower than the score predicted for a student who studied 2 hours.
- B. Mary scored about 3 points higher than the score predicted for a student who studied 2 hours.
- C. Mary scored about 3 points lower than the score predicted for a student who studied 2 hours.
- D. Mary scored about 2 points higher than the score predicted for a student who studied 2 hours.

38.) This is a paper/pencil copy of an online technology enhanced item.

Place (click and drag) one option from each of the lists below into its corresponding box to create an equation of a line that passes through the point $(-9, -10)$ and is parallel to $y = -\frac{1}{3}x + 5$.

same slope

$y = -\frac{1}{3}x - 13$

1	2	3
$\frac{1}{3}x$	+	1
$-\frac{1}{3}x$	-	5
$3x$		10
$5x$		13

$y + 10 = -\frac{1}{3}(x + 9)$

$y + 10 = -\frac{1}{3}x - 3$

$y = -\frac{1}{3}x - 13$

40.) Marcus measured the height, in inches, y , of plants over the course of 3 weeks. The correlation coefficient between the number of days, x , and the height of the plants is -0.85 . Which could be concluded based on the correlation coefficient of the data? *negative correlation* $x \uparrow y \downarrow$

- A. There is a strong relationship showing that as the number of days increases, the height of the plant increases.
- B. There is a strong relationship showing that as the number of days increases, the height of the plant decreases.
- C. There is a weak relationship showing that as the number of days increases, the height of the plant increases.
- D. There is a weak relationship showing that as the number of days increases, the height of the plant decreases.

39.) Two functions are shown below.

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

$3x - 2y = 1$

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

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

What is the value of x where the graphs intersect?

$(-0.5, -1.25)$

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

41.) A function is shown below.

$g(x) = 21.5 - 0.73x$

What is the value of $g(15)$?

$g(15) = 21.5 - 0.73(15)$

$g(15) = 10.55$

42.) The table below shows the weights of 8 different bears at a zoo.

Type of Bear	Weight (pounds)
Asiatic Black Bear	225
Black Bear	300
Brown Bear	550
Panda Bear	200
Polar Bear	1,000
Sloth Bear	300
Spectacled Bear	280
Sun Bear	100

If the weight of the sun bear is removed, which statement is true?

- A. The mean decreases more than the median.
- B. The mean decreases less than the median.
- C. The mean increases more than the median.
- D. The mean ~~and~~ increases less than the median.

$\bar{x} = 369.38$
 $Med = 290$

$\bar{x} = 407.86$
 $Med = 300$

$\uparrow 38.48$
 $\uparrow 10$

43.) The vertices of a quadrilateral $JKLM$ with vertices $J(-4, -2)$, $K(2, 1)$, $L(3, 4)$, and $M(-3, 1)$. What is the area of the quadrilateral?

- A. 15 square units
- B. 18 square units
- C. 20 square units
- D. 21 square units

ON THE BACK

44.) This is a paper/pencil copy of an online technology enhanced item.

Select (click) each situation that can be modeled using an exponential function.

- A taxi charges an initial fee of \$2.00 and \$1.50 for each additional mile. *linear*
- The population of a town increases by 15% each year. *exponential growth*
- An airplane flying at an altitude of 33,000 feet descends at rate of 20 feet per minute. *linear*
- A pizza restaurant charges \$5.50 per pizza and \$0.50 for each additional topping.
- A cell triples in size every hour. *exponential growth*

45.) What is the distance between the y-intercept of the function $f(x) = 4x^2 - 8x + 13$ and the y-intercept of the linear function g represented by the table below?

$f(x)$
y-intercept 13

x	y
2	16
3	10
2	6
4	-2
2	-6

$m = -2$
 $b = 20$

- A. 6 units
- B. 7 units
- C. 8 units
- D. 9 units

46.) The table below displays the walking heart rate and running heart rate of eight girls in beats per minute (bpm).

Using the linear best-fit model for the data, what is the predicted heart rate of a girl whose running heart rate is 160 bpm?

Walking Heart Rate	Running Heart Rate
66	128
72	136
74	134
78	138
80	142
84	146
86	148
88	152

- A. 225 bpm
- B. 97 bpm
- C. 90 bpm
- D. 164 bpm

$y = 1.04x + 58.84$
160

43

JM and KL

$$1^2 + 3^2 = c^2$$

$$1 + 4 = c^2$$

$$c^2 = 5$$

$$c = \sqrt{5}$$

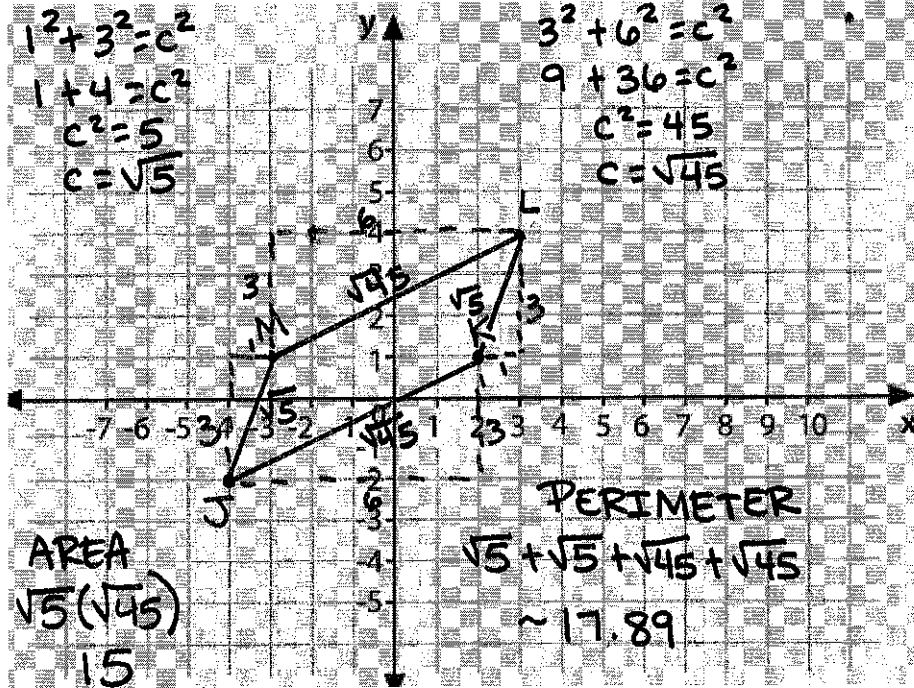
ML and JK

$$3^2 + 6^2 = c^2$$

$$9 + 36 = c^2$$

$$c^2 = 45$$

$$c = \sqrt{45}$$



47.) This is a paper/pencil copy of an online technology enhanced item.

Place (click and drag) the data sets into the appropriate rows in the table.

Symmetric about the mean	
Skewed Left	
Skewed Right	
<p>small outlier</p> <p>30, 90, 105, 120, 135, 150</p>	<p>large outlier</p> <p>10, 20, 30, 40, 50, 115</p>
<p>65, 75, 85, 95, 105, 115</p>	

48.) A rectangle has a perimeter of 68.

- Let x equal the width of the rectangle.
- Let y equal the area of the rectangle.

Which equation can be used to find the area of the rectangle?

- A. $y = x^2 + 34x$ B. $y = x^2 - 68x$
- C. $y = -x^2 + 34x$ D. $y = -x^2 + 68x$

49.) What is the midpoint of the shortest side of a triangle with vertices at $(0,0)$, $(-4,4)$, and $(2,8)$?

$(\frac{0-4}{2}, \frac{0+4}{2})$ A B C
 A. $(-2, 2)$ B. $(-1, 6)$ AC
 $d = \sqrt{(2-0)^2 + (8-0)^2} = \sqrt{4+64} = \sqrt{68}$
 C. $(1, 4)$ D. $(3, 4)$ BC
 $d = \sqrt{(2+4)^2 + (8-4)^2} = \sqrt{36+16} = \sqrt{52}$
 $d = \sqrt{(+4-0)^2 + (4-0)^2} = \sqrt{16+16} = \sqrt{32}$

50.) Lisa collected data on the grams of fat and grams of carbohydrates in 10 sandwiches at a popular restaurant. The table below represents the data she recorded.

Fat (in grams, x)	Carbohydrates (in grams, y)
42	49
65	53
48	50
23	29
12	32
18	32
37	40
30	38
24	36
17	31

What is the slope of the line that fits these data?

- A. $m = 0.5$
- B. $m = 2.3$
- C. $m = 1.5$
- D. $m = 2.7$

$P = 2w + 2L$
 $\frac{P-2w}{2} = L$
 48) Perimeter = 68
 $\frac{68-2x}{2} = 34-x$
 Area
 $x(34-x)$
 $34x - x^2$
 $-x^2 + 34x$