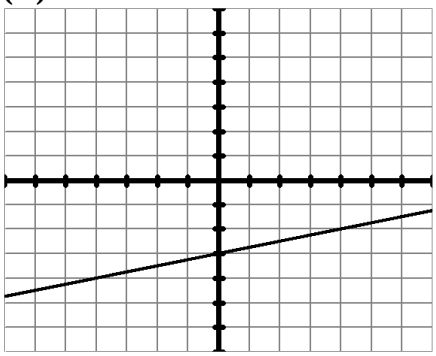
Algebra I Semester 1 FINAL REVIEW NAME:_____

(1) Find the *y*-intercept and the slope for each line shown, then write the equation for each line.

(A)

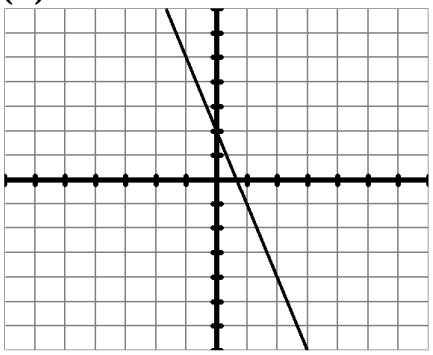


y-intercept:

slope:

equation:

(B)

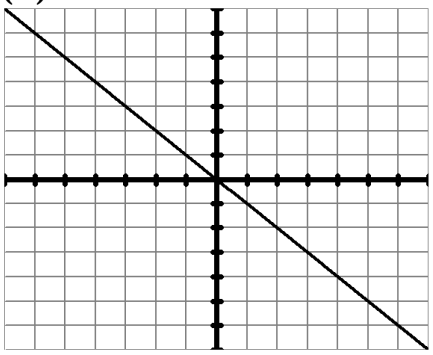


y-intercept:

slope:

equation:

(C)

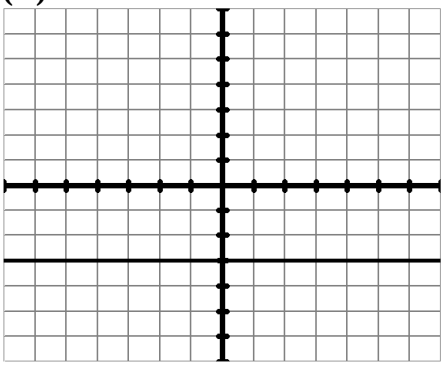


y-intercept:

slope:

equation:

(D)

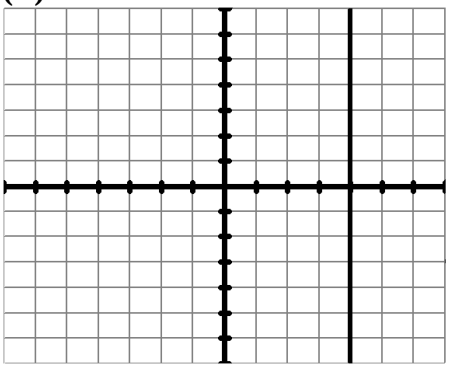


y-intercept:

slope:

equation:

(E)

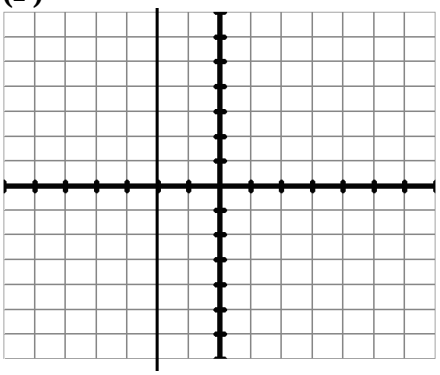


y-intercept:

slope:

equation:

(F)



y-intercept:

slope:

equation:

(2) Solve each absolute value equation.

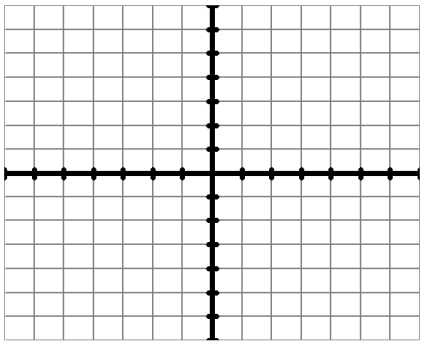
(A) $\lvert x+8\rvert=5$	**(B)** $\lvert x-4\rvert=14$
(C) $\lvert 2x-4\rvert=12$	**(D)** $\lvert 5x+2\rvert=17$

(3) The cost C (in dollars) for a company to print N number of books is given by the equation $C=40+3N$

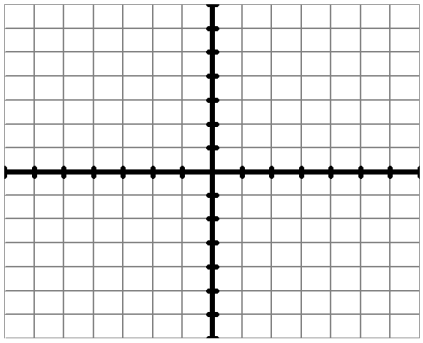
(A) Find the number of books the company printed if the cost was 100 dollars.	**(B)** Find the cost for the company to print 100 books.

(4) Graph each inequality.

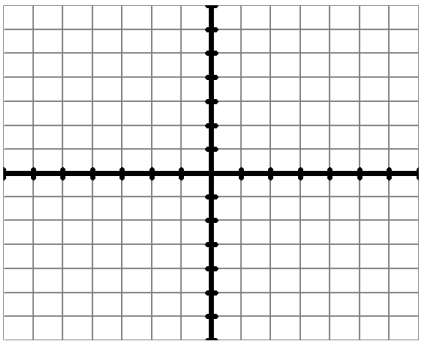
(A) $y \le 3x - 2$



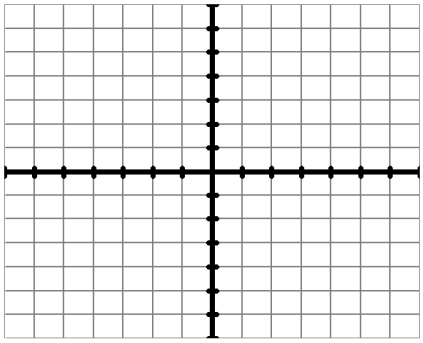
(B) $y > -\frac{2}{5}x$



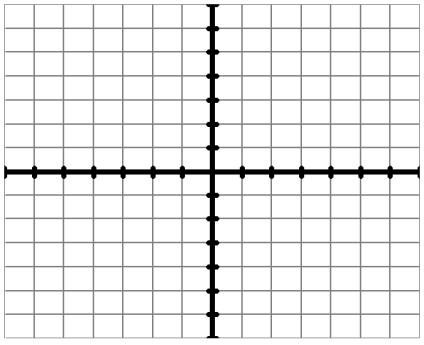
(C) $x \ge 2$



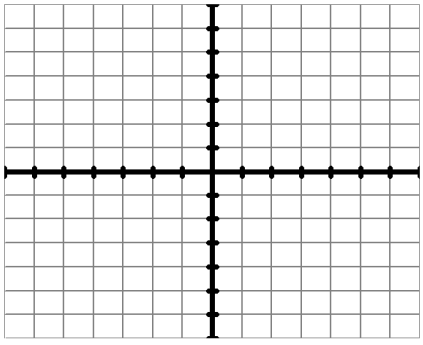
(D) $y < -3$



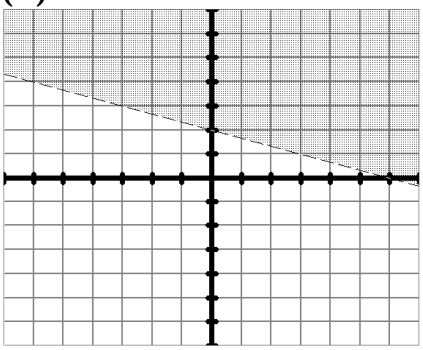
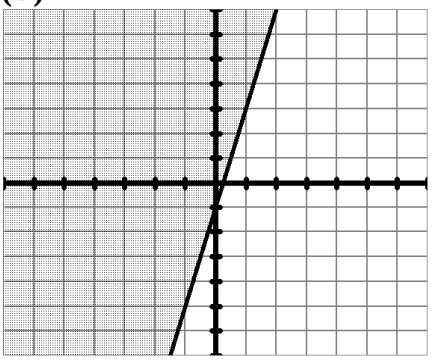
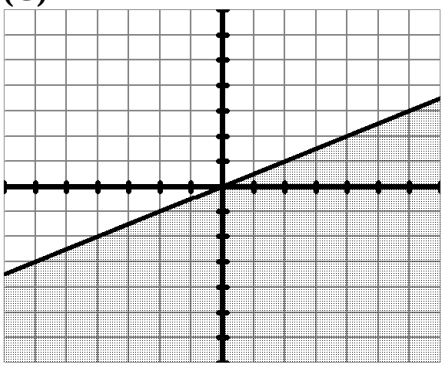
(E) $2x + 6y \le 12$



(F) $8x - 2y \le 10$



(5) Write the inequality for each graph shown.

(A)	**(B)**	**(C)**
		

(6) Without graphing, find the indicated intercept for the graph of each linear equation

(A) Find the x-intercept $-7x-8y=14$	**(B)** Find the y-intercept $\frac{1}{2}x-6y=6$	**(C)** Find the y-intercept $5x+4y=6$
(D) Find the x-intercept $-2x-y=10$	**(E)** Find the y-intercept $-5x+\frac{2}{5}y=-10$	**(F)** Find the x-intercept $-4x+\frac{3}{4}y=-12$

(7) Solve each equation for the variable p

(A) $L = \pi n^2 p$	**(B)** $L = \pi n^2 + p$	**(C)** $L = \pi + n^2 + p$
(D) $\frac{p+4}{n} = 12$	**(E)** $L = \frac{p}{\pi n^2}$	**(F)** $8 = \frac{p+10}{L}$

(8) Change each given standard form equation to slope-intercept form by solving for y

(A) $4x - 6y = 18$	**(B)** $2x + 8y = -6$	**(C)** $-12x - 6y = 6$

(9) Find all solution(s) of each equation.

(A) $4x+12=-4(2x-5)$	**(B)** $3(4x-5)=12x-7$
(C) $x-5(x-3)=-3(2+x)$	**(D)** $2x-4(x+1)=-2(x+2)$

(10) Write and solve an inequality for each situation.

(A) The product of 3 and a number is at least -27. Write and solve an inequality to find the possible values for this number.	**(B)** The quotient of a number and -6 is no more than -30. Write and solve an inequality to find the possible values for this number.	**(C)** Twelve more than a number is more than 48. Write and solve an inequality to find the possible values for this number.

(11) Write and solve an inequality for each situation.

(A) To have access to a local indoor swimming pool, you must pay a one-time fee of \$32. Each day you use the pool you are charged an additional \$5. Write and solve an inequality to find the possible number of days x you can use the pool with \$77.	**(B)** An amusement park offers a yearly pass to the park for \$220. Each time you visit the park you will have to pay \$4 for parking. Write and solve an inequality to find the possible number of days x you can go to the park with \$500.

(12) Write an equation for each situation.

(A) Find an equation (in slope-intercept form) for the line that passes through the points $(3,\ 4)$ and $(-2,\ 5)$. Note: It will be easiest to start with point-slope form and then change it to slope-intercept form.	**(B)** Find an equation (in slope-intercept form) for the line that passes through the points $(4,\ 4)$ and $(-1,\ -6)$. Note: It will be easiest to start with point-slope form and then change it to slope-intercept form.

(13) You purchased a large bag of fertilizer to fertilize your lawn every week. You used the same amount of fertilizer each week, so the relationship between the number of weeks and the amount of fertilizer remaining in the bag was **linear**. After 6 weeks, there were 27 pounds of fertilizer remaining in the bag. After 10 weeks, there were 9 pounds of fertilizer remaining in the bag. (You may use a calculator)

(A) Write an equation that gives the number of pounds y of fertilizer remaining in the bag after x weeks.

(B) How many pounds of fertilizer were in the bag when it was purchased?

(C) What does the slope represent in this situation?

(D) After how many weeks was the bag empty?

(14) You purchased a large bag of birdseed for the birdfeeder in your yard. You filled it to the top each day and it was always empty by the end of the day. Since you used the same amount each day, the relationship between the number of days and amount of seed remaining in the bag was **linear**. After 15 days, there were 75 cups of seed remaining in the bag. After 24 days, there were 48 cups of seed remaining in the bag. (You may use a calculator)

(A) Write an equation that gives the number of cups y of seed remaining in the bag after x days.

(B) How many cups of seed were in the bag when it was purchased?

(C) What does the slope represent in this situation?

(D) After how many days was the bag empty?

(15) Find each indicated slope.

(A) What will be the slope of any line that is **parallel** to the line $y = -\frac{5}{3}x + \frac{1}{4}$?	**(B)** What will be the slope of any line that is **perpendicular** to the line $y = -\frac{3}{4}x - \frac{1}{2}$?
(C) What will be the slope of any line that is **perpendicular** to the line $y = 4x - \frac{1}{5}$?	**(D)** What will be the slope of any line that is **parallel** to the line $y = 5x + 24$?

(16) (Multiple Choice) Which answer choice is an equation for a line that is perpendicular to the line $y = -\frac{2}{5}x + \frac{1}{3}$?

(A) $y = -3x - 15$ **(B)** $y = -\frac{2}{5}x - 3$ **(C)** $y = \frac{5}{2}x - 24$

(17) (Multiple Choice) Which answer choice is an equation for a line that is parallel to the line $y = \frac{1}{4}x + 5$?

(A) $y = -4x + 10$ **(B)** $y = \frac{1}{4}x - 7$ **(C)** $y = -\frac{1}{4}x - \frac{1}{5}$

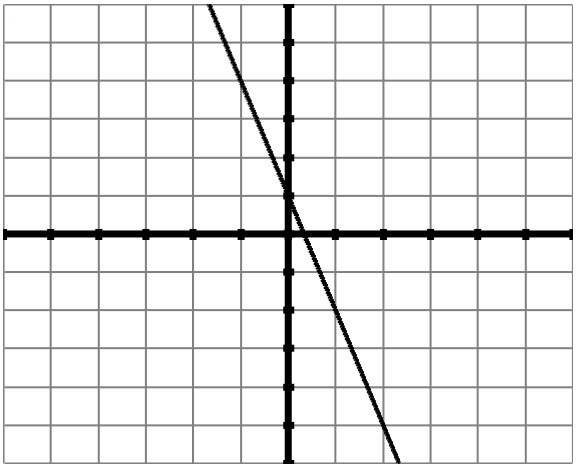
(18) (Multiple Choice) Which answer choice is an equation for a line that is parallel to the line $y = \frac{2}{3}x - 6$?

(A) $y = -\frac{3}{2}x - 6$ **(B)** $y = -\frac{2}{3}x + 15$ **(C)** $y = \frac{2}{3}x - 18$

(19) (Multiple Choice) Which answer choice is an equation for a line that is <u>perpendicular</u> to the line $y = 4x + 3$?

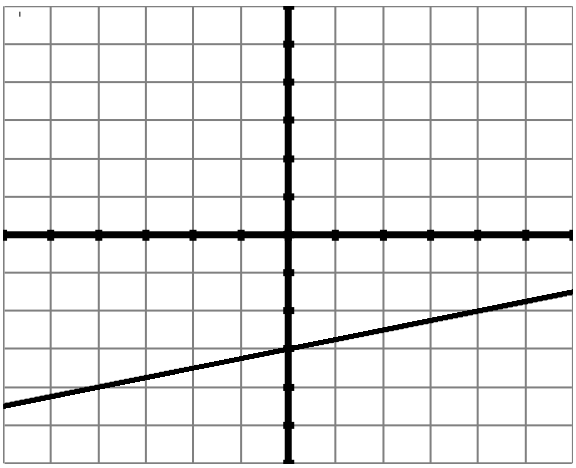
(A) $y = -4x - 15$ **(B)** $y = -\frac{1}{4}x + 35$ **(C)** $y = \frac{1}{4}x - 28$

(20) (Multiple Choice) Which answer choice is an equation for a line that is <u>parallel</u> to the line shown?



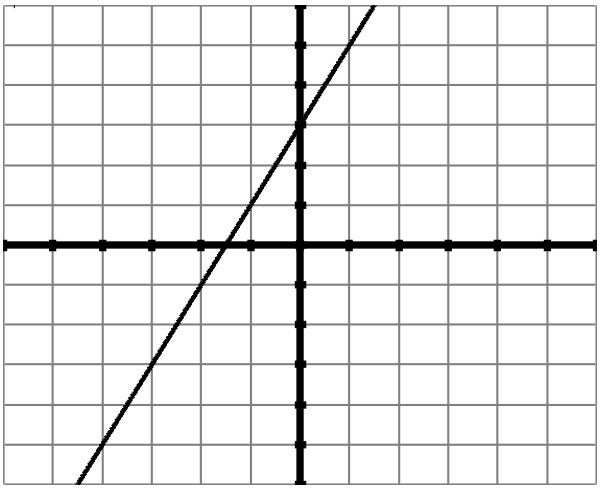
(A) $y = \frac{1}{3}x - 18$ **(B)** $y = -\frac{1}{3}x + 12$ **(C)** $y = 3x + 25$ **(D)** $y = -3x + 20$

(21) (Multiple Choice) Which answer choice is an equation for a line that is <u>perpendicular</u> to the line shown?



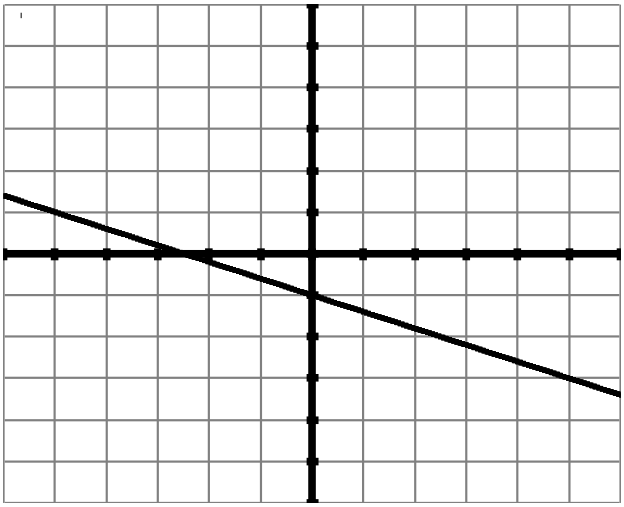
(A) $y = 4x - 10$ **(B)** $y = -\frac{1}{4}x - 32$ **(C)** $y = -4x + 27$ **(D)** $y = \frac{1}{4}x + 10$

(22) (Multiple Choice) Which answer choice is an equation for a line that is <u>parallel</u> to the line shown?



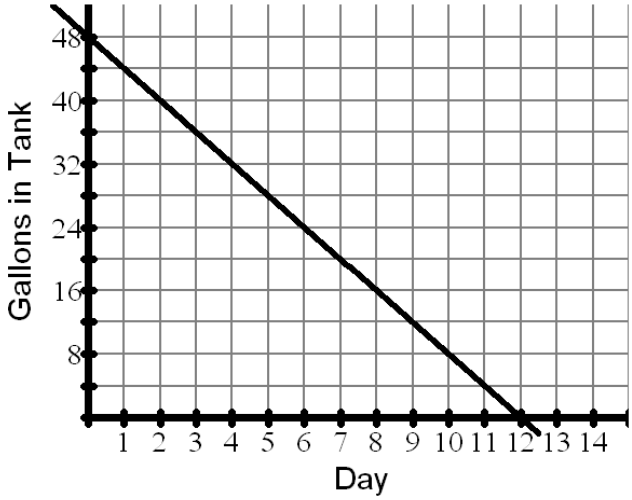
(A) $y = 2x - 19$ **(B)** $y = -2x + 15$ **(C)** $y = \frac{1}{2}x - 28$ **(D)** $y = -\frac{1}{2}x - 20$

(23) (Multiple Choice) Which answer choice is an equation for a line that is <u>perpendicular</u> to the line shown?



(A) $y = -\frac{5}{2}x + 23$ **(B)** $y = \frac{5}{2}x + 21$ **(C)** $y = -\frac{2}{5}x + 19$ **(D)** $y = \frac{2}{5}x - 14$

For questions **(24)** through **(27) ,** use the graph given below. The graph shows the total gallons remaining in a truck's gas tank over several days.



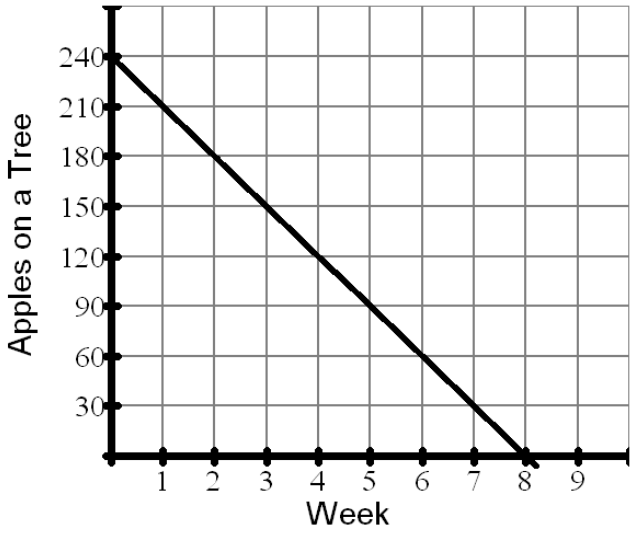
(24) Find the slope (including the units), then use it to explain what the slope represents in this situation.

(25) Let T represent total gallons in the tank and let d represent the day. Write an equation for the situation.

(26) Find the x-intercept and explain what it represents in this situation.

(27) Find the y-intercept and explain what it represents in this situation.

For questions **(28)** through **(31) ,** use the graph given below. The graph shows the total number of apples on a tree over several weeks.



(28) Find the slope (including the units), then use it to explain what the slope represents in this situation.

(29) Let A represent the total number of apples on the tree and let w represent the week. Write an equation for the situation.

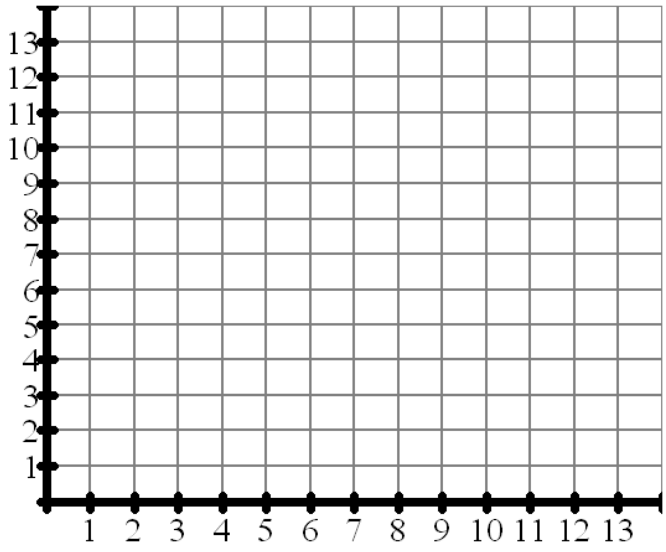
(30) Find the x-intercept and explain what it represents in this situation.

(31) Find the y-intercept and explain what it represents in this situation.

(32) A certain store has a sale in which all shirts are \$10 each and all shorts are \$15 each.
Let x represent the number of shirts you buy and let y represent the number of shorts you buy.

(A) Write an inequality to represent the different combinations of shirts and shorts you can buy with \$120.

(B) Label the axes and graph the inequality.



(C) For each combination below, state YES or NO to tell whether it is a possible combination for you to purchase. (Use your graph to answer this question)

(I) 5 shirts *and* 3 shorts

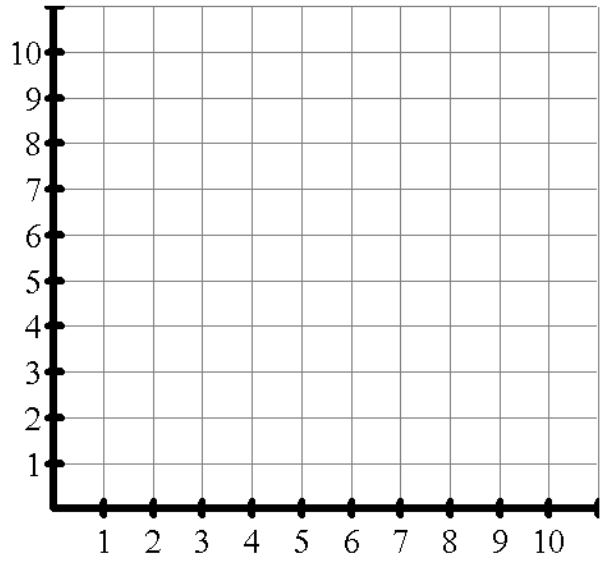
(II) 7 shirts *and* 5 shorts

(III) 8 shirts *and* 2 shorts

(33) An online store sells DVDs and video games. They sell DVDs for $20 each and video games for $25 each. The company's daily operating expenses are $200. Let x represent the number of DVDs they sell in a day and let y represent the number of video games they sell in a day.

(A) Write an inequality to represent the different combinations of DVDs and video games they can sell to earn a profit on any given day.

(B) Label the axes and graph the inequality.



(C) For each combination below, state YES or NO to tell whether it is a possible combination for the company to sell in a day and make a profit. (Use your graph to answer this question)

(I) 6 DVDs *and* 2 video games

(II) 4 DVDs *and* 6 video games

(III) 8 DVDs *and* 1 video games

(34) Explain how to translate the graph of $y = x^2$ to draw the graph of $y = (x+5)^2$.
(check your answer by graphing both of them on your calculator)

(35) Explain how to translate the graph of $y = x^2$ to draw the graph of $y = x^2 + 5$.
(check your answer by graphing both of them on your calculator)

(36) Explain how to translate the graph of $y = x^2$ to draw the graph of $y = (x-4)^2 - 6$.

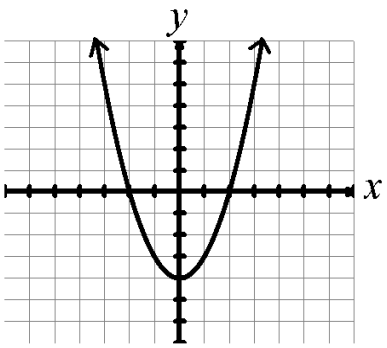
(37) Explain how to translate the graph of $y = |x|$ to draw the graph of $y = |x-3|$.
(check your answer by graphing both of them on your calculator)

(38) Explain how to translate the graph of $y = |x|$ to draw the graph of $y = |x| - 3$.
(check your answer by graphing both of them on your calculator)

(39) Explain how to translate the graph of $y = |x|$ to draw the graph of $y = |x+1| + 4$.

(40) Find/state the domain and the range for each graph shown.

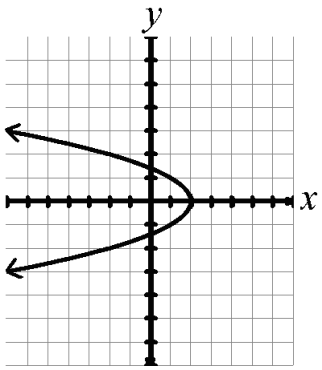
(A)



Domain:

Range:

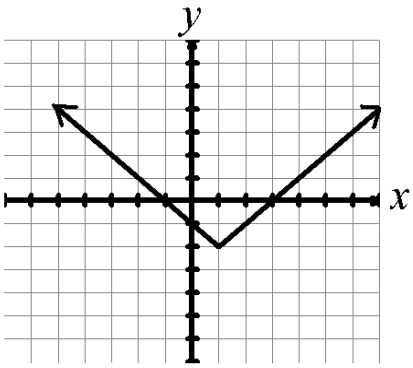
(B)



Domain:

Range:

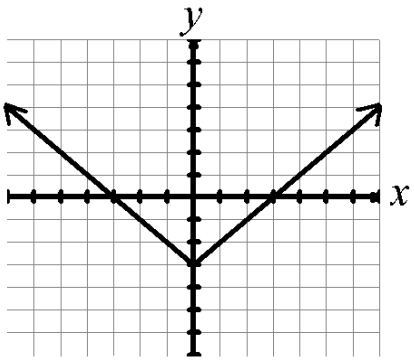
(C)



Domain:

Range:

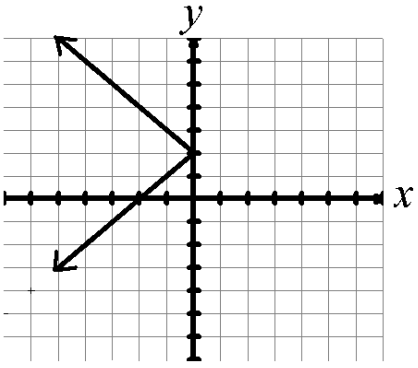
(D)



Domain:

Range:

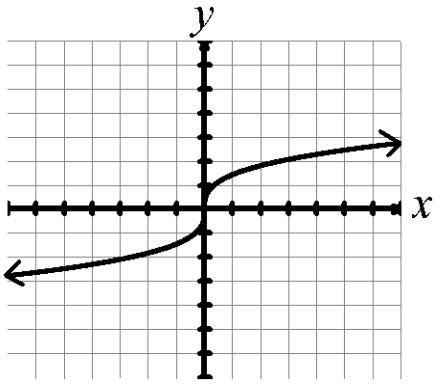
(E)



Domain:

Range:

(F)



Domain:

Range:

(41) For each given table of values, state whether they represent a LINEAR function, an EXPONENTIAL function, or NEITHER.

(A)

x	y
0	3
2	8
4	13
6	18

(B)

x	y
0	5
1	10
2	20
3	40

(C)

x	y
2	4
4	8
6	24
8	48

(D)

x	y
0	5
2	20
4	80
6	320

(E)

x	y
0	5
1	15
2	30
3	60

(F)

x	y
2	5
4	15
6	25
8	35

(G)

x	y
1	18
2	12
3	6
4	0

(H)

x	y
0	80
1	40
2	20
3	10

(I)

x	y
2	18
4	9
6	4
8	1

(42) Find the value of $f(5)$ for the function

$f(x) = 2x - 11.$

(43) Find the value of x when $f(x) = -9$ for the function

$f(x) = \frac{1}{2}x + 7.$

(44) Find the value of $f(-3)$ for the function

$f(x) = 5x - 3.$

(45) Find the value of x when $f(x) = 10$ for the function

$f(x) = 2x + 4.$

(46) Find the value of x when $f(x) = -5$ for the function

$f(x) = \frac{1}{4}x + 3$

(47) Find the value of $f(2)$ for the function

$f(x) = -6x + 14.$

(48) Find the formula for the *n*th term of the given sequence.

$5, 9, 13, 17, \ldots.$

(49) Find the formula for the *n*th term of the given sequence.

$$3, 10, 17, 24, \ldots.$$

(50) Find the formula for the *n*th term of the given sequence.

$$20, 17, 14, 11, \ldots.$$

(51) Find the value of n if $p^{2n} \cdot p^5 = p^{17}$

(52) Find the value of n if $\dfrac{p^{5n}}{p^{10}} = p^{30}$

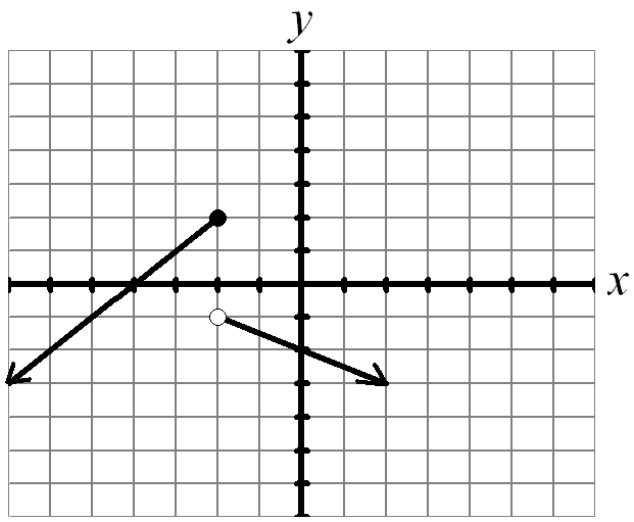
(53) Find the value of n if $p^{4n} \cdot p^6 = p^{22}$

(54) Find the value of n if $\dfrac{p^{2n}}{p^6} = p^{16}$

(55) Find the value of n if $p^{5n} \cdot p^{10} = p^{25}$

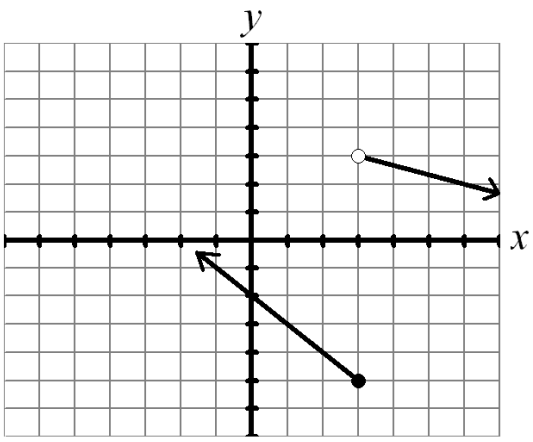
(56) Find the value of n if $\dfrac{p^{3n}}{p^{3}} = p^{21}$

(57) Write a piecewise function for the graph shown.



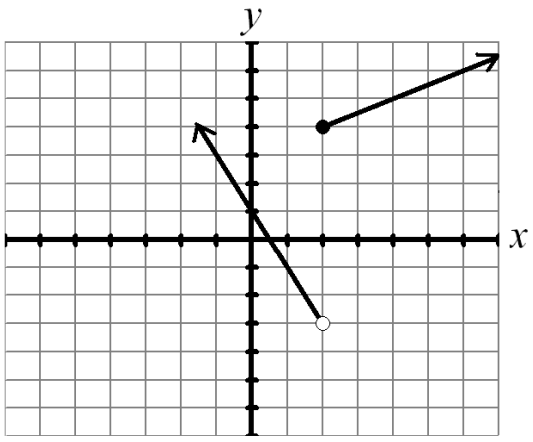
$$y = \begin{cases} \\ \\ \\ \end{cases}$$

(58) Write a piecewise function for the graph shown.



$$y = \begin{cases} \\ \\ \\ \end{cases}$$

(59) Write a piecewise function for the graph shown.

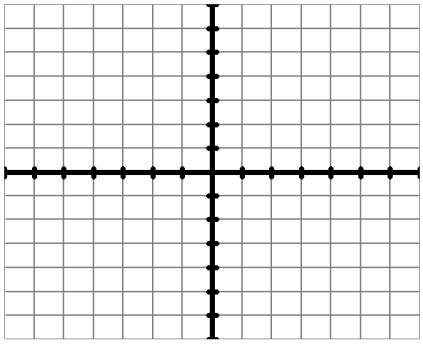


$$y = \begin{cases} \\ \\ \\ \end{cases}$$

(60) Solve each system by graphing.

(A)

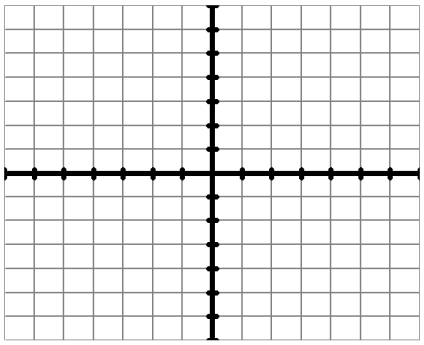
$$x - 2y = -8$$
$$4x + 2y = -2$$



Solution: (,)

(B)

$$y = -\frac{2}{3}x$$
$$-x - 3y = 6$$



Solution: (,)

(61) Use the Elimination method **or** the Substitution method to solve each system.
First decide and tell which method would be **EASIER** to use in each situation.

(A)

$$2x + 3y = 8$$
$$3x - y = 1$$

Method?:

Solution:

(B)

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

Method?:

Solution:

(C) $x = 2y + 3$, $2x + 4y = 6$ Method?:

Solution:

(D) $3x - 4y = 10$, $5x + 3y = 7$ Method?:

Solution:

(E) $2x - 3y = 6$, $4x - 6y = 11$ Method?:

Solution:

(F) $x - 4y = 20$, $2x + 3y = -15$ Method?:

Solution:

(62) For each situation described, assign the variables x and y to the unknowns, then write and solve a system of equations to answer the questions (if possible) .

(A) Ed has only nickels and dimes in a small coin bank. He has a total of \$6.30 and a total of 79 coins. Find the number of each coin he has (if possible).

What are you going to let x represent?_____

What are you going to let y represent?_____

(B) A company packed 244 stuffed animals into a total of 27 boxes. They used some small boxes which each held 8 stuffed animals and they used some large boxes which each held 12 stuffed animals. Find the number of small boxes they used and the number of large boxes they used (if possible).

What are you going to let x represent?_____

What are you going to let y represent?_____

(C) An ice cream supplier offers two different size cases containing a mixture of frozen ice cream cones and ice cream sandwiches. A small case contains 20 cones and 25 sandwiches and costs $15. A large case contains 60 cones and 75 sandwiches and costs $40. Find the cost of one sandwich (if possible).

What are you going to let x represent?_____

What are you going to let y represent?_____

(D) A peanut company offers two different size cases containing some bags of almonds and some bags of peanuts. A small case contains 10 bags of almonds and 25 bags of peanuts and costs $75. A large case contains 40 bags of almonds and 60 bags of peanuts and costs $220. Find the cost of one bag of peanuts (if possible).

What are you going to let x represent?_____

What are you going to let y represent?_____

(63) Find the indicated value.

(A) The value of a car decreases by 18% each year. A car is purchased for \$16,000. Find the value of the car after 5 years. (use a graphing calculator)	**(B)** The original value of a painting is \$1400, and the value increases by 9% each year. Find the value of the painting in 25 years. (use a graphing calculator)
(C) If you deposit \$360 in an account that pays 3% interest compounded annually, find the amount in the account after 5 years. (use a graphing calculator)	**(D)** The population of a town is decreasing at a rate of 12% per year. In the year 2000, there were 3040 people in the town. Find the number of people in the town in the year 2008. (use a graphing calculator)

(64) Simplify

(A) $(4x^6y^{-5})^3$	**(B)** $(-2m^{-3}n^5)^4$
(C) $(-3an^{-2})^3$	**(D)** $(x^2y^{-4})^{-3}$

(E) $\dfrac{(2x^{-6}y^{2})^{-3}}{2xy^{4}}$

(65) Rewrite $\sqrt[3]{p^{12}}$ in 3 other forms.

(66) Rewrite $\sqrt[4]{p^{8}}$ in 3 other forms.

(67) Rewrite $\sqrt{p^{10}}$ in 3 other forms.

(68) Rewrite $\sqrt[5]{p^{15}}$ in 3 other forms.

(69) Find the next three terms of the sequence

$$1, 3, 9, 27, \ldots.$$

(70) Find the next three terms of the sequence

$$243, 81, 27, 9, \ldots.$$

(71) Find the next three terms of the sequence

$$96, 48, 24, 12, \ldots.$$

(72) Use the given recursive rule to write the first four terms in the sequence.

$$a_1 = 20\ ,\ \ a_n = a_{n-1} - 4$$

(73) Use the given recursive rule to write the first four terms in the sequence.

$$a_1 = 2\ ,\ \ a_n = -4\, a_{n-1}$$

(74) Use the given recursive rule to write the first four terms in the sequence.

$$a_1 = 6\ ,\ \ a_n = a_{n-1} - 2$$

(75) Use the given recursive rule to write the first four terms in the sequence.

$$a_1 = 4\ ,\ \ a_n = -5\, a_{n-1}$$