

Name: _____

Algebra 12: Midterm Review

Midterm Format

(*Note – there will be a **calculator section** and a **noncalculator section**)

**Multiple choice problems*

For this section, make sure you choose an answer for *all* of them. Don't leave any blank! Multiple choice questions are graded as correct or incorrect (no partial credit).

**Open-Ended*

For this section, you must show all work to receive the total points for the problem.

Remember to label your answer and explain your work if the problem requires an explanation.

Unit 1 – Solving Equations (Textbook Chapter 2)

Solve for x .

1. $x - 8 = 20$

2. $18 = \frac{x}{3}$

3. $-6x = 72$

4. $\frac{4}{5}x = 10$

5. $2x - 3 = 17$

6. $5 + -3x = 29$

7. $-7 + \frac{x}{4} = 13$

8. $8 = \frac{-x}{5} + 14$

9. $\frac{x+9}{6} = 3$

10. $\frac{x+3}{2} = \frac{x-4}{5}$

11. $3(x-1) + 6 = 2x + 4 + x$

12. $6(x+5) = -(x+2)$

13. $\frac{1}{2}(30+8x) = 15+4x$

14. $-\frac{2}{5}x + 4 = 10$

15. $-2(6-5x) = 5(2x-4)$

Simplify the expression.

16. $3x + 5 - 4x^2 - 6 - 3x + 10 + 9x^2 + 5x^3$

17. $10x - 3y + -2x + y$

18. Solve for l : $A = lw$

19. Solve for r : $Y = \frac{r}{t}$

20. Solve for r : $\frac{P}{r} = t$

21. Solve for y .

a. $6x = 9 - 3y$

b. $4x - 2y = 15$

c. $y + 3x = 8$

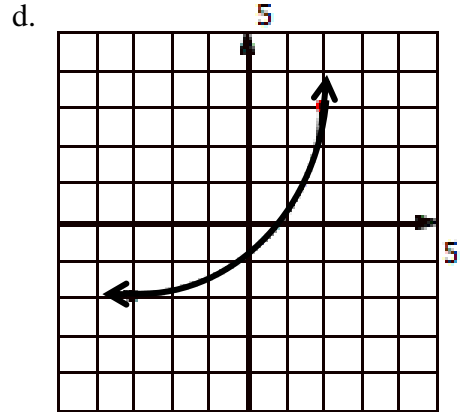
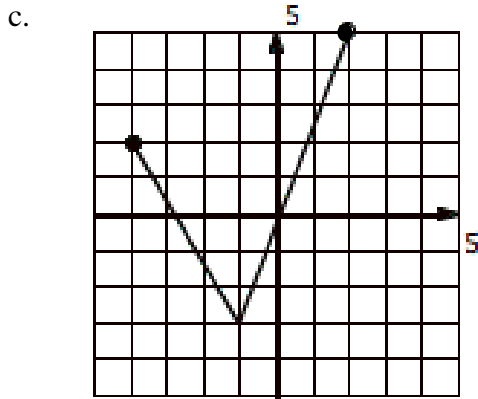
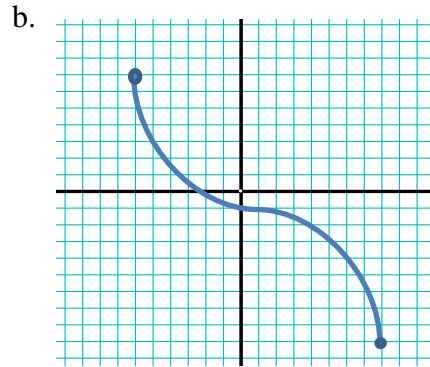
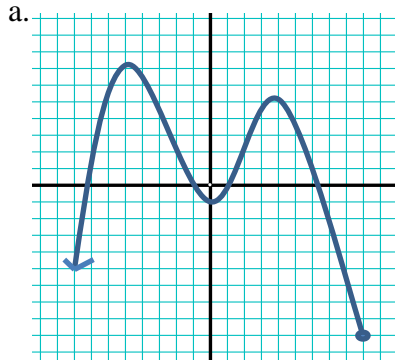
Unit 2 – Functions (Textbook Chapter 4, and Sections 1.9 & 9.7)

22. Identify the domain and range of the function: $\{(-4, 2), (-9, -5), (-4, 12), (8, -8)\}$

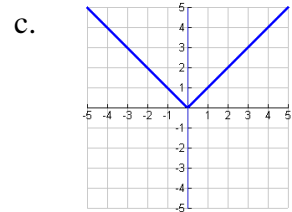
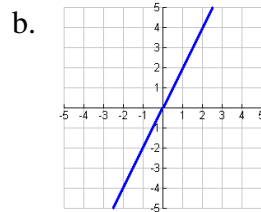
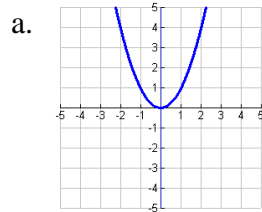
Domain: { }

Range: { }

23. Using the graphs below, state the domain and range.



24. Use the graphs to the right.



Which graph shows a linear function?

Which graph shows a quadratic function?

25. Evaluate $f(x) = 4x - 3$ for $x = -5$

26. Evaluate $y = 4x^2 - 8$ for $x = -2$

27. Find x if $f(x) = 26$. $f(x) = 2x - 8$

28. Find x if $g(x) = -23$. $g(x) = -5x + 2$

29. Use the tile pattern for the questions below.

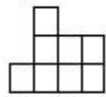


Figure 2

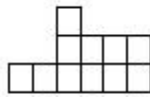


Figure 3

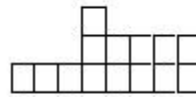


Figure 4

- a. Make a table to show the relationship between the Figure Number (x) and the Number of Tiles (y).

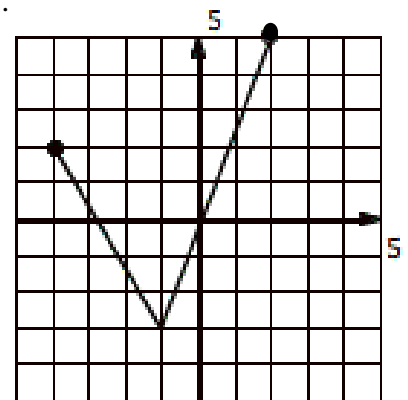
Figure Number (x)	0	1	2	3	4	5
Number of Tiles (y)						

- b. Write a function rule to represent the tile pattern.

- c. How many tiles will figure 100 have?

30. Using the graph of $h(x)$ to the right, answer the following questions:

- a. Is $h(x)$ a function? Explain.



b. $h(0) =$ _____

c. $h(-4) =$ _____

d. Find x when $h(x) = -3$ $x =$ _____

e. Find x when $h(x) = 5$ $x =$ _____

- f. What are the domain and range of the graph?

31. Using the graph of $f(x)$ to the right, answer the following questions:

a. Is $f(x)$ a function? Explain.

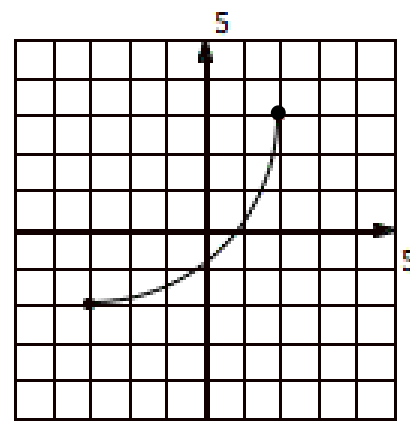
b. $f(2) =$ _____

c. $f(-3) =$ _____

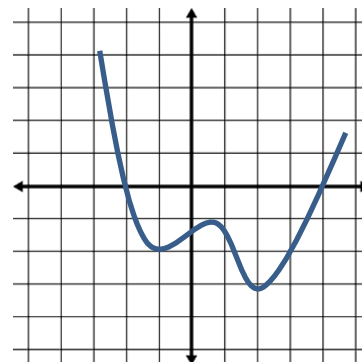
d. Find x if $f(x) = 1$ $x =$ _____

e. Find x if $f(x) = -2$ $x =$ _____

f. What are the domain and range of the graph?



32. What are the x - and y - intercepts of the graph at right?



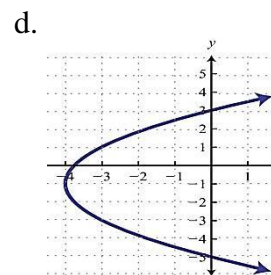
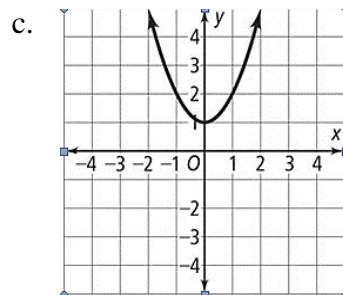
33. Which of the following are functions? Circle your answers.

a.

x	y
0	0
1	4
2	8
3	12

b.

x	y
4	7
2	5
0	3
2	1



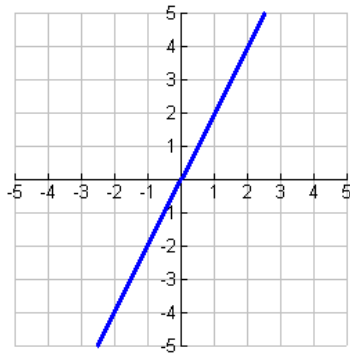
34. Use the equation: $3x + 4y = 12$

a. Solve for y .

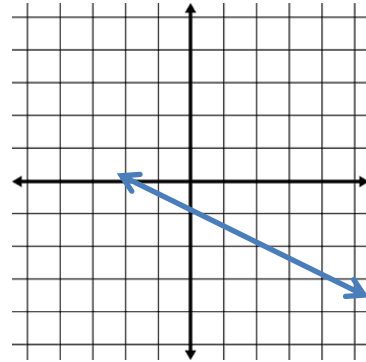
b. Find the y -intercept.

Unit 3 – Linear Functions (Textbook Chapter 5)

35. What is the slope of the line shown?



36. What is the slope of the line shown?



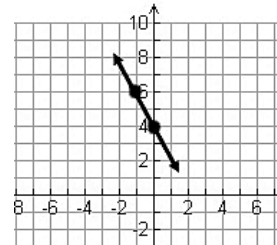
37. Find the slope of the line through the given points.

$(-1, 3)$ and $(5, -2)$

38. Find the slope of the line through the given points.

$(4, -2)$ and $(-3, -2)$

39. Write an equation of the line in slope-intercept form.



40. Write an equation in point-slope form and in slope-intercept form of the line that passes through the given points.

$(-2, -3)$ and $(3, 7)$

Point-slope: _____ Slope-intercept: _____

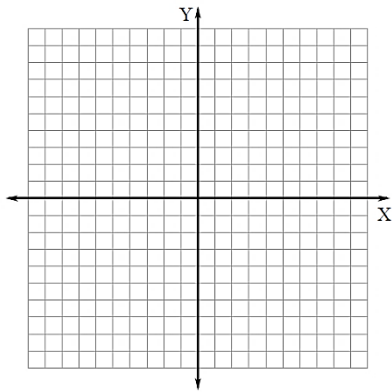
41. Write an equation in point-slope form and in slope-intercept form of the line that passes through the given points.

$(-2, 1)$ and $(4, 4)$

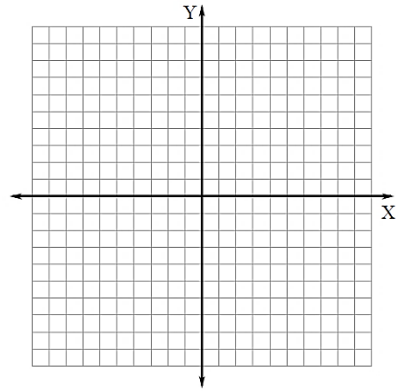
Point-slope: _____ Slope-intercept: _____

42. Identify the slope and the y-intercept for the equation $y = -3x + 8$.

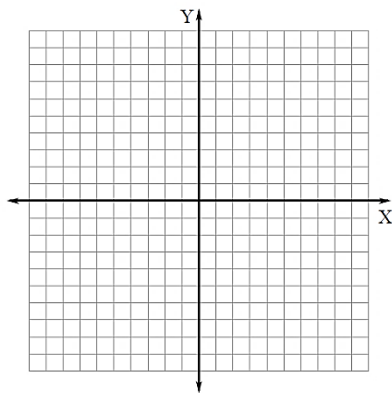
43. Create a graph of the equation $y = \frac{-1}{2}x - 4$.



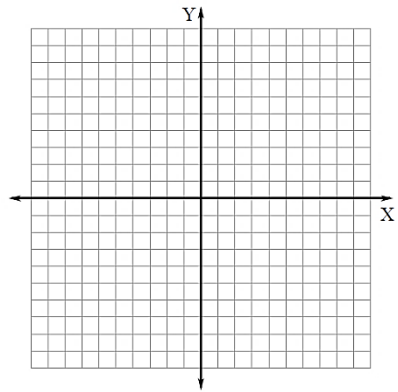
44. Create a graph of the equation $y = 3x + 2$.



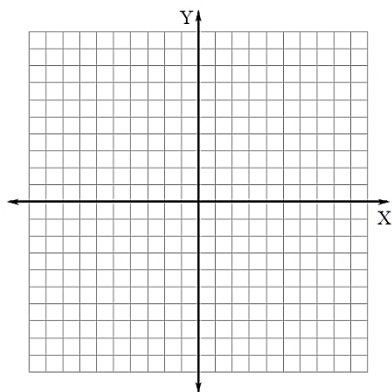
45. Create a graph of the equation $y - 3 = 4(x + 2)$



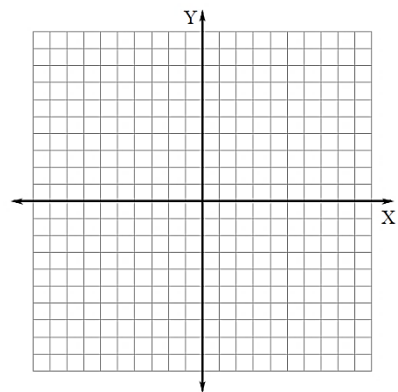
46. Create a graph of the equation. $6x - 2y = 18$



47. Create a graph of the equation $4x + 3y = 12$



48. Create a graph of the equation $y + 5 = -\frac{1}{2}(x - 3)$



49. Write the equation of the line with a slope of -3 and y-intercept of 5.

50. Write the equation of a line which passes through the point $(-2, -7)$ and has a slope of 2.

51. Write the equation of a line which passes through the point $(6, 4)$ and has a slope of 3.

52. Find the x- and y-intercepts of the equation. $4x - 2y = 16$

53. Find the x- and y-intercepts of the equation. $6x - 3y = 48$

54. Write the equation of a line which passes through the point $(6, 3)$ and is **parallel** to the line $y = 2x + 9$.

55. Write the equation of a line which passes through the point $(3, 6)$ and is **perpendicular** to the line $y = \frac{3}{4}x - 11$.

56. Are the following pairs of equations parallel, perpendicular, or neither?

a. $y = 3x + 2$ and $y = -3x + 9$ _____

b. $y = 5x + 3$ and $-5x + y = -8$ _____

c. $y = \frac{1}{5}x - 5$ and $y = -5x + 2$ _____

d. $y = 3x - 12$ and $3y + x = 12$ _____

e. $x = 12$ and $y = \frac{-7}{4}$ _____

57. Ernest plans to rent a car. The car rental is \$40.75 plus \$0.50 each mile. Write a function $C(x)$, for cost of x miles. Determine the cost of driving two hundred miles.

Function: _____

Cost: _____

58. Jared has a job that pays \$9.00 an hour and he works between 10 and 25 hours each week depending on his availability. His weekly salary can be modeled by the equation: $y = 9x$, where y is his weekly profit and x is the numbers of hours he worked in a week.

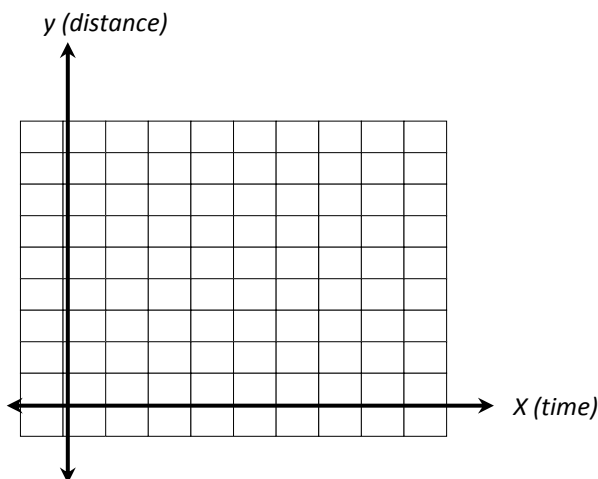
- Describe the independent and dependent variables.
- State the domain for this problem. What does it mean in context of the situation?
- State the range for this problem. What does it mean in context of the situation?
- What does each value in the ordered pair $(25, 225)$ mean in this situation?

59. Jim and Scott are having a bicycle race. Jim began at the starting line and rode at a constant rate of 3 feet per second. Scott got a one-foot head start and rode five feet every 2 seconds.

- Graph lines on the axes provided.
- Write an equation for each line.

Jim: _____

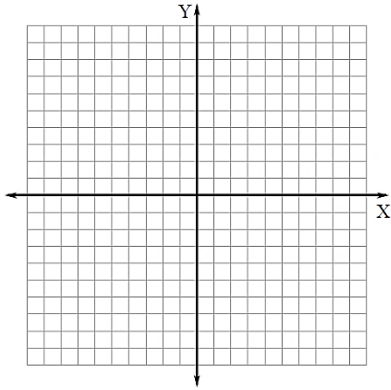
Scott: _____



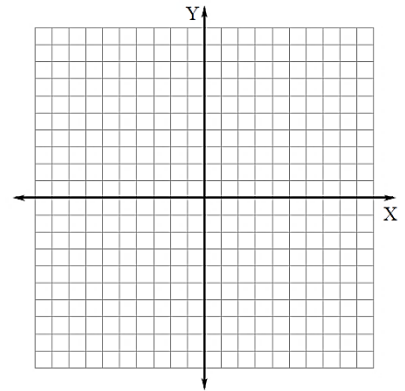
- When four seconds have gone by, who is ahead?
- At what time were they at the same place in the race?
- What was the distance at this point?
- If the race is 3 feet long, who won? Justify your answer.

Create a graph of each equation.

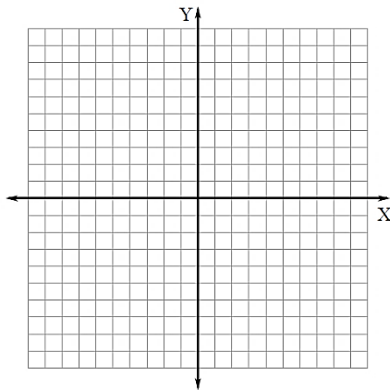
60. $y = -1$



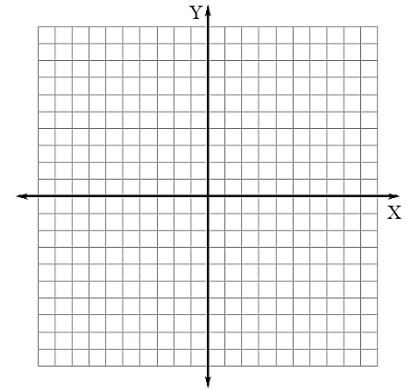
61. $y = 4$



62. $x = -3$

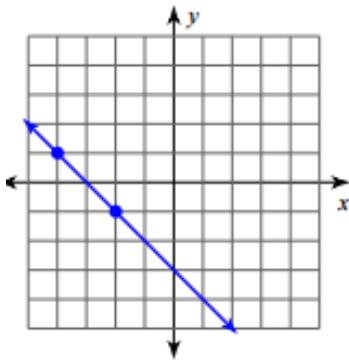


63. $x = 1$

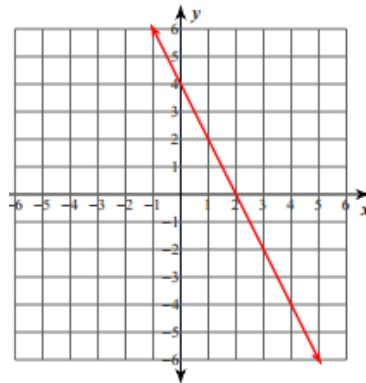


Write an equation for each line.

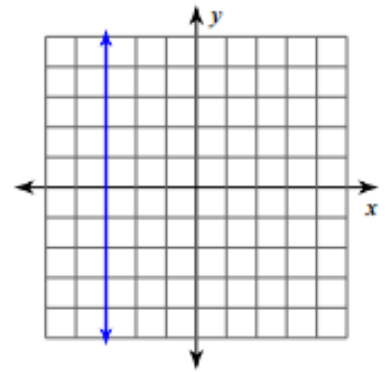
64.



65.



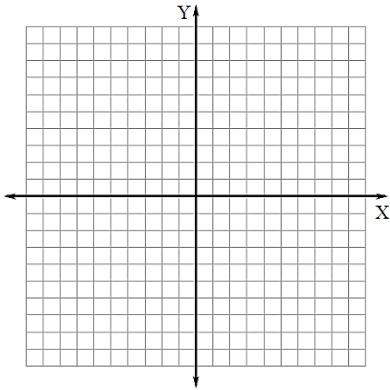
66.



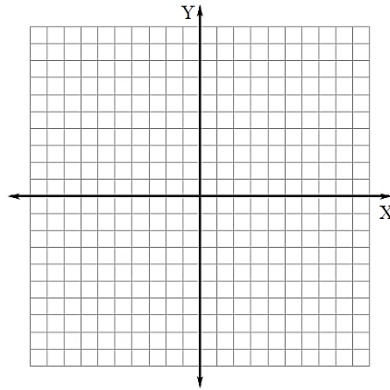
Unit 4 – Systems of Linear Equations (Textbook Chapter 6)

Solve each system of linear equations by graphing. Write your solution as an ordered pair (x, y) .

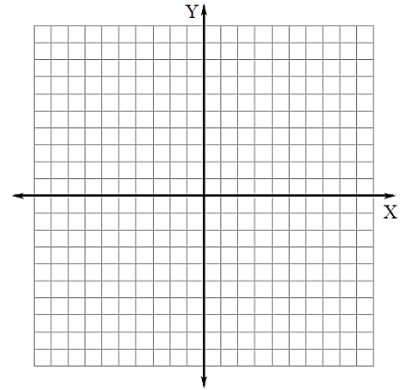
67. $y = x - 4$
 $y = 3x - 4$



68. $y = 4x - 11$
 $y = -2x + 7$



69. $y = -3x + 3$
 $y = 2x - 7$



Solve each system of linear equations using a method of your choice. Write your solution as an ordered pair (x, y) .

70. $y = x + 3$
 $y = -4x - 2$

71. $x = y$
 $x - 3y = 4$

72. $27x + 36y = 18$
 $9x + 12y = 6$

73. $y = 5x - 1$
 $3x - 2y = 1$

74. $2x + 3y = 12$
 $x - 2y = -4.5$

75. $x + y = 7$
 $x - y = 3$

$$\begin{aligned} 76. \quad & 2x + y = -5 \\ & 3x - y = -10 \end{aligned}$$

$$\begin{aligned} 77. \quad & x - 3y = 27 \\ & 3x - 3y = 39 \end{aligned}$$

$$\begin{aligned} 78. \quad & 4x + 2y = 2 \\ & 3x + y = 4 \end{aligned}$$

Without graphing, decide whether the following system of linear equations has *one solution*, *infinitely many solutions*, or *no solution*. Explain.

$$\begin{aligned} 79. \quad & 8x = 2y - 16 \\ & y = 4x \end{aligned}$$

$$\begin{aligned} 80. \quad & 18x - 3y = 9 \\ & y = 6x - 3 \end{aligned}$$

$$\begin{aligned} 81. \quad & y = 3x + 2 \\ & 6x - 2y = 8 \end{aligned}$$

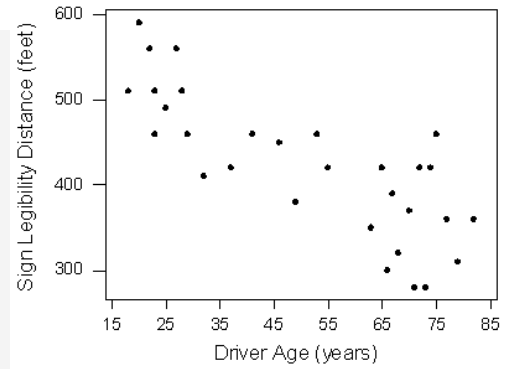
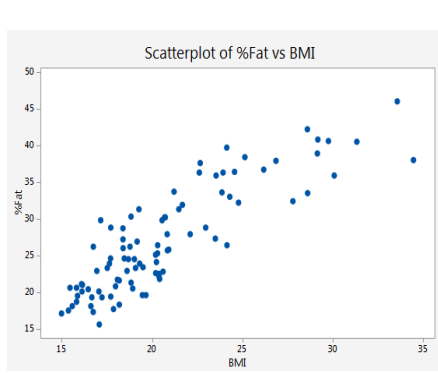
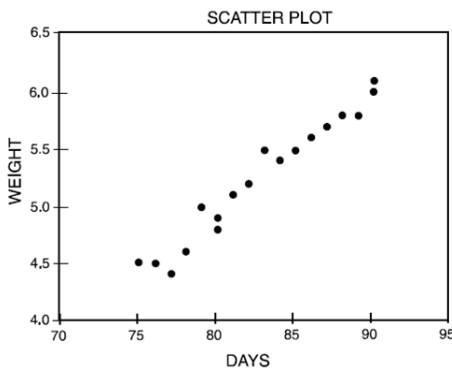
Write a system of linear equations and use the system to solve the problem.

82. There are 785 students in the senior class. If there are 77 more females in the class than males, how many male and female seniors are there in the class?

83. The concession stand is selling hot dogs and hamburgers during a game. At halftime, they sold a total of 78 hot dogs and hamburgers and made \$105.50. How many of each item did they sell if hamburgers sold for \$1.50 and hot dogs sold for \$1.25?

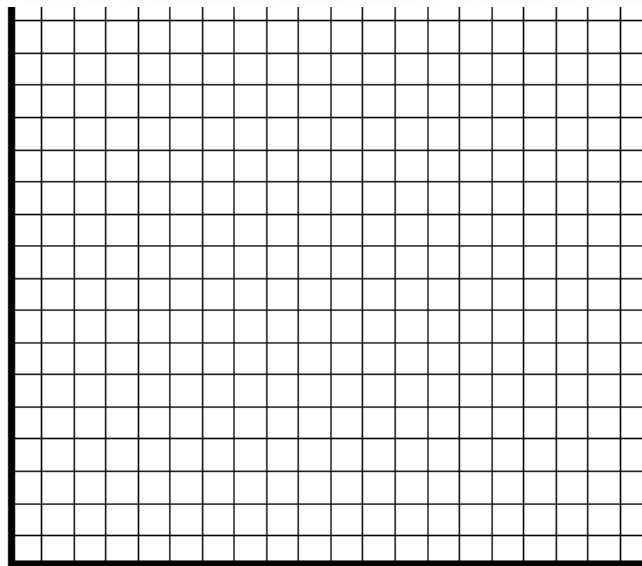
84. The Beardsley Zoo is filling two water tanks for the elephant exhibit. One water tank contains 50 gal of water and is filled at a constant rate of 3 gal/h. The second water tank contains 29 gal of water and is filled at a constant rate of 10 gal/h. When will the two tanks have the same amount of water? How much water will they each have at that time?

85. Describe the association for each scatterplot (positive or negative, strong or weak).

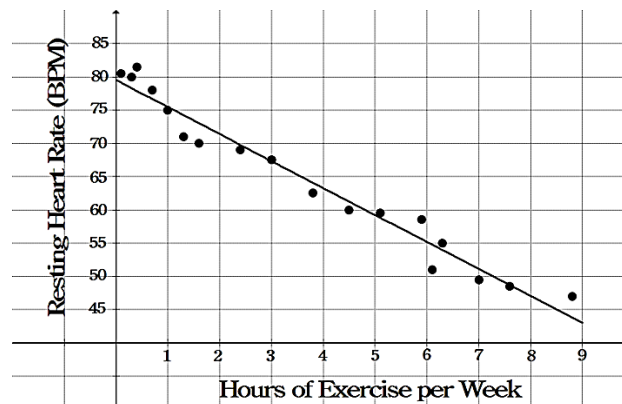


86. Using the data given, create a scatterplot and draw a line of best fit.

Hours of Sleep	9	5	6	6	8	9	10	7	6	8
Math Test Score	93	70	77	81	88	91	76	78	68	100



87. Given the scatterplot below, use the line of best fit to predict the resting heart rate of a person who exercises 6 hours per week.

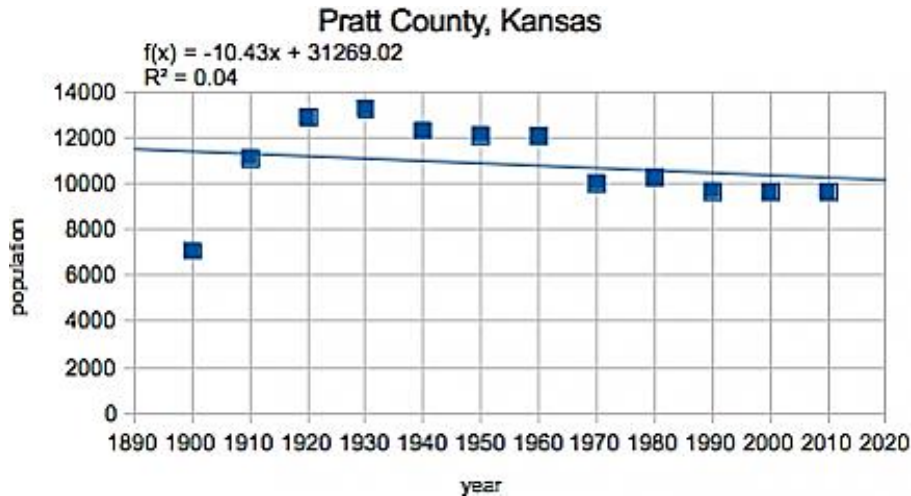


88. Using the given screenshot from the graphing calculator, write the equation for the line of best fit.

```

LinReg
y=ax+b
a=1.314732859
b=1.302319279
r2=.8334968668
r=.9129604958
    
```

89. Using the given scatterplot and line of best fit, interpret the slope and y-intercept in context of the situation.



90. Given the following data and equation for line of best fit, what do x and y represent? Interpret the slope and y-intercept in context of the situation.

Time (in minutes)	Depth (in cm)
2	7
4	8
6	13
8	19
10	20
12	24
14	32
16	37
18	38
20	41
22	47

$$y = 2.07x + 1.18$$