

Name: \_\_\_\_\_ Date: \_\_\_\_\_ Block: \_\_\_\_\_

**Final Exam Study Guide**

1. Which of the properties of real numbers is illustrated below?

$$a + b = b + a$$

2. Convert 6 yards to inches.

3. How long does it take to travel 150 miles at an average speed of 60 miles per hour?

4. Evaluate  $(-7 + 5y) \div 3x$  when  $x = -3$  and  $y = 5$ .

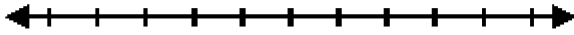
5. Evaluate  $3a^3 + (3a)^2$  when  $a = -3$ .

6. You and five friends go to a movie. The tickets cost \$6.75 each. You each buy a drink for \$2.25 and a box of popcorn for \$4.00. Write an expression that represents the total amount of money spent. Then evaluate the expression.

7. The literature club is printing a storybook to raise money. The print shop charges \$3 for each book, and \$45 to create the film. How many books can the club print if their budget is \$525?

8. Solve the equation.  $5(3 - 4x) = 7 - (4 - x)$
9. Solve the equation.  $4n - 2(3 - n) = -13$
10. Solve the equation.  $\frac{9x}{3} + 11x = 28$
11. Solve for  $A$ :  $B = \frac{5}{7}(A - 11)$
12. The formula  $S = 2lw + 2lh + 2wh$  gives the surface area of a rectangular prism with length  $l$ , width  $w$ , and height  $h$ . Solve the equation for  $h$ .
13. Hannah pays \$39 per month for her cellular phone, which includes 1 hour of use. After the first hour, she pays 20¢ per minute. How much will her monthly bill be if she uses her phone 2.5 hours?

14. The cost of a 5 pound bag of dog food ranges from \$5.25 to \$5.95. Write and graph an inequality to describe this statement.



15. Solve:  $9x - 5 \leq 7x - 11$

16. Solve the inequality. Then graph your solution.  $3(1 + x) > 1 + 5x$



17. Solve the compound inequality.  $-5 < -2h - 15 < 7$

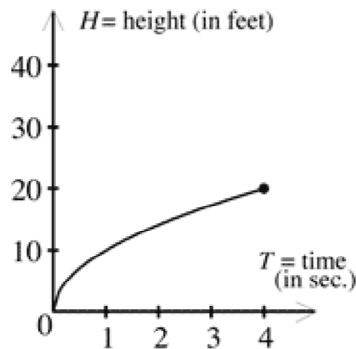
18. Solve the absolute value equation.  $3 = |-6 + 3b|$

19. Solve the absolute value inequality:  $|b - 5| < 2$

20. Solve the absolute value inequality:  $|-2x + 3| > 7$

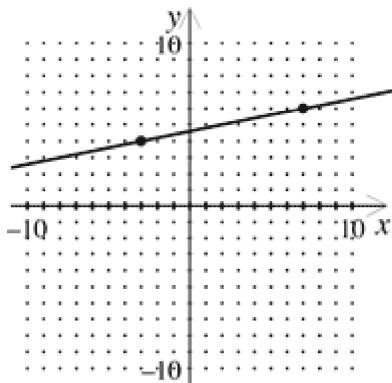
21. Determine whether the relation is a function.  
 $(4, 0), (4, 1), (5, 2), (6, 3), (6, 4)$

22. What is the domain and what is the range of the function in the graph?



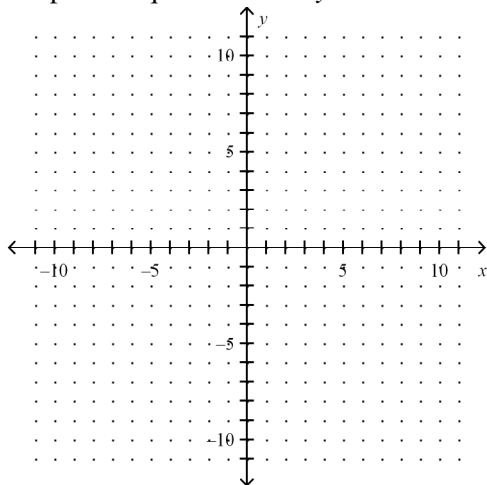
23. Find the slope of the line passing through the points  $(5,7)$  and  $(-4,2)$ .

24. Find the slope of the line.

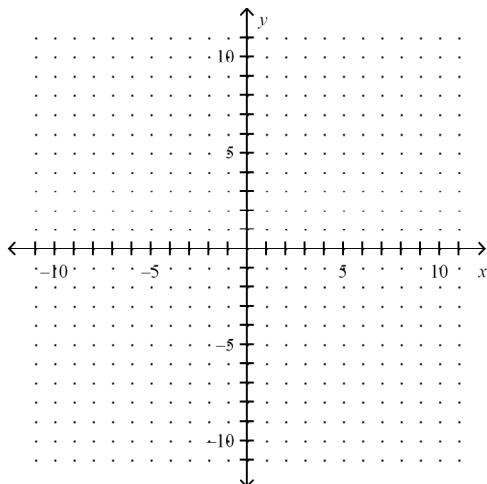


25. In 1983 the pollution in a local lake was rated at 1.4 parts per million. By 1985 it had risen to 2.8 parts per million. Which of the following expresses the rate of change in parts per million per year from 1983 to 1985?

26. Graph the equation  $4x + 8y = 32$



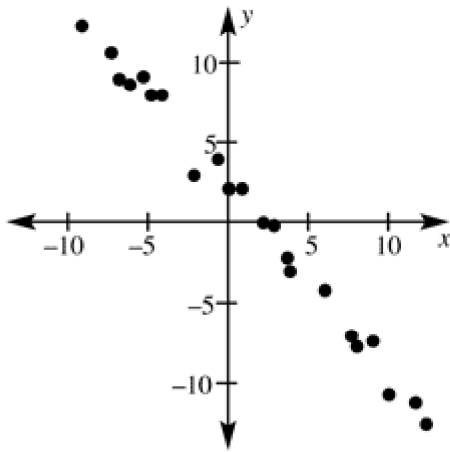
27. Graph the equation.  $y = -\frac{3}{4}x + 3$



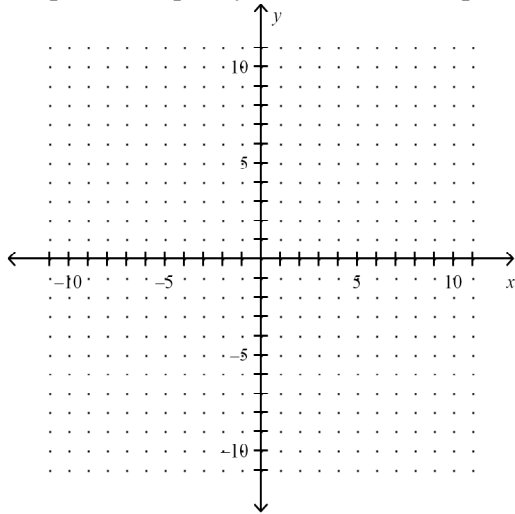
28. A monthly phone bill,  $b(m)$ , consists of a \$31 service fee plus \$0.15 per minute,  $m$ , of long distance calls, given by the function  $b(m) = 31 + 0.15m$ .
- Draw a graph of  $b$  for values of  $m$  from 0 to 120 minutes.
  - Estimate the bill if 89 minutes of long distance calls are made.

29. Find the slope and y-intercept of the graph of  $3x - 7y = 42$ .
30. Write an equation of a line that has slope 4 and y-intercept 6.
31. Write the equation of the line, in slope-intercept form, that passes through the point  $(-2, 3)$  and has slope 3.
32. Write an equation of the line that is perpendicular to the line  $y = -4x - 7$  and passes through  $(0, -8)$ . Express your answer in slope-intercept form.
33. Find the slope-intercept equation of the line passing through the points  $(-3, -5)$  and  $(6, -2)$ .
34. Write an equation to model the following situation.  
An amusement park charges \$10.00 admission and \$2.00 per ride.
35. The fisherman's market has shrimp that sell for \$4.25 a pound and halibut that sell for \$2.00 a pound. Write an equation that represents how much of each type of fish can be bought with \$11.

36. For the scatter plot shown, state whether  $x$  and  $y$  have a *positive correlation*, a *negative correlation*, or *no correlation*.



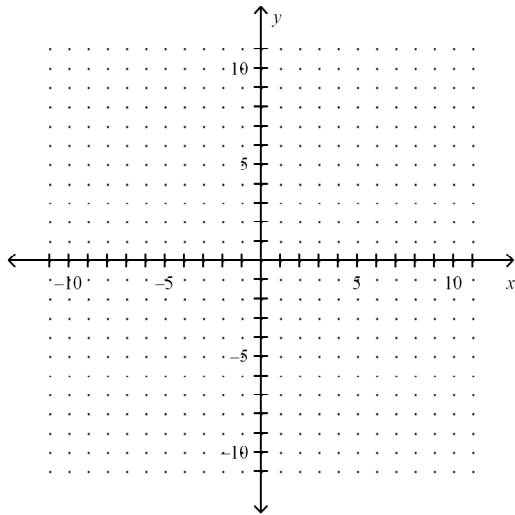
37. Graph the inequality in the coordinate plane shown.  $y \leq 2x - 2$



38. Graph the linear system in the coordinate plane shown and estimate the solution.

$$x + y = -4$$

$$3x + y = -6$$



39. A rental car agency charges \$12 per day plus 14 cents per mile to rent a certain car. Another agency charges \$15 per day plus 9 cents per mile to rent the same car. How many miles per day will have to be driven for the cost of a car from the first agency to equal the cost of a car from the second agency?

**Solve the linear system.**

40.  $3x + y = 17$   
 $-4x - y = -21$

41.  $2x + 2y = -5$   
 $y = -x$

42.  $3x + 4y = -3$   
 $2x + y = 8$



43.  $2x + 5y = -2$   
 $3x - 2y = 4$

44. Tickets to a local movie were sold at \$3.00 for adults and \$1.50 for students. If 170 tickets were sold for a total of \$480.00, how many adult tickets were sold?

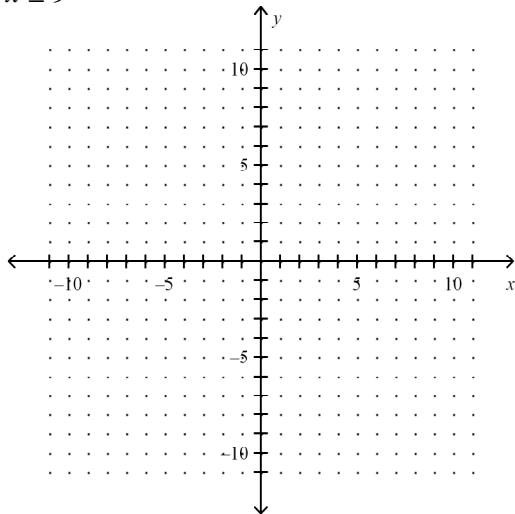
45. A group of 68 people attend a ball game. There were three times as many children as adults in the group. Write a system of equations that you could use to set up this problem, where  $a$  is the number of adults and  $c$  is the number of children in the group. Solve the system of equations for  $c$ , the number of children in the group.

46. Graph the system of linear inequalities in the coordinate plane shown. Shade the solution.

$$2x + 5y \geq 15$$

$$x \geq y$$

$$x \leq 9$$



Solve the system of equations.

47.  $4x + 2y + z = 10$   
 $-6x - y - 5z = -34$   
 $3x + 3y + 6z = 9$

48.  $2x + y - z = -1$   
 $x - 2y = -7$   
 $x + y + z = 4$

49. If  $A = \begin{bmatrix} -7 & -7 & -8 \\ 9 & 3 & 6 \\ 2 & -6 & -2 \end{bmatrix}$  and  $B = \begin{bmatrix} 6 & -7 & -2 \\ 9 & -4 & -6 \\ -2 & 4 & 3 \end{bmatrix}$ , find  $A + B$ .

50. If  $A = \begin{bmatrix} -3 & -8 \\ -7 & 4 \end{bmatrix}$ , find  $-2A$ .

51. Solve the matrix equation for  $x$  and  $y$ .  $3 \begin{bmatrix} 4 & x \\ -1 & 3 \end{bmatrix} - 2 \begin{bmatrix} 1 & 3 \\ y & 0 \end{bmatrix} = \begin{bmatrix} 10 & 6 \\ -7 & 9 \end{bmatrix}$

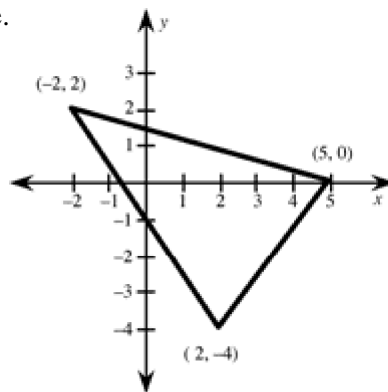
52. Given  $A = \begin{bmatrix} 0 & 2 & -6 \\ 9 & -1 & 0 \end{bmatrix}$  and  $B = \begin{bmatrix} 1 & -6 \\ 0 & -9 \\ -7 & 8 \end{bmatrix}$ , find  $AB$ .

53. Perform the matrix operation, if possible.  $\begin{bmatrix} 2 & -3 \\ 6 & 5 \\ 1 & 4 \end{bmatrix} \begin{bmatrix} 2 & 4 \\ 3 & -2 \end{bmatrix}$

54. Evaluate the determinant of the matrix.  $\begin{bmatrix} 3 & 4 \\ 2 & 6 \end{bmatrix}$

55. Evaluate the determinant of the matrix.  $\begin{bmatrix} 4 & 1 & 3 \\ 1 & 5 & 2 \\ 5 & 4 & 5 \end{bmatrix}$

56. Find the area of the triangle.



57. Use Cramer's Rule to solve the linear system  $3x + 3y = 12$   
 $2x + y = 11$

58. Use Cramer's Rule to solve the linear system  $x + y + z = 9$   
 $2x + y + 3z = 12$   
 $x - 3y - 3z = 9$

$$x + y + z = -4$$

59. Use Cramer's Rule to solve the linear system  $2x - y + 3z = 1$

$$3x + 2y - z = 4$$

60. Find the inverse of the matrix.  $\begin{bmatrix} 5 & 2 \\ -1 & 3 \end{bmatrix}$

61. Use a calculator to find the inverse of the matrix.  $\begin{bmatrix} 1 & 0 & 1 \\ 1 & 1 & 9 \\ 0 & 1 & 9 \end{bmatrix}$

62. Use an inverse matrix to solve the linear system.

$$16x + 5y = 211$$

$$16x + y = 183$$

63. The inverse of the coefficient matrix is given. Use the inverse to solve the linear system.

$$3x + y + 4z = 19$$

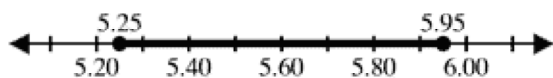
$$-2x - 3z = -17$$

$$4x + y + 6z = 29$$

$$A^{-1} = \begin{bmatrix} 3 & -2 & -3 \\ 0 & 2 & 1 \\ -2 & 1 & 2 \end{bmatrix}$$

## Final Exam Study Guide Answer Section

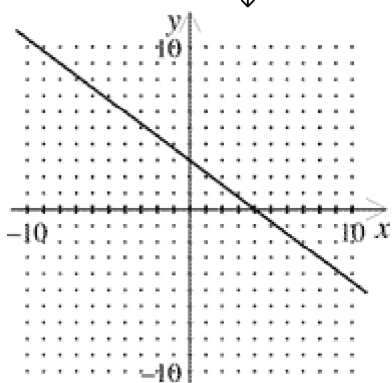
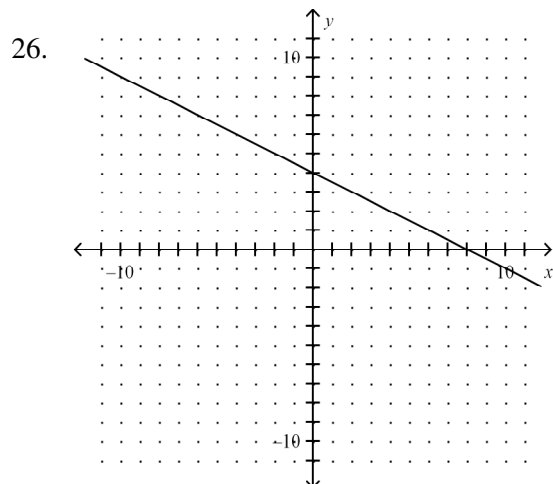
1. commutative law
2. 216 in.
3. 2.5 h
4. -2
5. 0
6. Possible answer:  $6(\$6.75 + \$2.25 + \$4.00) = \$78.00$
7. 160
8.  $x = \frac{4}{7}$
9.  $-\frac{7}{6}$
10.  $x = 2$
11.  $\frac{7B + 55}{5}$
12.  $h = \frac{S - 2lw}{2l + 2w}$
13. \$57
14.  $5.25 \leq c \leq 5.95$ ;



15.  $x \leq -3$
16.  $x < 1$

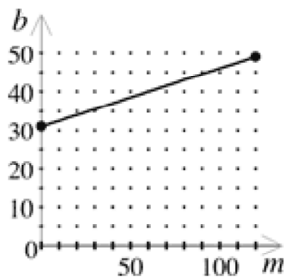


17.  $-5 > h > -11$
18. 3, 1
19.  $3 < b < 7$
20.  $x < -2$  or  $x > 5$
21. It is not a function.
22.  $0 \leq x \leq 4, 0 \leq y \leq 20$
23.  $\frac{5}{9}$
24.  $\frac{1}{5}$
25.  $\frac{7}{10}$



27.

28. a.



b. \$44.35

29. slope =  $\frac{3}{7}$ ; y-intercept: -6

30.  $y = 4x + 6$

31.  $y = 3x + 9$

32.  $y = \frac{1}{4}x - 8$

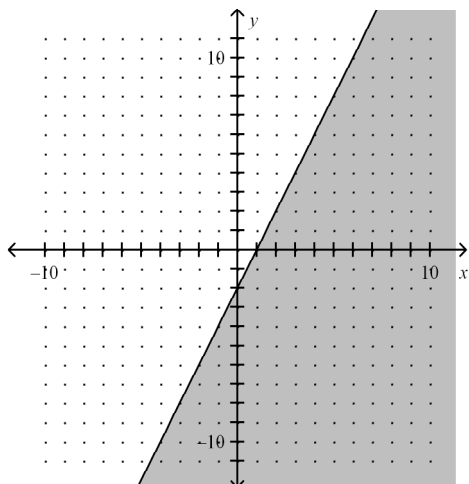
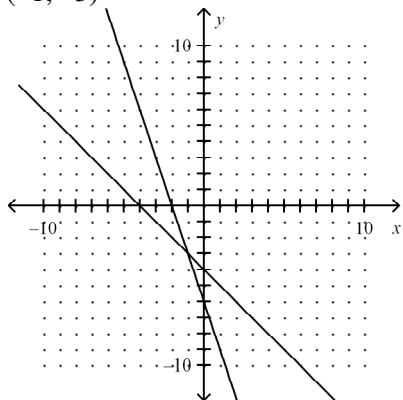
33.  $y = \frac{1}{3}x - 4$

34.  $y = 2x + 10$

35.  $4.25x + 2.00y = 11$

36. Negative correlation

37.

38.  $(-1, -3)$ 

39. 60 miles per day

40.  $(4, 5)$ 

41. no solution

42.  $(7, -6)$ 43.  $\left(\frac{16}{19}, -\frac{14}{19}\right)$ 

44. 150

45. Solve the linear system:

$$a + c = 68$$

$$c = 3a$$

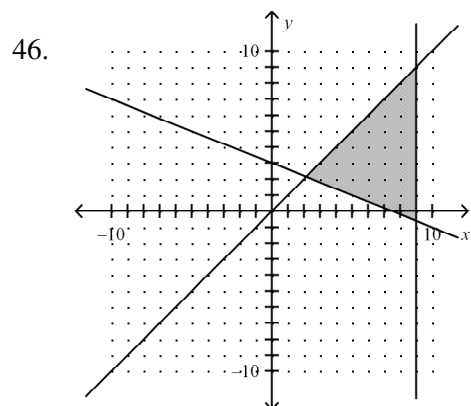
by substitution:

$$a + 3a = 68$$

$$\frac{4a}{4} = \frac{68}{4}$$

$$a = 17$$

$$c = 3(17) = 51 \text{ children}$$



47.  $(5, -6, 2)$

48.  $(-1, 3, 2)$

49. 
$$\begin{bmatrix} -1 & -14 & -10 \\ 18 & -1 & 0 \\ 0 & -2 & 1 \end{bmatrix}$$

50. 
$$\begin{bmatrix} 6 & 16 \\ 14 & -8 \end{bmatrix}$$

51.  $x = 4, y = 2$

52. 
$$\begin{bmatrix} 42 & -66 \\ 9 & -45 \end{bmatrix}$$

53. 
$$\begin{bmatrix} -5 & 14 \\ 27 & 14 \\ 8 & -4 \end{bmatrix}$$

54. 10

55. 10

56. 17

57. -3

58. 3

59. 
$$x = \frac{\begin{vmatrix} -4 & 1 & 1 \\ 1 & -1 & 3 \\ 4 & 2 & -1 \end{vmatrix}}{\begin{vmatrix} 1 & 1 & 1 \\ 2 & -1 & 3 \\ 3 & 2 & -1 \end{vmatrix}} = \frac{39}{13} = 3; y = \frac{\begin{vmatrix} 1 & -4 & 1 \\ 2 & 1 & 3 \\ 3 & 4 & -1 \end{vmatrix}}{\begin{vmatrix} 1 & 1 & 1 \\ 2 & -1 & 3 \\ 3 & 2 & -1 \end{vmatrix}} = -\frac{52}{13} = -4; z = \frac{\begin{vmatrix} 1 & 1 & -4 \\ 2 & -1 & 1 \\ 3 & 2 & 4 \end{vmatrix}}{\begin{vmatrix} 1 & 1 & 1 \\ 2 & -1 & 3 \\ 3 & 2 & -1 \end{vmatrix}} = -\frac{39}{13} = -3$$



$$60. \begin{bmatrix} \frac{3}{17} & -\frac{2}{17} \\ \frac{1}{17} & \frac{5}{17} \end{bmatrix}$$

$$61. \begin{bmatrix} 0 & 1 & -1 \\ -9 & 9 & -8 \\ 1 & -1 & 1 \end{bmatrix}$$

$$62. \begin{bmatrix} 16 & 5 \\ 16 & 1 \end{bmatrix}^{-1} \begin{bmatrix} 211 \\ 183 \end{bmatrix} = \begin{bmatrix} 11 \\ 7 \end{bmatrix}$$

$$63. (4, -5, 3)$$