

June 2009

Dear Algebra II Parents and Students,

In preparation for Algebra II it is important for students to have a solid foundation in the understanding of linear functions, which is a large topic in Algebra I. With the changing content expectations, linear functions are no longer covered in the Algebra II curriculum. Therefore, the mathematics department at Eisenhower High School feels it is important for students to review these important concepts prior to the beginning of the school year. By reviewing these concepts, students will be better prepared for the rigorous Algebra II curriculum. Attached is an Algebra II prerequisite packet which contains problems dealing with linear functions. The incoming Algebra II students will be tested on these concepts during the first week of school so that teachers can assess their knowledge of linear functions.

It is important that you, as a future Algebra II student make the effort to complete these problems and also identify any difficulties you have prior to the school year. Please bring the completed packet to your Algebra II class on the first day of school. This packet and answers will also be available on the Eisenhower website; www.ikeeagles.net .

In addition, **please strongly consider purchasing a TI-84 Plus or N-Spire calculator to use throughout the school year.** The use of a graphing calculator in this course will aide in the understanding of the content.

The Eisenhower mathematics department looks forward to a smooth transition into the new curriculum. In advance, we appreciate the effort you will put into this packet.

Eisenhower Mathematics Department

To which sets of numbers does the number belong?

1. -17

Insert $<$, $>$, or $=$ to make the sentence true.

2. $-\frac{1}{3} \blacksquare -\frac{2}{5}$

3. $\sqrt{3} \blacksquare \sqrt{7}$

4. $|18 + 20| \blacksquare |-5 - 2|$

Find the opposite and the reciprocal of the number.

5. 500

6. $4 - \pi$

Name the property of real numbers illustrated by the equation.

7. $-6 + 6 = 0$

8. Simplify $|-11 + 3|$.

Evaluate the expression for the given value of the variable(s).

9. $\frac{4(3k - 6)}{1 + k}; k = -2$

10. $|4b - 4| + |3 - b^2| + 2b^3; b = 2$

Simplify by combining like terms.

11. $4c - 4d + 8c - 3d$

12. $-3(-4y + 3) + 7y$

13. $\frac{x}{2} + \frac{x^2}{3} - \frac{x}{5} - \frac{x^2}{4}$

Solve the equation.

15. $3y + 20 = 3 + 2y$

16. $-5y - 9 = -(y - 1)$

17. $6(x - 0.8) - 0.2(5x - 4) = 6$

18. $3|3x + 4| - 7 = 5$

19. $|3x + 5| = 1$

Solve the equation or formula for the indicated variable.

20. The formula for the time a traffic light remains yellow is $t = \frac{1}{8}s + 1$, where t is the time in seconds and s is the speed limit in miles per hour.
- Solve the equation for s .
 - What is the speed limit at a traffic light that remains yellow for 4.5 seconds?
21. The sides of a triangle are in the ratio 3 : 4 : 5. What is the length of each side if the perimeter of the triangle is 90 cm?
22. Two cars leave Denver at the same time and travel in opposite directions. One car travels 10 mi/h faster than the other car. The cars are 500 mi apart in 5 h. How fast is each car traveling?

Solve the inequality. Graph the solution set.

23. $-4k + 5 \leq 21$
24. $2(4y - 5) < -10$
25. $4(3b - 5) < -31 + 12b$

Solve the compound inequality. Graph the solution set.

26. $5x + 10 \geq 10$ and $7x - 7 \leq 14$
27. $4x - 5 < -17$ or $5x + 6 > 31$
28. $-2 \leq 2x - 4 < 4$

Solve the inequality. Graph the solution.

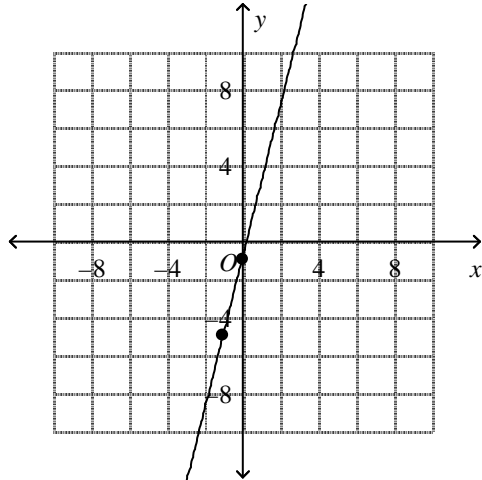
29. $|2x + 3| \geq 19$
30. $|2x + 10| < 26$

Solve the equation. Check for extraneous solutions.

31. $|4x + 3| = 9 + 2x$
32. Is the relation $\{(-2, 5), (-1, 5), (-1, 4), (-1, -3), (-2, 0)\}$ a function? Explain.
33. Find the domain and range.
 $\left\{ \left(-1, \frac{1}{2} \right), \left(-\frac{1}{2}, -1 \right), \left(\frac{3}{2}, 0 \right), \left(2, \frac{3}{2} \right) \right\}$
34. Graph the equation $6x + 6y = 30$ by finding the intercepts.
35. Graph the equation $-3x - y = 6$.
36. Suppose $f(x) = 4x - 2$ and $g(x) = -2x + 1$.
Find the value of $\frac{f(5)}{g(-3)}$.
37. For $f(x) = 5x + 1$, find $f(-4)$.

Find the slope of the line through the pair of points.

38.



Write in standard form an equation of the line passing through the given point with the given slope.

39. slope = -8 ; $(-2, -2)$

Find the slope of the line.

40. $3x + 5y = -15$

Find an equation for the line:

41. through $(-4, 6)$ and parallel to $y = -3x + 4$.

42. The range of a car is the distance R in miles that a car can travel on a full tank of gas. The range varies directly with the capacity of the gas tank C in gallons.

- Find the constant of variation for a car whose range is 341 mi with a gas tank that holds 22 gal.
- Write an equation to model the relationship between the range and the capacity of the gas tank.

Find the value of y for a given value of x , if y varies directly with x .

43. If $y = 166$ when $x = 83$, what is y when $x = 23$?

Graph the absolute value equation.

44. $y = -|2x + 3|$

45. The equation $y = -|x + 5|$ describes a function that is translated from a parent function.

- Write the equation of the parent function.
- Find the number of units and the direction of translation.
- Sketch the graphs of the two functions.

46. Write the equation that is the translation of $y = |x|$ left 1 unit and up 2 units.

47. Graph the function $y = |x - 5| - 4$.

Graph the inequality.

48. $4x - 2y < -3$

49. $-3x + y \leq 5$

50. A doctor's office schedules 15-minute appointments and half-hour appointments for weekdays. The doctor limits these appointments to, at most, 30 hours per week. Write an inequality to represent the number of 15-minute appointments x and the number of half-hour appointments y the doctor may have in a week.

Graph the absolute value inequality.

51. $y \geq |x + 3| - 2$

52. $-|x - 1| > y - 5$

Without graphing, classify each system as *independent*, *dependent*, or *inconsistent*.

53.
$$\begin{cases} -2x - y = 9 \\ 3x - 4y = -8 \end{cases}$$

Solve the system by the method of substitution.

54.
$$\begin{cases} 5x - y = 5 \\ 5x - 3y = 15 \end{cases}$$

55.
$$\begin{cases} \frac{1}{2}v + w = 10 \\ \frac{2}{3}v + 4w = 8 \end{cases}$$

56. A group of 52 people attended a ball game. There were three times as many children as adults in the group. Set up a system of equations that represents the numbers of adults and children who attended the game and solve the system to find the number of children who were in the group.

Use the elimination method to solve the system.

57.
$$\begin{cases} -4x + 4y = -8 \\ x - 4y = -7 \end{cases}$$

58.
$$\begin{cases} 0.18f - 0.3g = 3 \\ 0.15g - 0.9f = -5.55 \end{cases}$$

59.
$$\begin{cases} -x + 2y = 10 \\ -3x + 6y = 11 \end{cases}$$

Solve the system of inequalities by graphing.

60.
$$\begin{cases} y \leq -3x - 1 \\ y > 3x - 2 \end{cases}$$

61.
$$\begin{cases} y \geq 3x \\ y > |x + 2| - 3 \end{cases}$$

62. Your club is baking vanilla and chocolate cakes for a bake sale. They need at most 25 cakes. You cannot have more than 10 chocolate cakes. Write and graph a system of inequalities to model this system.

Answer Section

- ANS:
integers, rational numbers, real numbers
OBJ: 1-1.1 Graphing and Ordering Real Numbers
- ANS:
>
OBJ: 1-1.1 Graphing and Ordering Real Numbers
- ANS:
<
OBJ: 1-1.1 Graphing and Ordering Real Numbers
- ANS:
>
OBJ: 1-1.2 Properties of Real Numbers
- ANS:
 $-500, \frac{1}{500}$
OBJ: 1-1.2 Properties of Real Numbers
- ANS:
 $\pi - 4, \frac{1}{4 - \pi}$
OBJ: 1-1.2 Properties of Real Numbers
- ANS:
Inverse Property of Addition
OBJ: 1-1.2 Properties of Real Numbers
- ANS:
8
OBJ: 1-1.2 Properties of Real Numbers
- ANS:
48
OBJ: 1-2.1 Evaluating Algebraic Expressions
- ANS:
21
OBJ: 1-2.1 Evaluating Algebraic Expressions
- ANS:
 $12c - 7d$
OBJ: 1-2.2 Simplifying Algebraic Expressions
- ANS:
 $19y - 9$
OBJ: 1-2.2 Simplifying Algebraic Expressions
- ANS:
 $\frac{x^2}{12} + \frac{3x}{10}$
OBJ: 1-2.2 Simplifying Algebraic Expressions

15. ANS:
-17
OBJ: 1-3.1 Solving Equations

16. ANS:
 $-2\frac{1}{2}$
OBJ: 1-3.1 Solving Equations

17. ANS:
2
OBJ: 1-3.1 Solving Equations

18. ANS:
 $x = 0$ or $x = -2\frac{2}{3}$
OBJ: 1-5.1 Absolute Value Equations

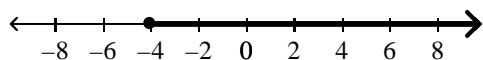
19. ANS:
 $x = -1\frac{1}{3}$ or $x = -2$
OBJ: 1-5.1 Absolute Value Equations

20. ANS:
 $s = 8t - 8$; $s = 28$ mi/h
OBJ: 1-3.1 Solving Equations

21. ANS:
22.5 cm, 30 cm, and 37.5 cm
OBJ: 1-3.2 Writing Equations to Solve Problems

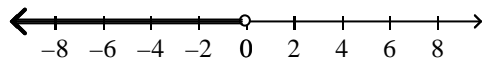
22. ANS:
45 mi/h and 55 mi/h
OBJ: 1-3.2 Writing Equations to Solve Problems

23. ANS:
 $k \geq -4$



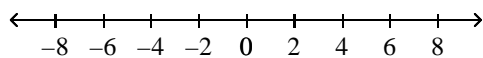
OBJ: 1-4.1 Solving and Graphing Inequalities

24. ANS:
 $y < 0$



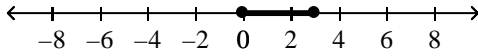
OBJ: 1-4.1 Solving and Graphing Inequalities

25. ANS:
no solutions



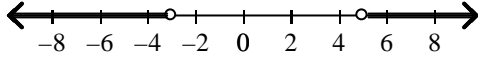
OBJ: 1-4.1 Solving and Graphing Inequalities

26. ANS:
 $x \geq 0$ and $x \leq 3$



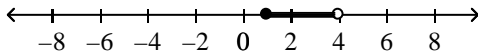
OBJ: 1-4.2 Compound Inequalities

27. ANS:
 $x < -3$ or $x > 5$



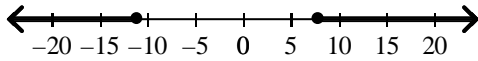
OBJ: 1-4.2 Compound Inequalities

28. ANS:
 $1 \leq x < 4$



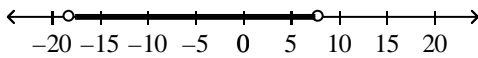
OBJ: 1-4.2 Compound Inequalities

29. ANS:
 $x \leq -11$ or $x \geq 8$



OBJ: 1-5.2 Absolute Value Inequalities

30. ANS:
 $-18 < x < 8$



OBJ: 1-5.2 Absolute Value Inequalities

31. ANS:
 $x = 3$ or -2

OBJ: 1-5.1 Absolute Value Equations

32. ANS:
 No; a domain value corresponds to two or more range values.

OBJ: 2-1.1 Graphing Relations

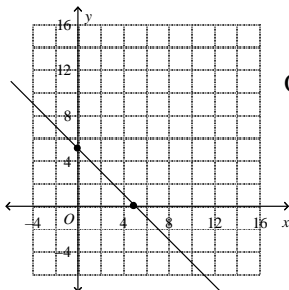
33. ANS:

$$\text{domain: } \left\{ -1, -\frac{1}{2}, \frac{3}{2}, 2 \right\}$$

$$\text{range: } \left\{ -1, 0, \frac{1}{2}, \frac{3}{2} \right\}$$

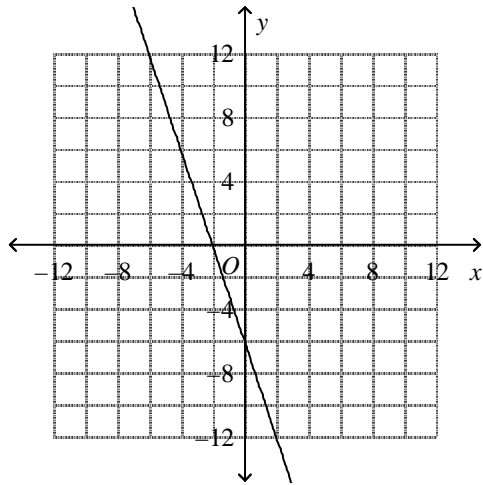
OBJ: 2-1.1 Graphing Relations

34. ANS:



OBJ: 2-2.1 Graphing Linear Equations

35. ANS:



OBJ: 2-2.1 Graphing Linear Equations

36. ANS:

$$2\frac{4}{7}$$

OBJ: 2-1.2 Identifying Functions

37. ANS:

$$-19$$

OBJ: 2-1.2 Identifying Functions

38. ANS:

$$4$$

OBJ: 2-2.1 Graphing Linear Equations

39. ANS:

$$8x + y = -18$$

OBJ: 2-2.2 Writing Equations of Lines

40. ANS:

$$-\frac{3}{5}$$

OBJ: 2-2.2 Writing Equations of Lines

41. ANS:

$$y = -3x - 6$$

OBJ: 2-2.2 Writing Equations of Lines

42. ANS:

$$15\frac{1}{2} \text{ mi/gal}; R = 15\frac{1}{2}C$$

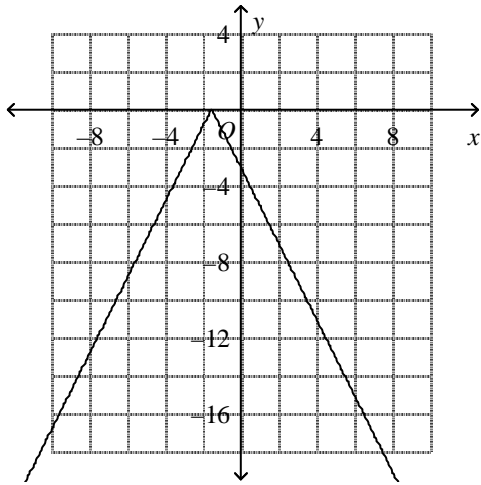
OBJ: 2-3.1 Writing and Interpreting a Direct Variation

43. ANS:

$$46$$

OBJ: 2-3.1 Writing and Interpreting a Direct Variation

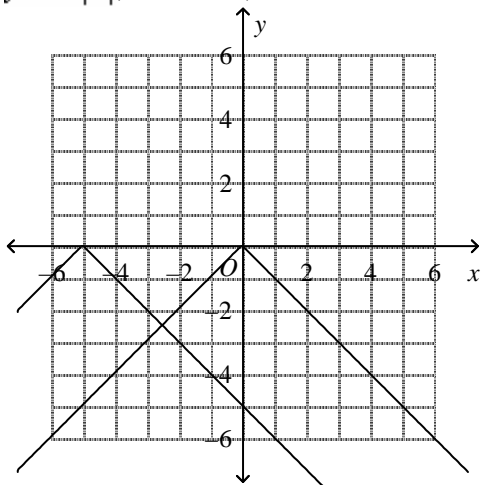
44. ANS:



OBJ: 2-5.1 Graphing Absolute Value Functions

45. ANS:

$y = -|x|$; 5 units left;



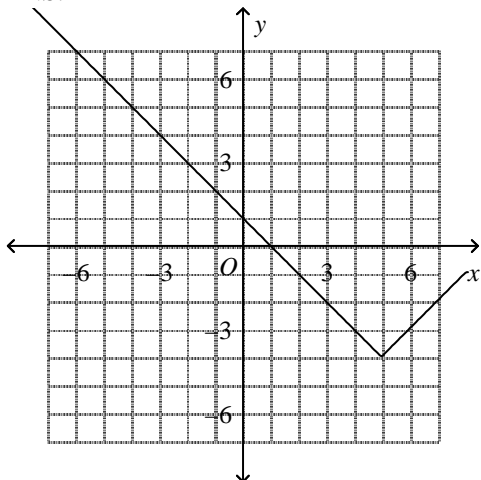
OBJ: 2-6.2 Translating Graphs Horizontally

46. ANS:

$y = |x + 1| + 2$

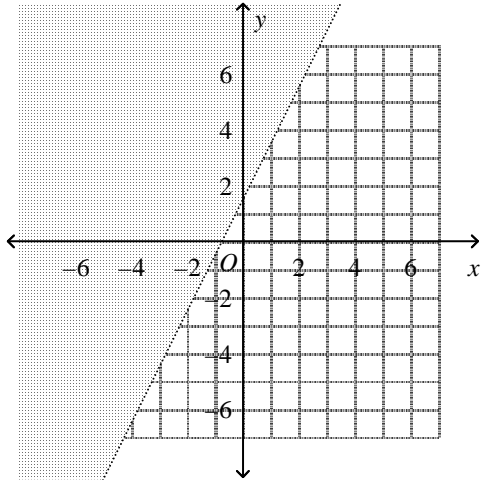
OBJ: 2-6.2 Translating Graphs Horizontally

47. ANS:



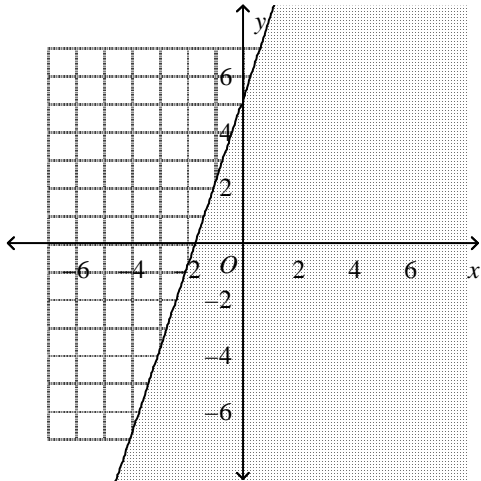
OBJ: 2-6.2 Translating Graphs Horizontally

48. ANS:



OBJ: 2-7.1 Graphing Linear Inequalities

49. ANS:



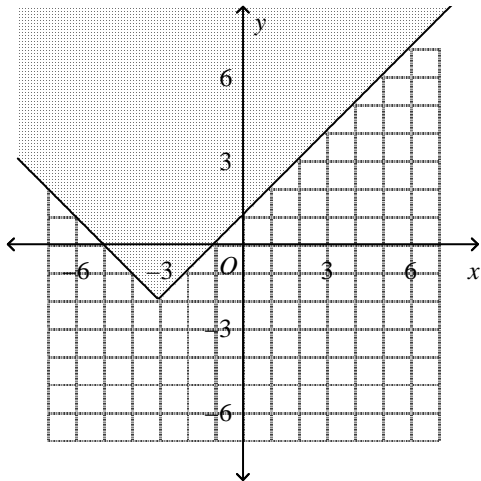
OBJ: 2-7.1 Graphing Linear Inequalities

50. ANS:

$$15x + 30y \leq 1800$$

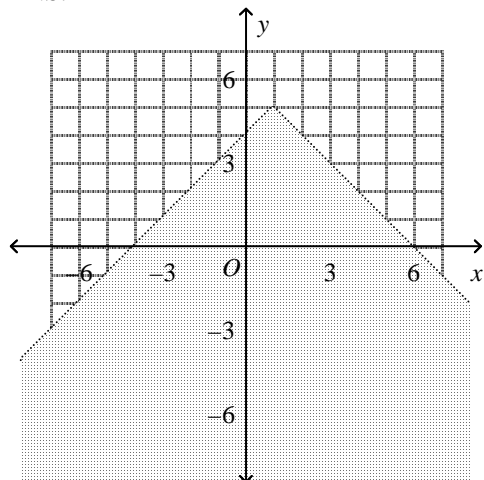
OBJ: 2-7.1 Graphing Linear Inequalities

51. ANS:



OBJ: 2-7.2 Graphing Two-Variable Absolute Value Inequalities

52. ANS:



OBJ: 2-7.2 Graphing Two-Variable Absolute Value Inequalities

53. ANS:

independent

OBJ: 3-1.1 Systems of Linear Equations

54. ANS:

$(0, -5)$

OBJ: 3-2.1 Solving Systems by Substitution

55. ANS:

$(24, -2)$

OBJ: 3-2.1 Solving Systems by Substitution

56. ANS:

$$\begin{cases} a + c = 52 \\ c = 3a \end{cases}; 13 \text{ adults, } 39 \text{ children}$$

OBJ: 3-2.1 Solving Systems by Substitution

57. ANS:

$(5, 3)$

OBJ: 3-2.2 Solving Systems by Elimination

58. ANS:

$$f = 5, g = -7$$

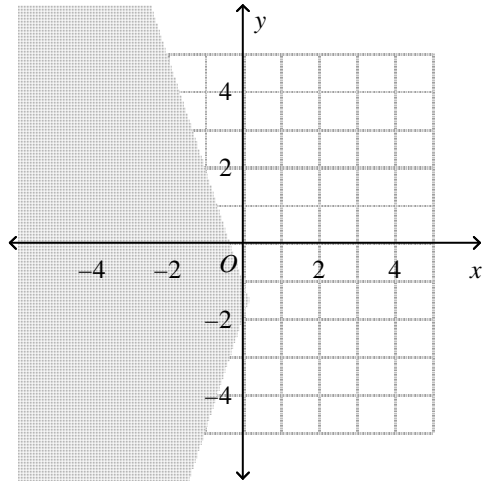
OBJ: 3-2.2 Solving Systems by Elimination

59. ANS:

no solutions

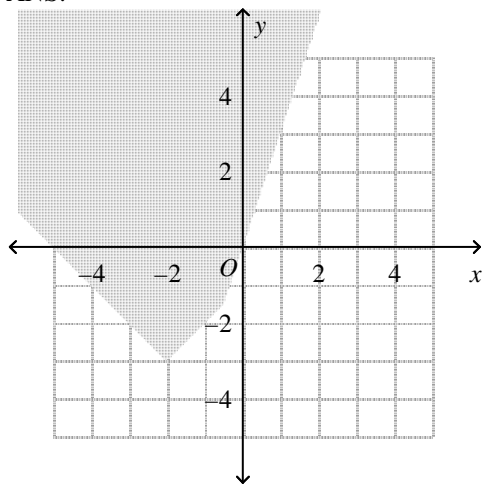
OBJ: 3-2.2 Solving Systems by Elimination

60. ANS:



OBJ: 3-3.1 Solving Systems of Inequalities

61. ANS:

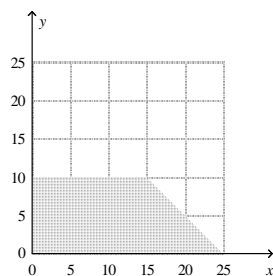


OBJ: 3-3.1 Solving Systems of Inequalities

62. ANS:

Let x = the number of vanilla cakes.
Let y = the number of chocolate cakes.

$$\begin{cases} x \geq 0 \\ y \geq 0 \\ x + y \leq 25 \\ y \leq 10 \end{cases}$$



OBJ: 3-3.1 Solving Systems of Inequalities