

ALEKS[®] Math 102 Mock Final #5

Beginning and Intermediate Algebra Combined / MATH 102 - Fall 2014 – 504 (Prof. Miller)

Student Name/ID:

1. Use substitution to solve the system.

$$4x + 5y = -10$$

$$y = 3x + 17$$

$$x = \boxed{}$$

$$y = \boxed{}$$

2. Suppose that the relation T is defined as follows.

$$T = \{ (-4, 0), (-9, 2), (8, 2) \}$$

Give the domain and range of T

Write your answers using set notation.

3. A line passes through the point $(-4, 3)$ and has a slope of $-\frac{5}{4}$

Write an equation in slope-intercept form for this line.

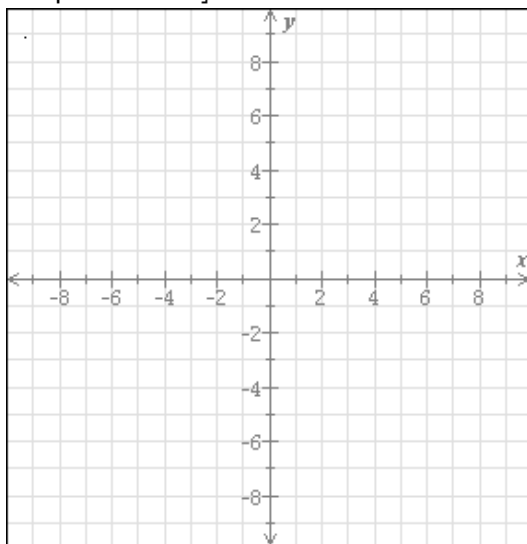
4. Write 2984 in scientific notation.

5. Solve $(u - 2)^2 - 32 = 0$ where u is a real number.
Simplify your answer as much as possible.

6. Use the quadratic formula to solve for x .

$$3x^2 + 9x + 4 = 0$$

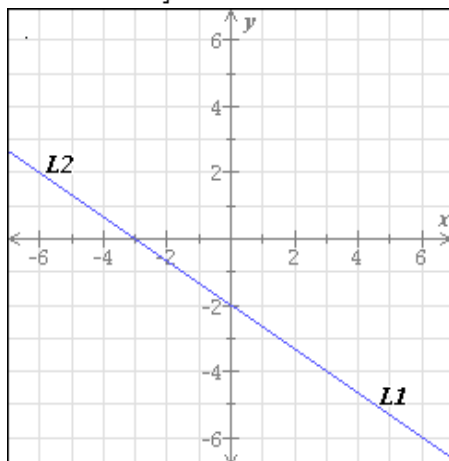
7. Graph the line $y = 8$



8. For each system of linear equations shown below, classify the system as "consistent dependent," "consistent independent," or "inconsistent." Then, answer the question about its solutions.

$$L1: y = \frac{-2}{3}x - 2$$

$$L2: 2x + 3y = -6$$



This system of equations is:

- consistent dependent - consistent independent - inconsistent

This means the system has:

- a unique solution:

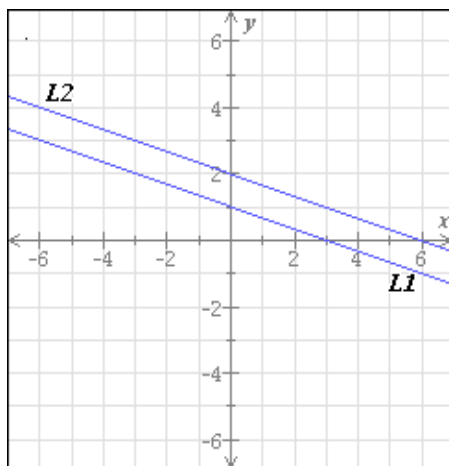
Solution: (,)

- no solution

- infinitely many solutions

$$L1: y = \frac{-1}{3}x + 1$$

$$L2: y = \frac{-1}{3}x + 2$$



This system of equations is:

- consistent dependent - consistent independent - inconsistent

This means the system has:

- a unique solution:

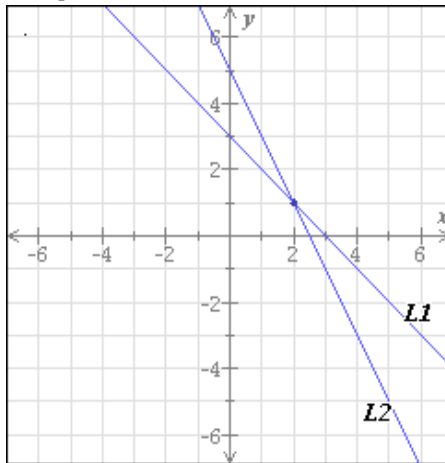
Solution: (\quad , \quad)

- no solution

- infinitely many solutions

L1: $y = -x + 3$

L2: $y = -2x + 5$



This system of equations is:

- consistent dependent - consistent independent - inconsistent

This means the system has:

- a unique solution:

Solution: (\quad , \quad)

- no solution

- infinitely many solutions

9. The sets E and F are defined as follows.

$$E = \{x \mid x \leq 2\}$$

$$F = \{x \mid x > 8\}$$

Write $E \cap F$ and $E \cup F$ using interval notation.

If the set is empty, write \emptyset

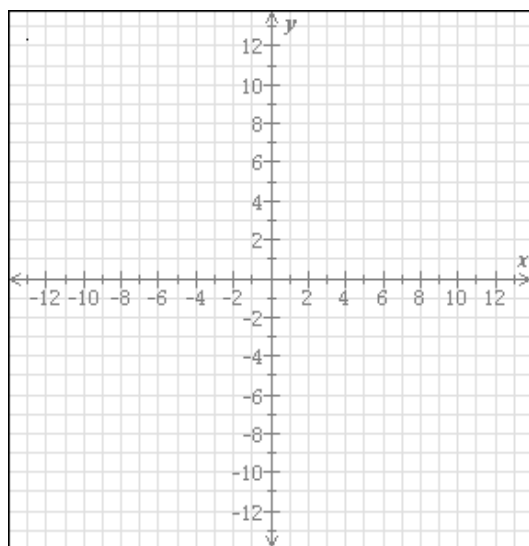
10. Divide.

$$(-24 z x^4 + 13 z^6 x^4) \div (-3 z^2 x^3)$$

Simplify your answer as much as possible.

11. Graph the parabola.

$$y = 2x^2$$



12. Multiply.

$$(u + 4)(u - 4)$$

Simplify your answer.

13. Factor.

$$x^2 - 12x + 20$$

14. Solve the following proportion for x

$$\frac{x}{12} = \frac{5}{17}$$

Round your answer to the nearest tenth.

15. Use the quadratic formula to solve for x .

$$2x^2 + 5x - 1 = 0$$

16. Find the least common multiple of these two expressions.

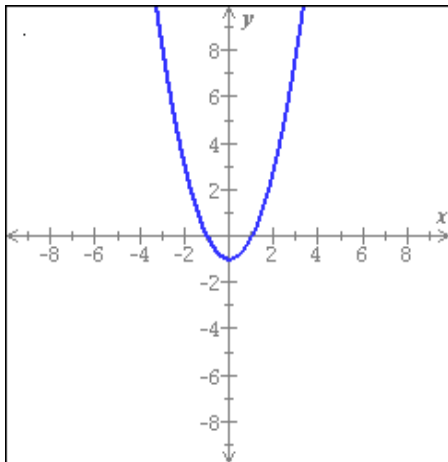
$$6w^4v^7 \text{ and } 14y^8w^5v^2$$

17. Simplify.

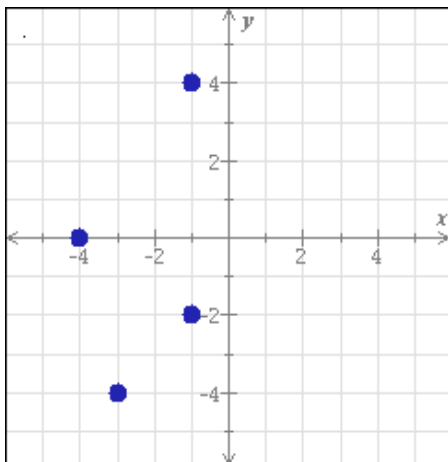
$$\left(-5a^3b\right)^3$$

Write your answer without parentheses.

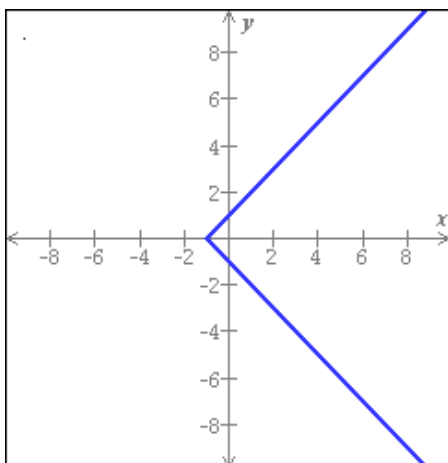
18. For each graph below, state whether it represents a function.



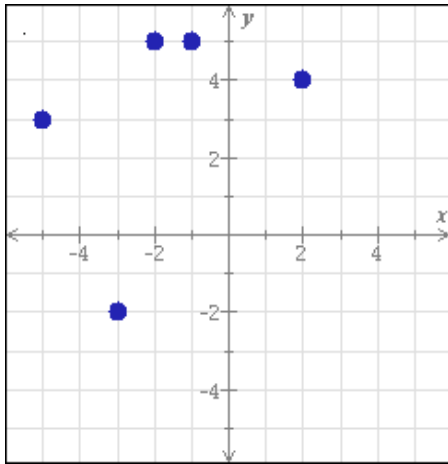
Function?:
Yes No



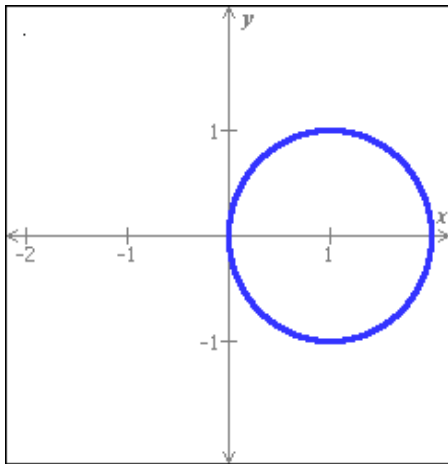
Function?:
Yes No



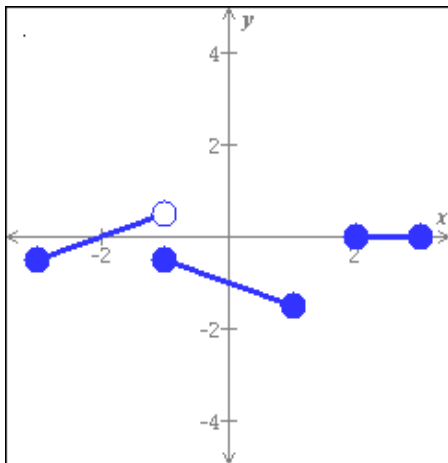
Function?:
Yes No



Function?:
Yes No



Function?:
Yes No



Function?:
Yes No

19. Find the domain of the function.

$$v(x) = \sqrt{24 - 8x}$$

Write your answer using interval notation.

20. Simplify.

$$\sqrt{50}$$

21. A ball is thrown vertically upward. After t seconds, its height h (in feet) is given by the function

$$h(t) = 64t - 16t^2$$

What is the maximum height that the ball will reach?

Do not round your answer.

22. For each relation, decide whether or not it is a function.

| | |
|---|---|
| <p>Relation 1</p> <p>$\{(7,7), (5,5), (0,-7), (-7,-7)\}$</p> <p> <input type="radio"/> Function <input type="radio"/> Not a Function </p> | <p>Relation 2</p> <p>$\{(0,-3), (9,-3), (3,-9), (-9,-3)\}$</p> <p> <input type="radio"/> Function <input type="radio"/> Not a Function </p> |
| <p>Relation 3</p> <p>Domain Range</p> <p> <input type="radio"/> Function <input type="radio"/> Not a Function </p> | <p>Relation 4</p> <p>Domain Range</p> <p> <input type="radio"/> Function <input type="radio"/> Not a Function </p> |

23. Simplify.

$$\sqrt{\frac{81}{25}}$$

Be sure to write your answer in simplest form.

24. Simplify.

$$\left(x^{-4}z^4\right)\left(\frac{2xu^2}{z^{-1}}\right)^{-3}$$

Write your answer using only positive exponents.

25. Write 0.00493 in scientific notation.

26. The sum of two numbers is 46 and the difference is 12 What are the numbers?

27. Factor.

$$3x^2 - 23x + 30$$

28. Solve the following proportion for x

$$\frac{x}{13} = \frac{8}{11}$$

Round your answer to the nearest tenth.

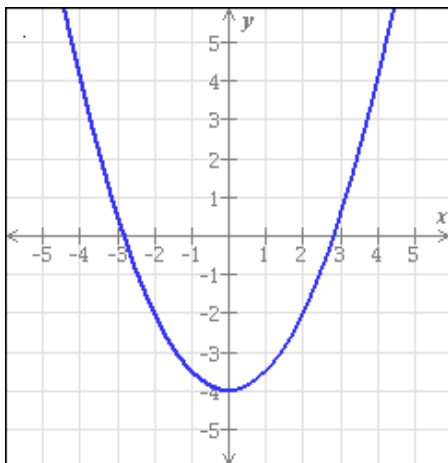
29. Find the least common multiple of $15c^4$ and $9c^2$

30. Give the degree of the polynomial.

$$-3 - 16y^5w^3v^4 + v^5y^3 + 6w$$

31. The graph of a function f is shown below.

Find $f(2)$ and find one value of x for which $f(x) = -4$



32. The gas tank of a truck is a cylinder 4 ft long with a diameter of 2.25 ft. At the gas station, a pump pours gas at the rate of 3 ft^3 per minute. How many minutes does it take to fill the empty tank with that pump?

Use the value 3.14 for π and round your answer to the nearest minute.

33. The cost C (in dollars) of manufacturing x wheels at Ravi's Bicycle Supply is given by the function $C(x) = 0.5x^2 - 170x + 25,850$. What is the minimum cost of manufacturing wheels?

Do not round your answer.

34. Factor $15x + 6x^3$

35. Flying against the wind, a jet travels 9270 mi in 9 hours. Flying with the wind, the same jet travels 10,640 mi in 8 hours. What is the rate of the jet in still air and what is the rate of the wind?

Rate of the jet in still air: mi/h

Rate of the wind: mi/h

36. Factor:

$$5x^2 - 3xy - 14y^2$$

37. Find the greatest common factor of $10y^2$ and $25y$

38. Find the slope and the y -intercept of the line.

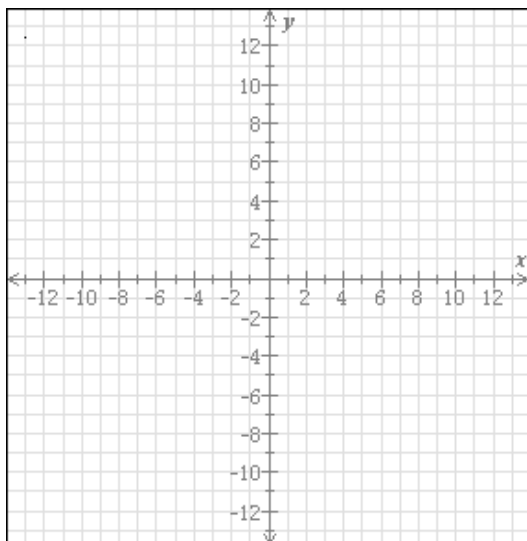
$$-6x + 3y = -3$$

Write your answers in simplest form.

39. Find the x -intercept(s) and the coordinates of the vertex for the parabola $y = x^2 + 2x - 24$. If there is more than one x -intercept, separate them with commas.

40. Graph the parabola.

$$y = 3x^2 - 30x + 69$$

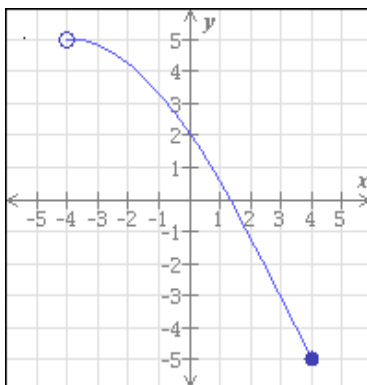


41. Solve.

$$(5z + 4)(3 + z) = 0$$

(If there is more than one solution, separate them with commas.)

42. The entire graph of the function h is shown in the figure below.
Write the domain and range of h using interval notation.



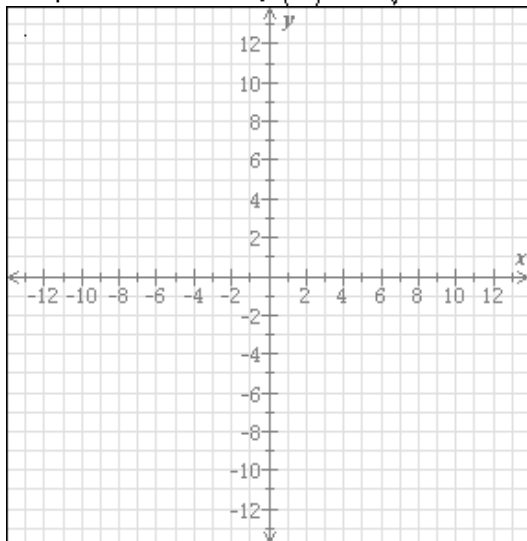
43. Order the expressions by choosing $>$ $<$ or $=$

$$3^4 \times 3^3 \square 3^{12}$$

$$3^3 \times 4^3 \square 12^4$$

$$3^4 \times 4^3 \square 12^3$$

44. Graph the function $f(x) = 2\sqrt{x} + 5$



45. Simplify.

$$\frac{y^7}{y^5}$$

46. Solve for y

$$2y^2 - 14y + 16 = (y - 3)^2$$

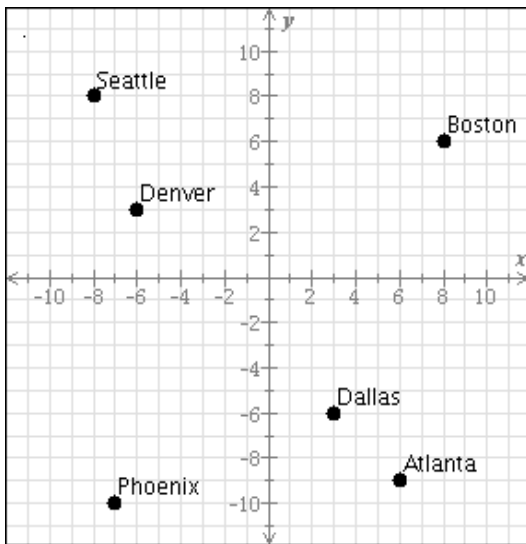
If there is more than one solution, separate them with commas.

47. Use the distributive property to remove the parentheses.

$$5a^5(4a^4 - 6)$$

Simplify your answer as much as possible.

48. Give the location of Denver as an ordered pair (x, y)



49. Evaluate the expressions.

$$3\left(\frac{2}{5}\right)^0 =$$

$$(-4)^0 =$$

50. Find the least common multiple of these two expressions.

$$6y^4u^6v^2 \text{ and } 21u^8v^7$$

51. Write 0.0005941 in scientific notation.

52. Solve the inequality for w

$$2 - \frac{5}{6}w < w + \frac{3}{8}$$

Simplify your answer as much as possible.

53. Solve for w

$$w^2 + 8w + 12 = 0$$

54. Two systems of equations are given below.

For each system, choose the best description of its solution.

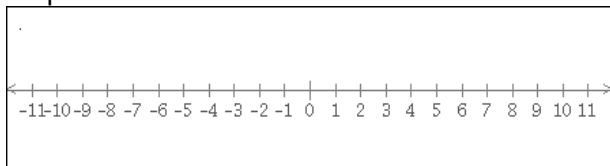
If applicable, give the solution.

| | |
|--|--|
| $\begin{aligned} -4x + y &= -8 \\ 4x - y &= 8 \end{aligned}$ | <p><input type="radio"/> The system has no solution.</p> <p><input type="radio"/> The system has a unique solution:</p> <p>$(x, y) = (\square, \square)$</p> <p><input type="radio"/> The system has infinitely many solutions. They must satisfy the following equation:</p> <p>$y = \square$</p> |
| $\begin{aligned} 4x - y &= 4 \\ -4x + y &= 4 \end{aligned}$ | <p><input type="radio"/> The system has no solution.</p> <p><input type="radio"/> The system has a unique solution:</p> <p>$(x, y) = (\square, \square)$</p> <p><input type="radio"/> The system has infinitely many solutions. They must satisfy the following equation:</p> <p>$y = \square$</p> |

55. Solve the compound inequality.

$$4x + 2 \geq -10 \text{ and } 3x - 4 < 8$$

Graph the solution on the number line.



56. Fill in the table using this function rule.

$$y = -10x + 2$$

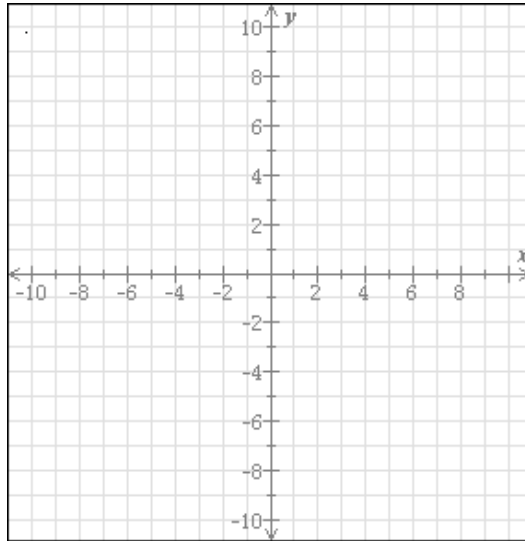
| x | y |
|-----|-----|
| -1 | |
| 0 | |
| 1 | |
| 5 | |

57. Simplify.

$$\sqrt{45}$$

58. The length of a rectangle is 5 ft more than twice the width, and the area of the rectangle is 42 ft^2 . Find the dimensions of the rectangle.

59. Graph the line whose y -intercept is 9 and whose x -intercept is -5



60. Multiply.

$$(w - 8)(w + 2)$$

Simplify your answer.

Math 102 Mock Final #5 Answers for class Beginning and Intermediate Algebra Combined / MATH 102 - Fall 2014 – 504

1. $x = -5$

$$y = 2$$

2. domain = $\{-4, -9, 8\}$

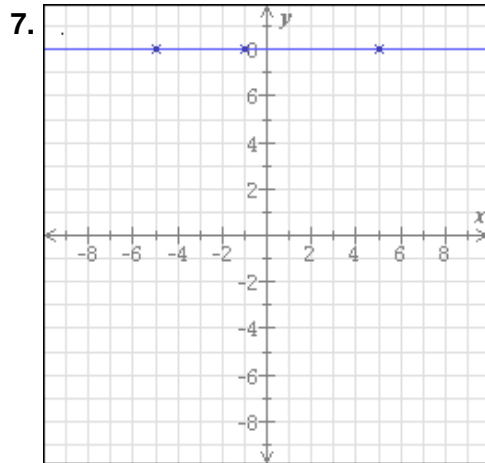
$$\text{range} = \{0, 2\}$$

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

4. 2.984×10^3

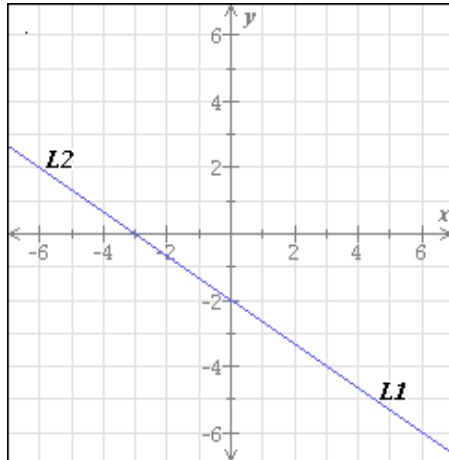
5. $u = 2 + 4\sqrt{2}, 2 - 4\sqrt{2}$

6. $\frac{-9 + \sqrt{33}}{6}, \frac{-9 - \sqrt{33}}{6}$



8. L1: $y = \frac{-2}{3}x - 2$

L2: $2x + 3y = -6$



This system of equations is:

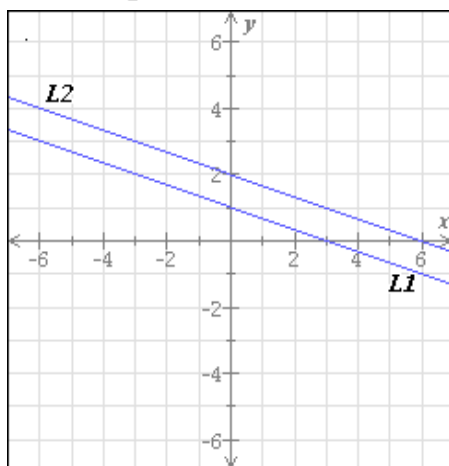
- consistent dependent

This means the system has:

- infinitely many solutions

L1: $y = \frac{-1}{3}x + 1$

L2: $y = \frac{-1}{3}x + 2$



This system of equations is:

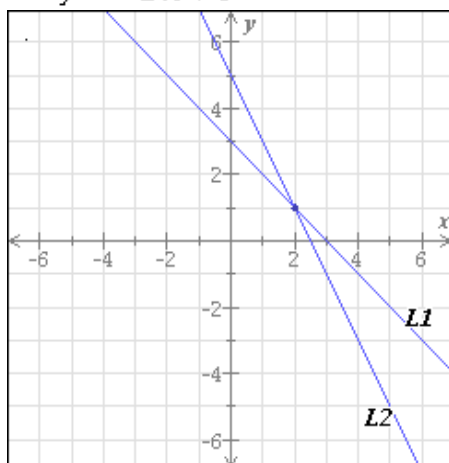
- inconsistent

This means the system has:

- no solution

$$L1: y = -x + 3$$

$$L2: y = -2x + 5$$



This system of equations is:

- consistent independent

This means the system has:

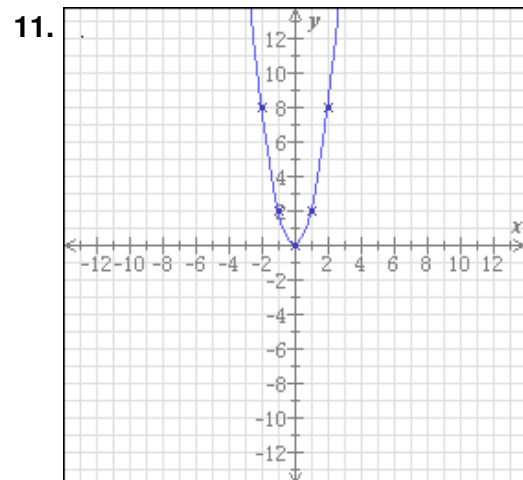
- a unique solution:

Solution: $(2, 1)$

9. $E \cap F = \emptyset$

$$E \cup F = (-\infty, 2] \cup (8, \infty)$$

10. $\frac{8x}{z} - \frac{13z^4x}{3}$



12. $u^2 - 16$

13. $(x - 2)(x - 10)$

14. $x = 3.5$

15. $\frac{-5 + \sqrt{33}}{4}, \frac{-5 - \sqrt{33}}{4}$

16. $42y^8w^5v^7$

17. $-125a^9b^3$

18.

| | | |
|---|---|---|
| | | |
| Function? <input checked="" type="radio"/> Yes <input type="radio"/> No | <input type="radio"/> Yes <input checked="" type="radio"/> No | <input type="radio"/> Yes <input checked="" type="radio"/> No |
| | | |
| Function? <input checked="" type="radio"/> Yes <input type="radio"/> No | <input type="radio"/> Yes <input checked="" type="radio"/> No | <input checked="" type="radio"/> Yes <input type="radio"/> No |

19. $(-\infty, 3]$

20. $5\sqrt{2}$

21. Height: 64 ft

22.

| <p>Relation 1</p> <p>$\{(7, 7), (5, 5), (0, -7), (-7, -7)\}$</p> <p><input checked="" type="radio"/> Function <input type="radio"/> Not a Function</p> | <p>Relation 2</p> <p>$\{(0, -3), (9, -3), (3, -9), (-9, -3)\}$</p> <p><input checked="" type="radio"/> Function <input type="radio"/> Not a Function</p> | | | | | | | | | | | | | | | | | | | | |
|--|---|-------|------|----|------|----|-------|---|-------|----|---|--------|-------|---|----|---|----|---|---|---|---|
| <p>Relation 3</p> <table border="0"> <thead> <tr> <th>Domain</th> <th>Range</th> </tr> </thead> <tbody> <tr> <td>star</td> <td>-1</td> </tr> <tr> <td>star</td> <td>-4</td> </tr> <tr> <td>paper</td> <td>2</td> </tr> <tr> <td>paper</td> <td>-2</td> </tr> </tbody> </table> <p><input type="radio"/> Function <input checked="" type="radio"/> Not a Function</p> | Domain | Range | star | -1 | star | -4 | paper | 2 | paper | -2 | <p>Relation 4</p> <table border="0"> <thead> <tr> <th>Domain</th> <th>Range</th> </tr> </thead> <tbody> <tr> <td>n</td> <td>-2</td> </tr> <tr> <td>f</td> <td>-2</td> </tr> <tr> <td>t</td> <td>0</td> </tr> <tr> <td>s</td> <td>0</td> </tr> </tbody> </table> <p><input type="radio"/> Function <input checked="" type="radio"/> Not a Function</p> | Domain | Range | n | -2 | f | -2 | t | 0 | s | 0 |
| Domain | Range | | | | | | | | | | | | | | | | | | | | |
| star | -1 | | | | | | | | | | | | | | | | | | | | |
| star | -4 | | | | | | | | | | | | | | | | | | | | |
| paper | 2 | | | | | | | | | | | | | | | | | | | | |
| paper | -2 | | | | | | | | | | | | | | | | | | | | |
| Domain | Range | | | | | | | | | | | | | | | | | | | | |
| n | -2 | | | | | | | | | | | | | | | | | | | | |
| f | -2 | | | | | | | | | | | | | | | | | | | | |
| t | 0 | | | | | | | | | | | | | | | | | | | | |
| s | 0 | | | | | | | | | | | | | | | | | | | | |

23. $\frac{9}{5}$

24. $\frac{z}{8x^7u^6}$

25. 4.93×10^{-3}

26. Larger number: 29
Smaller number: 17

27. $(x-6)(3x-5)$

28. $x=9.5$

29. $45c^4$

30. 12

31. $f(2)=-2$

One value of x for which $f(x)=-4$: 0

32. 5 minute(s)

33. Cost: \$11,400

34. $3x(5+2x^2)$

35. Rate of the jet in still air: 1180 mi/h
Rate of the wind: 150 mi/h

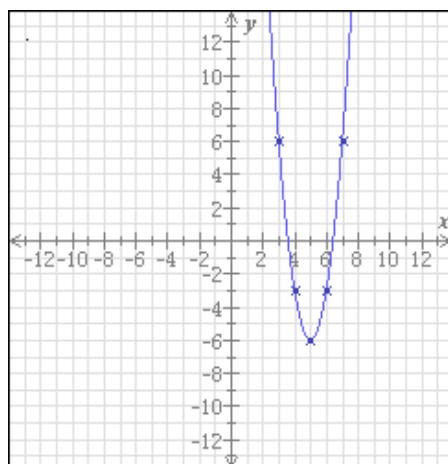
36. $(x-2y)(5x+7y)$

37. $5y$

38. slope: 2
 y -intercept: -1

39. x -intercept(s): 4 , -6
vertex: $(-1, -25)$

40.

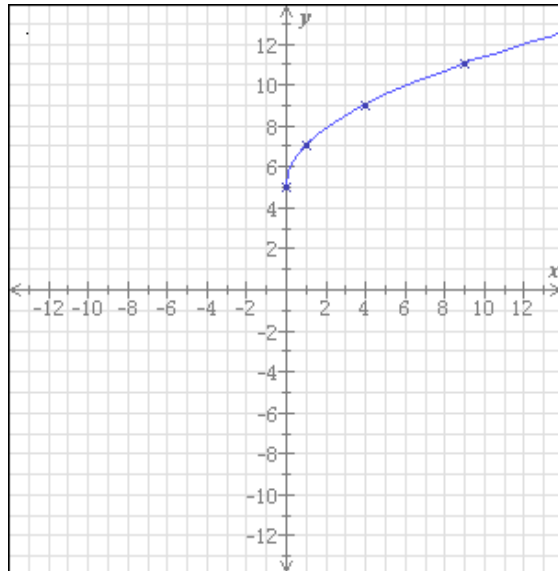


41. $z = -\frac{4}{5}, -3$

42. domain = $(-4, 4]$
range = $[-5, 5)$

43. $3^4 \times 3^3 < 3^{12}$
 $3^3 \times 4^3 < 12^4$
 $3^4 \times 4^3 > 12^3$

44.



45. y^2

46. $y = 7, 1$

47. $20a^9 - 30a^5$

48. $(x, y) = (-6, 3)$

49. $3\left(\frac{2}{5}\right)^0 = 3$
 $(-4)^0 = 1$

50. $42y^4u^8v^7$

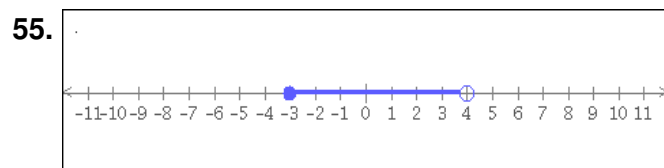
51. 5.941×10^{-4}

52. $w > \frac{39}{44}$

53. $w = -6 - 2$

54.

| | |
|--------------------------------|---|
| $-4x + y = -8$ $4x - y = 8$ | <input type="radio"/> The system has no solution. <input type="radio"/> The system has a unique solution: $(x, y) = (\square, \square)$ <input checked="" type="radio"/> The system has infinitely many solutions. They must satisfy the following equation: $y = 4x - 8$ |
| $4x - y = 4$ $-4x + y = 4$ | <input checked="" type="radio"/> The system has no solution. <input type="radio"/> The system has a unique solution: $(x, y) = (\square, \square)$ <input type="radio"/> The system has infinitely many solutions. They must satisfy the following equation: $y = \square$ |



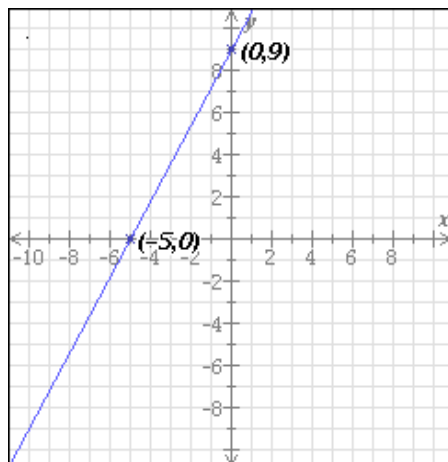
56.

| x | y |
|-----|-----|
| -1 | 12 |
| 0 | 2 |
| 1 | -8 |
| 5 | -48 |

57. $3\sqrt{5}$

58. Length: 12 ft
 Width: 3.5 ft

59.



60. $w^2 - 6w - 16$