

ALEKS® Math 102 Mock Final #1

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

Student Name/ID:

1. Simplify.

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

Write your answer using only positive exponents.

2. Divide.

$$(-12x^5y^6 + 14xy^6) \div (-3x^2y^5)$$

Simplify your answer as much as possible.

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

$$T = \{ (9, -8), (0, 9), (-7, 4), (-7, -5) \}$$

Give the domain and range of T

Write your answers using set notation.

4. Find the greatest common factor of $9x^2$ and $6y^3$

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

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

6. Solve $(v-7)^2 - 32 = 0$ where v is a real number.
Simplify your answer as much as possible.

7. Find the domain of the function.

$$f(x) = \sqrt{-x+9}$$

Write your answer using interval notation.

8. Solve the inequality for y

$$\frac{5}{8}y - 1 > 6y - \frac{3}{2}$$

Simplify your answer as much as possible.

9. Fill in the table using this function rule.

$$y = -5x + 2$$

x	y
-1	
0	
1	
2	

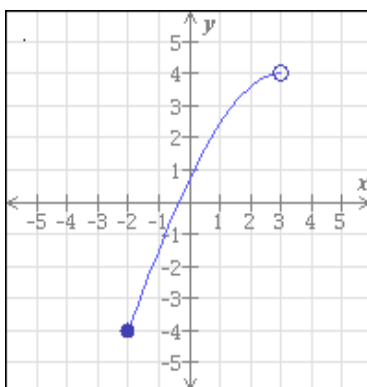
10. Factor $6y^2 + 9y^3$

11. Simplify.

$$(-7ab^3)^2$$

Write your answer without parentheses.

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



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

<p>Relation 1</p> <table> <thead> <tr> <th>Domain</th> <th>Range</th> </tr> </thead> <tbody> <tr> <td>desk</td> <td rowspan="4">-8</td> </tr> <tr> <td>paper</td> </tr> <tr> <td>sun</td> </tr> <tr> <td>rock</td> </tr> </tbody> </table> <p> <input type="radio"/> Function <input type="radio"/> Not a Function </p>	Domain	Range	desk	-8	paper	sun	rock	<p>Relation 2</p> <table> <thead> <tr> <th>Domain</th> <th>Range</th> </tr> </thead> <tbody> <tr> <td>cloud</td> <td>c</td> </tr> <tr> <td>star</td> <td>s</td> </tr> <tr> <td>pencil</td> <td>d</td> </tr> <tr> <td>pen</td> <td>c</td> </tr> </tbody> </table> <p> <input type="radio"/> Function <input type="radio"/> Not a Function </p>	Domain	Range	cloud	c	star	s	pencil	d	pen	c
Domain	Range																	
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<p>Relation 3</p> <p>$\{(-3, -3), (-3, -4), (-3, 9), (-5, 0)\}$</p> <p> <input type="radio"/> Function <input type="radio"/> Not a Function </p>	<p>Relation 4</p> <p>$\{(k, k), (b, g), (g, k), (g, g)\}$</p> <p> <input type="radio"/> Function <input type="radio"/> Not a Function </p>																	

14. Solve the following proportion for v

$$\frac{v}{7} = \frac{8}{3}$$

Round your answer to the nearest tenth.

15. Multiply.

$$(u + 7)(u - 7)$$

Simplify your answer.

16. Solve the following proportion for y

$$\frac{17}{7} = \frac{y}{5}$$

Round your answer to the nearest tenth.

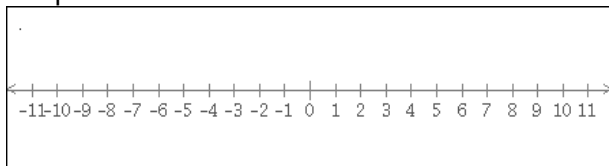
17. A line passes through the point $(-4, -1)$ and has a slope of $-\frac{5}{2}$

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

18. Solve the compound inequality.

$$-12 \leq 4x + 4 < 16$$

Graph the solution on the number line.



19. A swimming pool has to be drained for maintenance. The pool is shaped like a cylinder with a diameter of 9 m and a depth of 1.9 m. If the water is pumped out of the pool at the rate of 15 m^3 per hour, how many hours does it take to empty the pool?

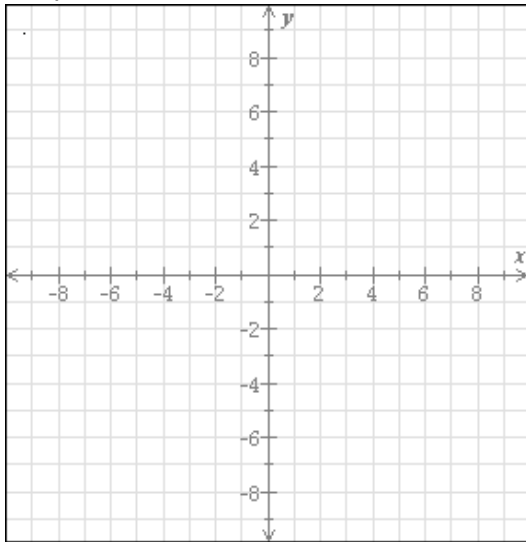
Use the value 3.14 for π and round your answer to the nearest hour.

20. Find the least common multiple of $10m^4$ and $8a^3$

21. Simplify.

$$\frac{y^6}{y^3}$$

22. Graph the line $x = -1$



23. Solve for x

$$(x - 3)^2 = 2x^2 - 10x + 4$$

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

24. Write 0.0005941 in scientific notation.

25. Simplify.

$$\sqrt{\frac{9}{49}}$$

Be sure to write your answer in simplest form.

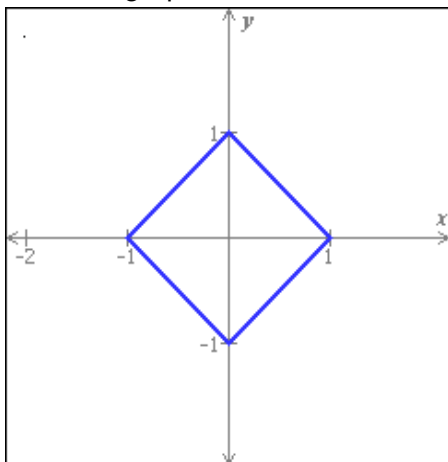
26. The cost C (in dollars) of manufacturing x wheels at Ravi's Bicycle Supply is given by the function

$$C(x) = 0.5x^2 - 170x + 25,850$$

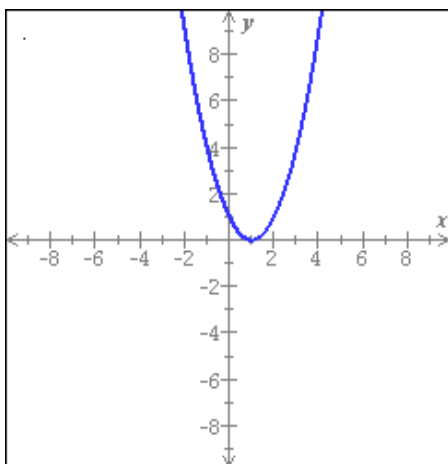
What is the minimum cost of manufacturing wheels?

Do not round your answer.

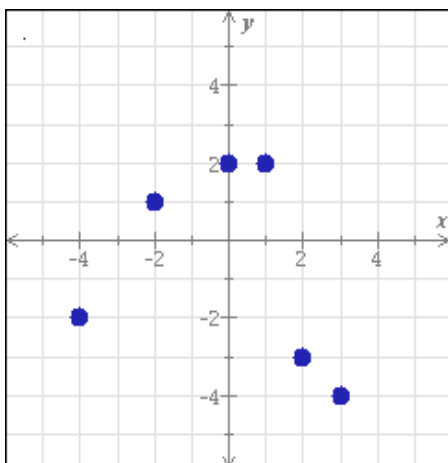
27. For each graph below, state whether it represents a function.



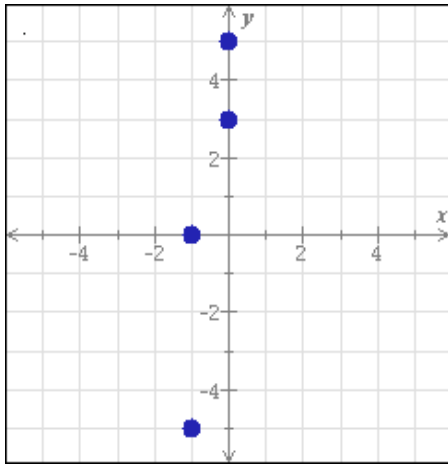
Function?:
Yes No



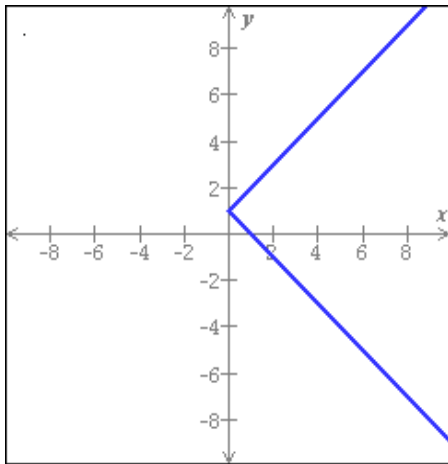
Function?:
Yes No



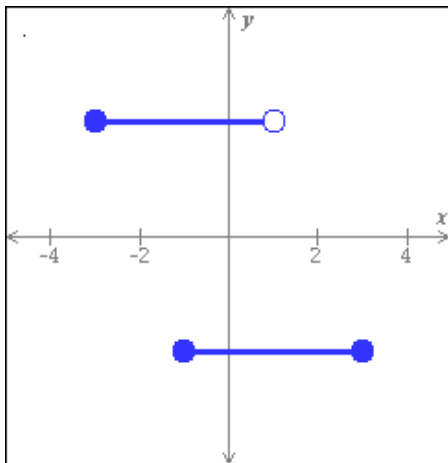
Function?:
Yes No



Function?:
Yes No



Function?:
Yes No



Function?:
Yes No

28. Use the quadratic formula to solve for x .

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

29. Write 659 in scientific notation.

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

$$15v^7u^3 \text{ and } 10v^6u^8w^5$$

31. Multiply.

$$(u+1)(u-5)$$

Simplify your answer.

32. Factor.

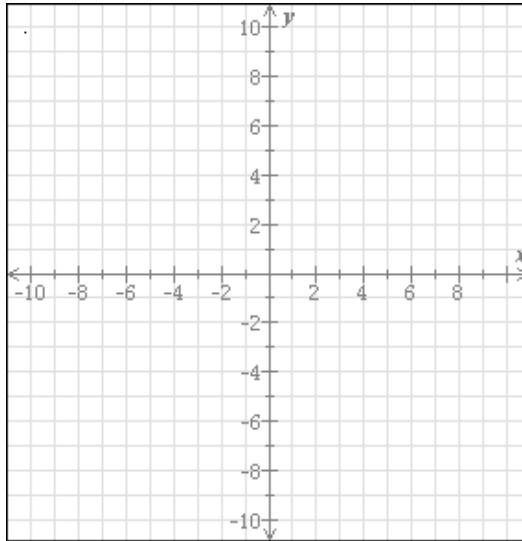
$$3y^2 - 4y - 20$$

33. A jet travels 1464 mi against the wind in 2 hours and 1704 mi with the wind in the same amount of time. 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

34. Graph the line whose y -intercept is -9 and whose x -intercept is -2



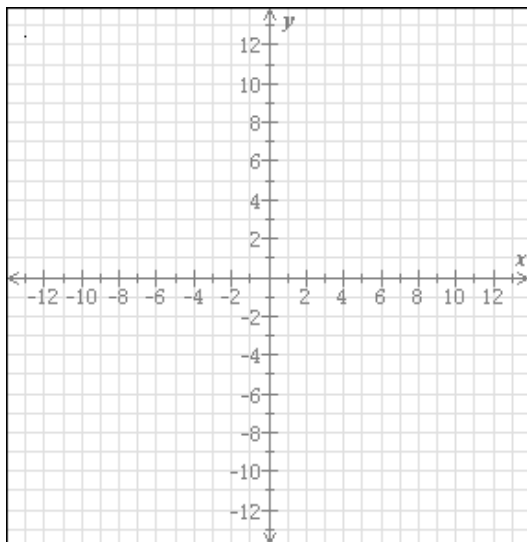
35. Find the x -intercept(s) and the coordinates of the vertex for the parabola $y = x^2 - 6x - 7$. If there is more than one x -intercept, separate them with commas.

36. Solve for u

$$u^2 - 10u + 21 = 0$$

37. Graph the parabola.

$$y = 3x^2 + 12x + 5$$

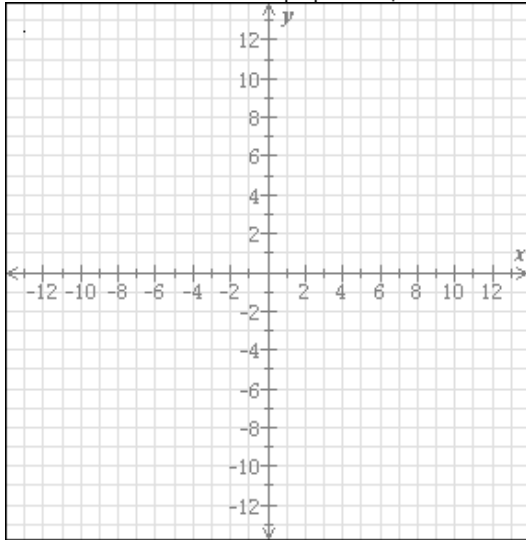


38. Solve.

$$(5y + 4)(1 + y) = 0$$

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

39. Graph the function $f(x) = 2\sqrt{x+3}$



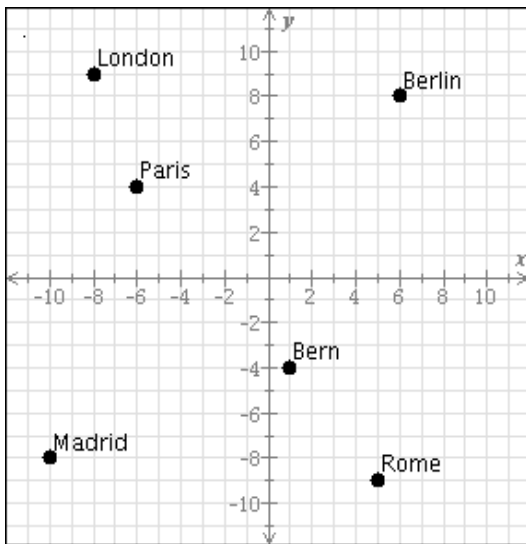
40. Simplify.

$$\sqrt{45}$$

41. Use the quadratic formula to solve for x .

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

42. Give the location of Rome as an ordered pair (x, y)



43. Use substitution to solve the system.

$$y = 3x - 4$$
$$4x + 3y = 27$$

$$x = \boxed{}$$

$$y = \boxed{}$$

44. Evaluate the expressions.

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

$$-(5)^0 =$$

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

$$2^2 \times 4^2 \quad \square \quad 8^4$$

$$2^4 \times 2^2 \quad \square \quad 2^8$$

$$2^4 \times 4^2 \quad \square \quad 8^2$$

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

$$-3x - 4y = -20$$

Write your answers in simplest form.

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

$$h(t) = 112t - 16t^2$$

What is the maximum height that the ball will reach?

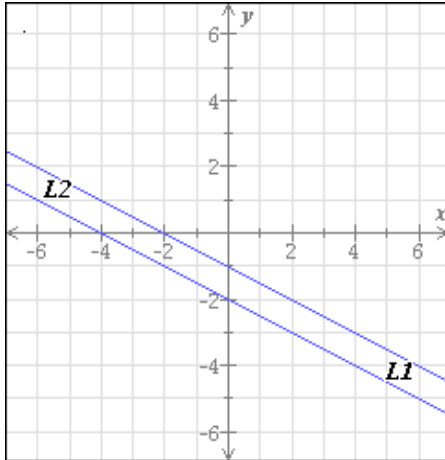
Do not round your answer.

48.

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.

$$L1: y = \frac{-1}{2}x - 1$$

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



This system of equations is:

- consistent dependent - consistent independent - inconsistent

This means the system has:

- a unique solution:

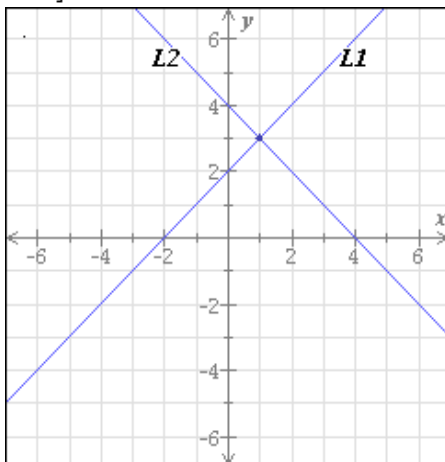
Solution: (,)

- no solution

- infinitely many solutions

$$L1: y = x + 2$$

$$L2: y = -x + 4$$



This system of equations is:

- consistent dependent - consistent independent - inconsistent

This means the system has:

- a unique solution:

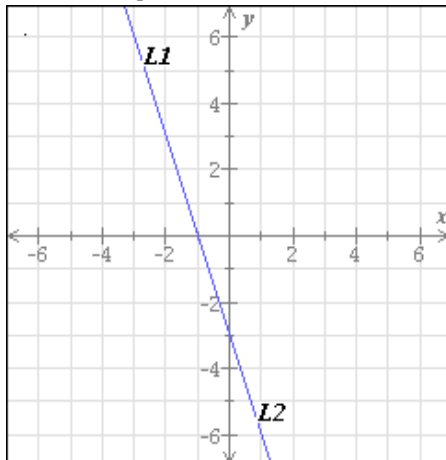
Solution: $\left(\quad , \quad \right)$

- no solution

- infinitely many solutions

L1: $y = -3x - 3$

L2: $3x + y = -3$



This system of equations is:

- consistent dependent - consistent independent - inconsistent

This means the system has:

- a unique solution:

Solution: $\left(\quad , \quad \right)$

- no solution

- infinitely many solutions

49. Write 0.00659 in scientific notation.

50. Factor:

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

51. Give the degree of the polynomial.

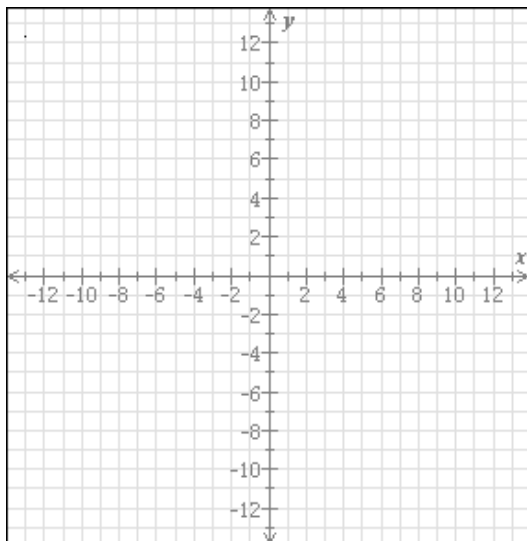
$$5 + 2y + v^9 w^3 - 9w^9 y^5 v^4$$

52. Simplify.

$$\sqrt{24}$$

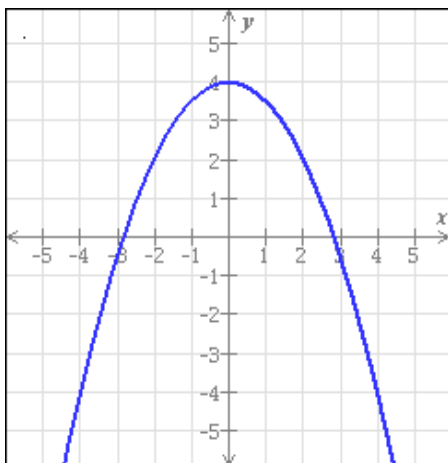
53. Graph the parabola.

$$y = -3x^2$$



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

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



55. Use the distributive property to remove the parentheses.

$$9x^6(8x + 7x^2)$$

Simplify your answer as much as possible.

56. The length of a rectangle is 5 yd less than twice the width, and the area of the rectangle is 33 yd^2 . Find the dimensions of the rectangle.

57. Factor.

$$y^2 - 10y + 16$$

58. The sets F and H are defined as follows.

$$F = \{x | x > 1\}$$

$$H = \{x | x \leq 6\}$$

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

If the set is empty, write \emptyset

59. The sum of two numbers is 42 One number is 2 times as large as the other. What are the numbers?

60. Two systems of equations are given below.

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

If applicable, give the solution.

$\begin{aligned} x + 5y &= 5 \\ -x - 5y &= 5 \end{aligned}$	<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.</p> <p>They must satisfy the following equation:</p> <p>$y = \square$</p>
$\begin{aligned} x + 3y &= 3 \\ -x - 3y &= -3 \end{aligned}$	<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.</p> <p>They must satisfy the following equation:</p> <p>$y = \square$</p>

Math 102 Mock Final #1 Answers for class Beginning and Intermediate Algebra Combined / MATH 102 - Fall 2014 – 504

1. $\frac{8u^3z^5}{x^7}$

2. $4x^3y - \frac{14y}{3x}$

3. domain = $\{9, 0, -7\}$
range = $\{-8, 9, 4, -5\}$

4. 3

5. $42y^4u^8v^7$

6. $v = 7 + 4\sqrt{2}, 7 - 4\sqrt{2}$

7. $(-\infty, 9]$

8. $y < \frac{4}{43}$

9.

x	y
-1	7
0	2
1	-3
2	-8

10. $3y^2(2 + 3y)$

11. $49a^2b^6$

12. domain = $[-2, 3)$
range = $[-4, 4)$

13.

Relation 1		Relation 2	
Domain	Range	Domain	Range
desk	-8	cloud	c, s, d
paper		star	
sun		pencil	
rock		pen	
<input checked="" type="radio"/> Function <input type="radio"/> Not a Function		<input type="radio"/> Function <input checked="" type="radio"/> Not a Function	

Relation 3		Relation 4	
$\{(-3,-3),(-3,-4),(-3,9),(-5,0)\}$		$\{(k,k),(b,g),(g,k),(g,g)\}$	
<input type="radio"/> Function <input checked="" type="radio"/> Not a Function		<input type="radio"/> Function <input checked="" type="radio"/> Not a Function	

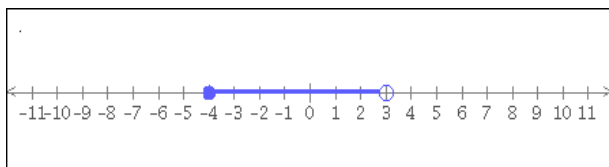
14. $v = 18.7$

15. $u^2 - 49$

16. $y = 12.1$

17. $y = -\frac{5}{2}x - 11$

18.

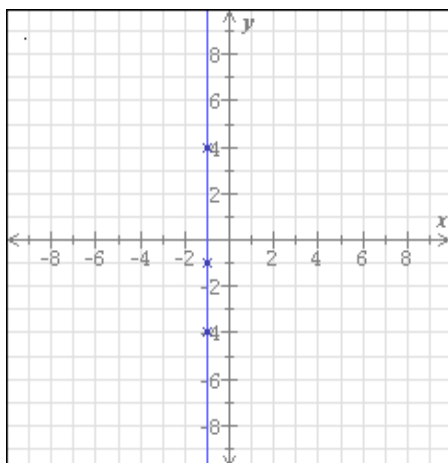


19. 8 hour(s)

20. $40m^4a^3$

21. y^3

22.



23. $x = -1, 5$

24. 5.941×10^{-4}

25. $\frac{3}{7}$

26. Cost: \$11,400

27.

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

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

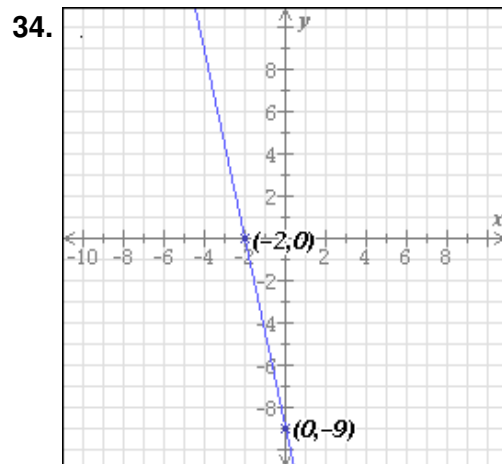
29. 6.59×10^2

30. $30v^7u^8w^5$

31. $u^2 - 4u - 5$

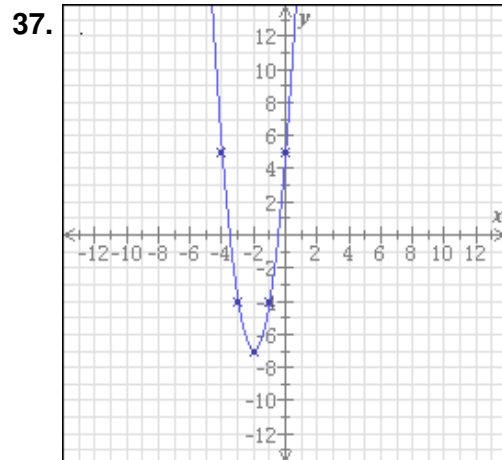
32. $(y+2)(3y-10)$

33. Rate of the jet in still air: 792 mi/h
Rate of the wind: 60 mi/h

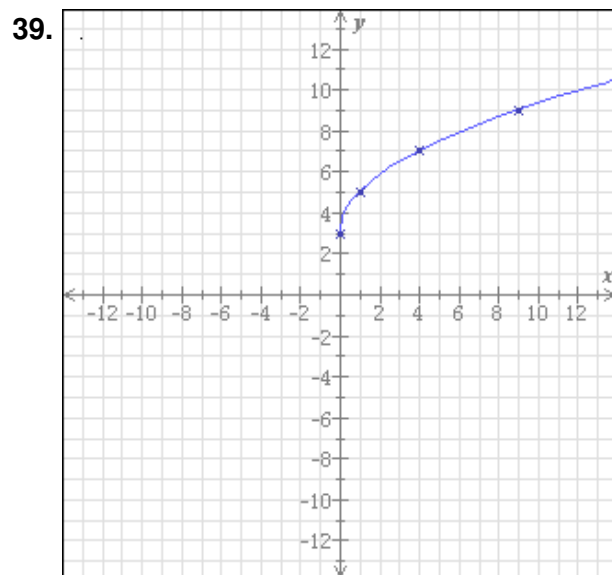


35. x-intercept(s): $7, -1$
vertex: $(3, -16)$

36. $u = 3, 7$



38. $y = -\frac{4}{5}, -1$



40. $3\sqrt{5}$

41. $\frac{9+\sqrt{33}}{8}, \frac{9-\sqrt{33}}{8}$

42. $(x, y) = (5, -9)$

43. $x = 3$
 $y = 5$

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

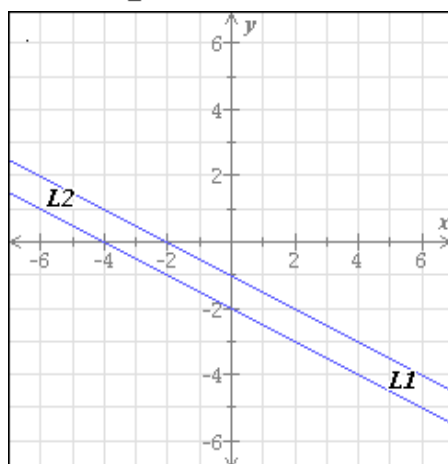
45. $2^2 \times 4^2 < 8^4$
 $2^4 \times 2^2 < 2^8$
 $2^4 \times 4^2 > 8^2$

46. slope: $-\frac{3}{4}$
y-intercept: 5

47. Height: 196 ft

48. L1: $y = \frac{-1}{2}x - 1$

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



This system of equations is:

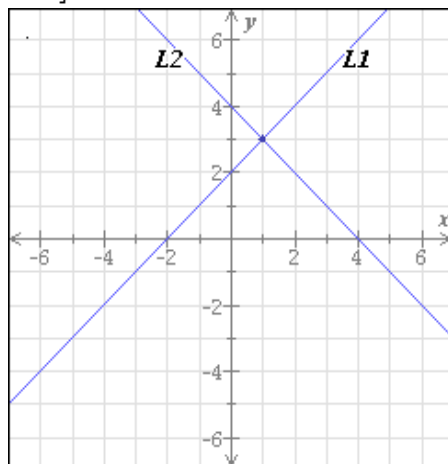
- inconsistent

This means the system has:

- no solution

L1: $y = x + 2$

L2: $y = -x + 4$



This system of equations is:

- consistent independent

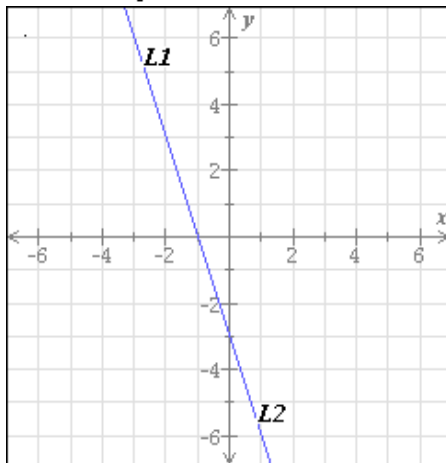
This means the system has:

- a unique solution:

Solution: $(1, 3)$

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

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



This system of equations is:

- consistent dependent

This means the system has:

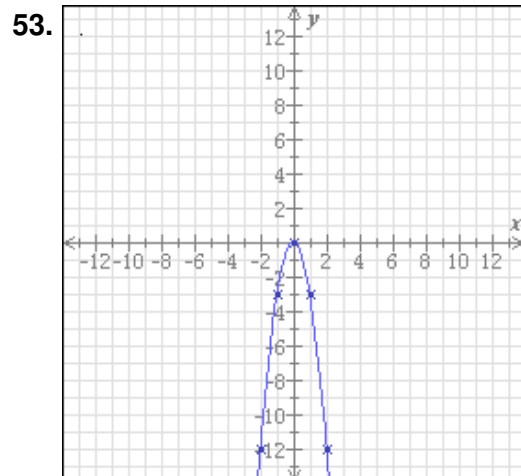
- infinitely many solutions

49. 6.59×10^{-3}

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

51. 18

52. $2\sqrt{6}$



54. One value of x for which $f(x) = 4$: 0
 $f(-2) = 2$

55. $72x^7 + 63x^8$

56. Length: 6 yd
Width: 5.5 yd

57. $(y - 2)(y - 8)$

58. $F \cup H = (-\infty, \infty)$

$F \cap H = (1, 6]$

59. Larger number: 28
Smaller number: 14

<p>60.</p> $\begin{aligned} x + 5y &= 5 \\ -x - 5y &= 5 \end{aligned}$	<p><input checked="" 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.</p> <p>They must satisfy the following equation:</p> <p>$y = \square$</p>
$\begin{aligned} x + 3y &= 3 \\ -x - 3y &= -3 \end{aligned}$	<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 checked="" type="radio"/> The system has infinitely many solutions.</p> <p>They must satisfy the following equation:</p> <p>$y = -\frac{x}{3} + 1$</p>