



Precalculus

Summer Review Problems

Review of Key Topics from Algebra 1, Geometry, and Algebra 2

Welcome to Precalculus and Honors Precalculus! This collection of review problems will help you cement some of the key skills which you will need in this class. Everything in this packet was covered either in Algebra 1, Geometry, or Algebra 2.

Basic Instructions:

- Start the review packet a few weeks before the beginning of the school year.
- An answer key is provided so that you may check your work.
- You will also find a reference page which identifies the key skill for each problem and supplies links to the relevant sections in Khan Academy to help you review.
- There is insufficient room to write your calculations on these pages, so feel free to do your work in a notebook.
- You will take a low-stakes diagnostic quiz on this material to identify any gaps in critical concepts. You will be given additional assignments to help you learn the material until you can demonstrate mastery of it.

1. Simplify the given algebraic expression.

$$7(4y - 8) - (3y + 3)$$

$$7(4y - 8) - (3y + 3) = \underline{\hspace{2cm}}$$

2. Simplify the algebraic expression.

$$13x^2 + 5 - [4(x^2 - 6) + 6]$$

$$13x^2 + 5 - [4(x^2 - 6) + 6] = \underline{\hspace{2cm}}$$

3. Simplify the following expression.

$$5^{-5}$$

$$5^{-5} = \underline{\hspace{2cm}} \text{ (Type a simplified fraction.)}$$

4. Evaluate the given exponential expression.

$$(4^4)^3$$

$$(4^4)^3 = \underline{\hspace{2cm}}$$

5. Simplify the exponential expression.

$$(-7x^5y)(-3x^7y^4)$$

$$(-7x^5y)(-3x^7y^4) = \underline{\hspace{2cm}}$$

6. Simplify the exponential expression.

$$\left(\frac{-14a^2b^6}{7a^7b^{-5}}\right)^3$$

$$\left(\frac{-14a^2b^6}{7a^7b^{-5}}\right)^3 = \underline{\hspace{2cm}} \text{ (Simplify your answer. Use positive exponents only.)}$$

7. Use the product rule to simplify the following expression.

$$\sqrt{18x^2}$$

$$\sqrt{18x^2} = \underline{\hspace{2cm}}$$

(Type an exact answer using radicals as needed.)

8. Use the quotient rule to simplify the following expression. Assume that $x > 0$.

$$\frac{\sqrt{256x^3}}{\sqrt{4x}}$$

$$\frac{\sqrt{256x^3}}{\sqrt{4x}} = \underline{\hspace{2cm}}$$

9. Subtract the following terms, if possible.

$$\sqrt{75x} - \sqrt{27x}$$

Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

- A. $\sqrt{75x} - \sqrt{27x} = \underline{\hspace{2cm}}$
(Type an exact answer, using radicals as needed.)
- B. The radicals cannot be combined.
-

10. Rationalize the denominator. Simplify the answer.

$$\frac{\sqrt{5}}{\sqrt{11}}$$

$$\frac{\sqrt{5}}{\sqrt{11}} = \underline{\hspace{2cm}}$$

(Type an exact answer using radicals as needed.)

11. Rationalize the denominator.

$$\frac{11}{\sqrt{5} - 2}$$

$$\frac{11}{\sqrt{5} - 2} = \underline{\hspace{2cm}}$$

(Simplify your answer. Type an exact answer, using radicals as needed.)

12. Evaluate the given expression.

$$\sqrt[3]{-\frac{1}{216}}$$

Select the correct choice below and fill in any answer boxes to complete your choice.

- A. The expression is a real number. $\sqrt[3]{-\frac{1}{216}} = \underline{\hspace{2cm}}$ (Simplify your answer.)
- B. The expression is not a real number.
-

13. Evaluate the expression without using a calculator.

$$125^{\frac{2}{3}}$$

Rewrite the expression using a radical.

$$125^{\frac{2}{3}} = \underline{\hspace{2cm}} \text{ (Do not evaluate.)}$$

Evaluate.

$$125^{\frac{2}{3}} = \underline{\hspace{2cm}} \text{ (Simplify your answer.)}$$

14. Perform the indicated operations. Write the resulting polynomial in standard form and indicate its degree.

$$(7x^2 - 6x - 1) + (2x^2 - 3x + 5) - (x^2 - x - 3)$$

$$(7x^2 - 6x - 1) + (2x^2 - 3x + 5) - (x^2 - x - 3) = \underline{\hspace{2cm}}$$

(Simplify your answer. Type your answer in standard form.)

The degree of the resulting polynomial is .
(Type a whole number.)

15. Find the product.

$$(x - 2)^3$$

$$(x - 2)^3 = \underline{\hspace{2cm}}$$

16. Perform the indicated operations.

$$(3x - 1)(4x - 3) - (4x - 5)(6x - 1)$$

$$(3x - 1)(4x - 3) - (4x - 5)(6x - 1) = \underline{\hspace{2cm}} \text{ (Simplify your answer.)}$$

17. Factor the given polynomial.

$$x^2 + 12x + 35$$

Select the correct choice below and, if necessary, fill in the answer box within your choice.

A. $x^2 + 12x + 35 = \underline{\hspace{2cm}}$

B. The polynomial is prime.

18. Factor the given polynomial.

$$x^2 - 16x + 63$$

Select the correct choice below and, if necessary, fill in the answer box within your choice.

A. $x^2 - 16x + 63 =$ _____

B. The polynomial is prime.

19. Factor the trinomial, or state that the trinomial is prime.

$$12y^2 + 3y + 10$$

Select the correct choice below and fill in any answer boxes within your choice.

A. $12y^2 + 3y + 10 =$ _____ (Factor completely.)

B. The polynomial is prime.

20. Factor completely, or state that the polynomial is prime.

$$x^3 - 5x^2 - 9x + 45$$

Select the correct choice below and, if necessary, fill in the answer box within your choice.

A. $x^3 - 5x^2 - 9x + 45 =$ _____

B. The polynomial is prime.

21. Factor completely, or state that the polynomial is prime.

$$2x^3 - 128a^2x + 28x^2 + 98x$$

Select the correct choice below and fill in any answer boxes within your choice.

A. $2x^3 - 128a^2x + 28x^2 + 98x =$ _____

B. The polynomial is prime.

22. Simplify the rational expression. Find all numbers that must be excluded from the domain of the simplified rational expression in order for it to be equivalent to the original expression.

$$\frac{5x - 20}{x^2 - 8x + 16}$$

Simplify the rational expression.

$$\frac{5x - 20}{x^2 - 8x + 16} = \underline{\hspace{2cm}} \text{ (Simplify your answer. Use positive exponents only.)}$$

Find the numbers that must be excluded from the domain of the simplified rational expression in order for it to be equivalent to the original expression. Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

- A. $x \neq \underline{\hspace{2cm}}$ (Use a comma to separate answers as needed.)
- B. There are no numbers excluded from the domain.
-

23. Simplify the rational expression. Find all numbers that must be excluded from the domain of the simplified rational expression.

$$\frac{y^2 + 8y - 9}{y^2 + 15y + 54}$$

Simplify the rational expression. Select the correct choice below and fill in any answer boxes in your choice.

$$\frac{y^2 + 8y - 9}{y^2 + 15y + 54} = \underline{\hspace{2cm}} \text{ (Simplify your answer. Use positive exponents only.)}$$

Find the numbers that must be excluded from the domain of the simplified rational expression in order for it to be equivalent to the original expression. Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

- A. $y \neq \underline{\hspace{2cm}}$ (Use a comma to separate answers as needed.)
- B. There are no numbers excluded from the domain.
-

24. Add as indicated.

$$\frac{16}{x^2 + 8x + 16} + \frac{4}{x + 4}$$

Select the correct choice below and fill in the answer box(es) to complete your choice.

(Simplify your answer. Use integers or fractions for any numbers in the expression. Use a comma to separate answers as needed.)

- A. $\frac{16}{x^2 + 8x + 16} + \frac{4}{x + 4} = \underline{\hspace{2cm}}$, $x \neq \underline{\hspace{2cm}}$
- B. $\frac{16}{x^2 + 8x + 16} + \frac{4}{x + 4} = \underline{\hspace{2cm}}$, no numbers must be excluded.
-

25. Solve and check the linear equation.

$$5(x - 2) + 18 = 4(x + 4)$$

What is the solution? Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

- A. The solution set is {_____}.
- B. The solution set is $\{x \mid x \text{ is a real number}\}$.
- C. The solution set is \emptyset .

26. For the following equation, **a.** Write the value or values of the variable that make a denominator zero. These are the restrictions on the variable. **b.** Keeping the restrictions in mind, solve the equation.

$$\frac{5}{x+2} - \frac{1}{x-2} = \frac{3x}{x^2-4}$$

- a.** Write the value or values of the variable that make a denominator zero.

_____ (Use a comma to separate answers as needed.)

- b.** What is the solution of the equation? Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

- A. The solution set is {_____}. (Use a comma to separate answers as needed.)
- B. The solution set is $\{x \mid x \text{ is a real number}\}$.
- C. The solution set is \emptyset .

27. Solve the absolute value equation or indicate that the equation has no solution.

$$|2x - 1| = 3$$

Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

- A. The solution set is {_____}.
(Simplify your answer. Use a comma to separate answers as needed.)
- B. The solution set is the empty set.

28. Solve.

$$3x^2 = 54x$$

The solution set is {_____}.
(Type an integer or an improper fraction. Use a comma to separate answers as needed.)

29. Solve the quadratic equation by completing the square.

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

The solution set is {_____}.
(Type an integer or a simplified fraction. Use a comma to separate answers as needed.)

30. Solve the quadratic equation by completing the square.

$$x^2 + 8x + 6 = 0$$

The solution set is {_____}.

(Type an exact answer, using radicals as needed. Use a comma to separate answers as needed.)

31. Solve the radical equation. Check all proposed solutions.

$$\sqrt{5x + 4} = x - 4$$

Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

- A. The solution set is {_____}.
(Use a comma to separate answers as needed. Simplify your answer.)
- B. The solution set is the empty set.

32. Compute the discriminant. Then determine the number and type of solutions of the given equation.

$$x^2 - 3x - 5 = 0$$

What is the discriminant?

_____ (Simplify your answer.)

Choose the sentence that describes the number and type of solutions of the quadratic equation.

- A. There are two imaginary solutions.
- B. There are an infinite number of real solutions.
- C. There are two unequal real solutions.
- D. There is one real solution.

33. After a 90% reduction, you purchase a new sofa on sale for \$72. What was the original price of the sofa?

The original price was \$_____.

34. A rectangular athletic field is twice as long as it is wide. If the perimeter of the athletic field is 360 yards, what are its dimensions?

What is the width?

_____ yards

What is the length?

_____ yards

35. A tree is supported by a wire anchored in the ground 24 feet from its base. The wire is 18 feet longer than the height that it reaches on the tree. Find the length of the wire.

The length of the wire is _____ feet.



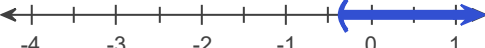

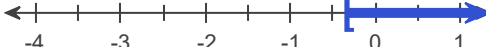
36. Other than \emptyset , use interval notation to express the solution set and graph the solution set on a number line.

$$6x - 14 \leq 3x - 15$$

Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

- A. The solution set in interval notation is _____.
(Simplify your answer. Use integers or fractions for any numbers in the expression.)
- B. The solution set is \emptyset .

Graph the solution set on a number line. Choose the correct graph below.

- A. 
- B. 
- C. 
- D. 
- E. The solution set is \emptyset .
- F. 

37. Solve the absolute value inequality.

$$|4(x - 1) + 10| \leq 18$$

Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

- A. The solution set in interval notation is _____.
(Simplify your answer.)
- B. The solution set is \emptyset .

38. Find the slope of the line passing through the pair of points or state that the slope is undefined. Then indicate whether the line through the points rises, falls, is horizontal, or is vertical.

$$(-4, 1) \text{ and } (4, 5)$$

Select the correct choice below and, if necessary, fill in the answer box within your choice.

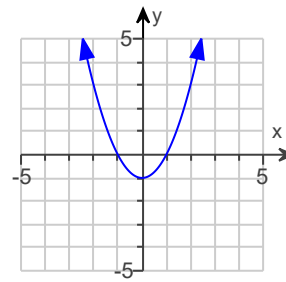
- A. The slope is _____. (Simplify your answer.)
- B. The slope is undefined.

Indicate whether the line through the points rises, falls, is horizontal, or is vertical.

- A. The line falls from left to right.
- B. The line is vertical.
- C. The line is horizontal.
- D. The line rises from left to right.

39. Use the graph to determine **a.** the function's domain; **b.** the function's range; **c.** the x-intercepts, if any; **d.** the y-intercept, if any; and **e.** the missing function values, indicated by question marks, below.

$$f(-2) = ? \quad f(2) = ?$$



- a.** The domain is _____ . (Use interval notation.)
- b.** The range is _____ . (Use interval notation.)
- c.** Select the correct choice below and fill in any answer boxes within your choice.
- A.** The x-intercept(s) is (are) _____ .
(Type an integer. Use a comma to separate answers as needed.)
- B.** There is no x-intercept.
- d.** Select the correct choice below and fill in any answer boxes within your choice.
- A.** The y-intercept is _____ . (Type an integer.)
- B.** There is no y-intercept.
- e.** $f(-2) =$ _____
 $f(2) =$ _____

40. Let $f(x) = x^2 - x - 4$ and $g(x) = 6x - 3$. Find $g(2)$ and $f(g(2))$.

$$g(2) = \underline{\hspace{2cm}} \text{ (Simplify your answer.)}$$

$$f(g(2)) = \underline{\hspace{2cm}} \text{ (Simplify your answer.)}$$

41. Use the given conditions to write an equation for the line in point-slope form and slope-intercept form.

Passing through $(-5, -3)$ and $(5, 11)$

Type the point-slope form of the equation of the line.

_____ (Use integers or simplified fractions for any numbers in the equation.)

Type the slope-intercept form of the equation of the line.

_____ (Use integers or simplified fractions for any numbers in the equation.)

42. Give the slope and y-intercept of the line whose equation is given. Then graph the linear function.

$$f(x) = -\frac{2}{5}x + 5$$

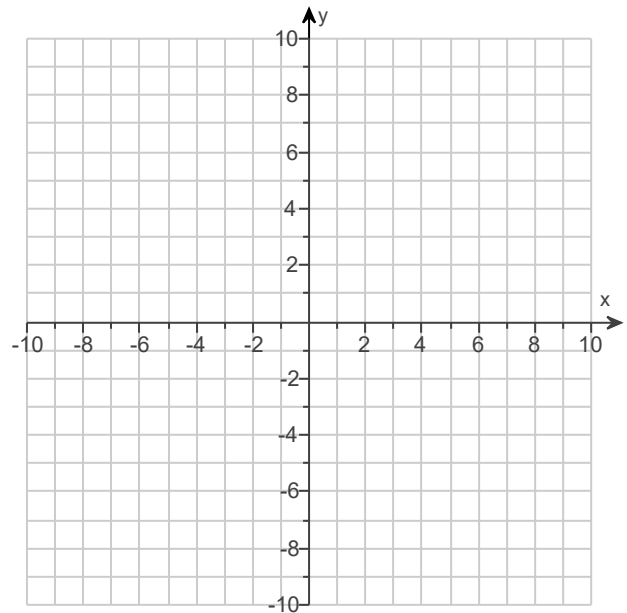
Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

- A. The slope is _____.
(Simplify your answer. Type an integer or a fraction.)
- B. The slope is undefined.

Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

- A. The y-intercept is _____.
(Simplify your answer. Type an integer or a fraction.)
- B. There is no y-intercept.

Use the graphing tool to graph the equation.



43. Divide using long division. State the quotient, $q(x)$, and the remainder, $r(x)$.

$$(15x^2 - 7x - 3) \div (5x - 4)$$

$$(15x^2 - 7x - 3) \div (5x - 4) = \underline{\hspace{2cm}} + \frac{\underline{\hspace{2cm}}}{5x - 4}$$

(Simplify your answers. Do not factor.)

44. In the following exercise, find the coordinates of the vertex for the parabola defined by the given quadratic function.

$$f(x) = 4x^2 + 16x + 3$$

The vertex is _____ . (Type an ordered pair.)

45. Use the vertex and intercepts to sketch the graph of the quadratic function. Give the equation for the parabola's axis of symmetry. Use the parabola to identify the function's domain and range.

$$f(x) = 16 - (x - 1)^2$$

Use the graphing tool to graph the equation. Use the vertex and one of the intercepts when drawing the graph.

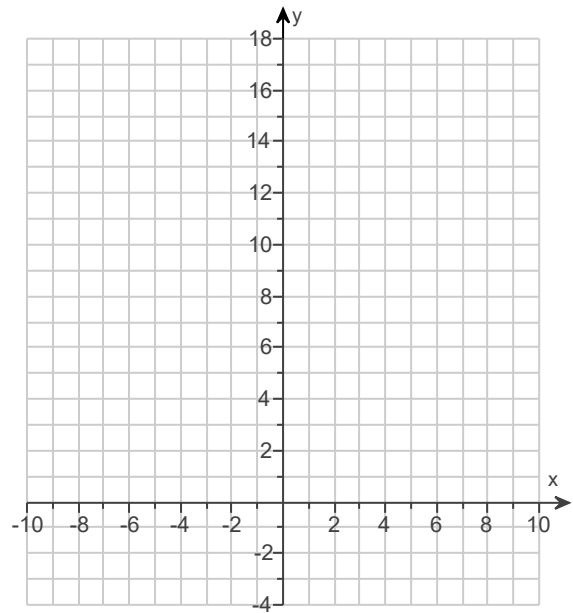
The axis of symmetry is _____.
(Type an equation. Simplify your answer.)

Identify the function's domain.

The domain is _____.
(Type the answer in interval notation.)

Identify the function's range.

The range is _____.
(Type the answer in interval notation.)



46. The number of houses that can be served by a water pipe varies directly as the square of the diameter of the pipe. A water pipe that has a 10-centimeter diameter can supply 40 houses.

- a. How many houses can be served by a water pipe that has a 40-centimeter diameter?
b. What size of water pipe is needed for a new subdivision of 1440 houses?

a. A water pipe that has a 40-centimeter diameter can supply _____ houses.

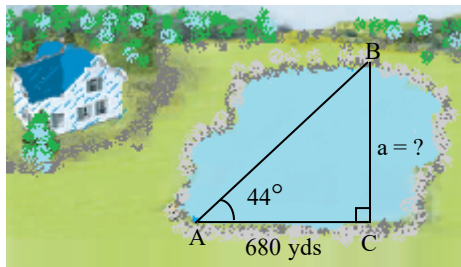
b. A water pipe that has a _____-centimeter diameter can supply 1440 houses.

47. Solve for x.

$$7^{4x-8} = 2401$$

The solution set is { _____ }.

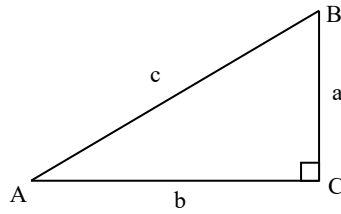
48. To find the distance across a lake, a surveyor took the measurements in the figure shown. Use these measurements to determine how far it is across the lake.



a = _____ yd
(Round the answer to the nearest whole number.)

49. Solve the right triangle shown in the figure.

$$a = 28.6, c = 51.5$$



$$A \approx \underline{\hspace{2cm}}^\circ$$

(Round to the nearest tenth as needed.)

$$B \approx \underline{\hspace{2cm}}^\circ$$

(Round to the nearest tenth as needed.)

$$b \approx \underline{\hspace{2cm}}$$

(Round to the nearest hundredth as needed.)

50. Solve the system by the method of your choice.

$$\begin{cases} x = 8y - 1 \\ -3x + 24y = 3 \end{cases}$$

Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

- A.** There is exactly one solution. The solution set is $\{\underline{\hspace{2cm}}\}$. (Simplify your answer. Type an ordered pair.)
- B.** There are infinitely many solutions. The solution set is $\{(x,y) \mid x = 8y - 1\}$ or $\{(x,y) \mid -3x + 24y = 3\}$.
- C.** The solution set is \emptyset .

Precalculus

Summer Review Answer Key

1. $25y - 59$

2. $9x^2 + 23$

3. $\frac{1}{3125}$

4. 16,777,216

5. $21x^{12}y^5$

6. $-\frac{8b^{33}}{a^{15}}$

7. $3|x|\sqrt{2}$

8. $8x$

9. A. $\sqrt{75x} - \sqrt{27x} = \underline{2\sqrt{3x}}$ (Type an exact answer, using radicals as needed.)

10. $\frac{\sqrt{55}}{11}$

11. $11\sqrt{5} + 22$

12. A. The expression is a real number. $\sqrt[3]{-\frac{1}{216}} = \underline{-\frac{1}{6}}$ (Simplify your answer.)

13. $\frac{(\sqrt[3]{125})^2}{25}$

14. $\frac{8x^2 - 8x + 7}{2}$

15. $x^3 - 6x^2 + 12x - 8$

16. $-12x^2 + 21x - 2$

17. A. $x^2 + 12x + 35 = \underline{(x + 5)(x + 7)}$

18. A. $x^2 - 16x + 63 = \underline{(x - 9)(x - 7)}$

19. B. The polynomial is prime.

20. A. $x^3 - 5x^2 - 9x + 45 = \underline{(x - 5)(x + 3)(x - 3)}$

21. A. $2x^3 - 128a^2x + 28x^2 + 98x = \underline{2x(x + 7 + 8a)(x + 7 - 8a)}$

22. $\frac{5}{x - 4}$

A. $x \neq \underline{4}$ (Use a comma to separate answers as needed.)

23. $\frac{y - 1}{y + 6}$

A. $y \neq \underline{-6, -9}$ (Use a comma to separate answers as needed.)

24. A. $\frac{16}{x^2 + 8x + 16} + \frac{4}{x + 4} = \underline{\frac{4(x + 8)}{(x + 4)^2}}$, $x \neq \underline{-4}$

25. A. The solution set is $\{ \underline{8} \}$.

26. $2, -2$

A. The solution set is $\{ \underline{12} \}$. (Use a comma to separate answers as needed.)

27. A. The solution set is $\{ \underline{-1, 2} \}$. (Simplify your answer. Use a comma to separate answers as needed.)

28. $0, 18$

29. $-1, -3$

30. $-4 + \sqrt{10}, -4 - \sqrt{10}$

31. A. The solution set is $\{ \underline{12} \}$. (Use a comma to separate answers as needed. Simplify your answer.)

32. 29

C. There are two unequal real solutions.

33. 720

34. 60

120

35. 25

36. A. The solution set in interval notation is $\left(-\infty, -\frac{1}{3} \right]$.

(Simplify your answer. Use integers or fractions for any numbers in the expression.)



37. A. The solution set in interval notation is $\underline{[-6,3]}$. (Simplify your answer.)

38. A. The slope is $\underline{\frac{1}{2}}$. (Simplify your answer.)

D. The line rises from left to right.

39. $(-\infty, \infty)$

$[-1, \infty)$

A. The x-intercept(s) is (are) $\underline{-1, 1}$. (Type an integer. Use a comma to separate answers as needed.)

A. The y-intercept is $\underline{-1}$. (Type an integer.)

3

3

40. 9

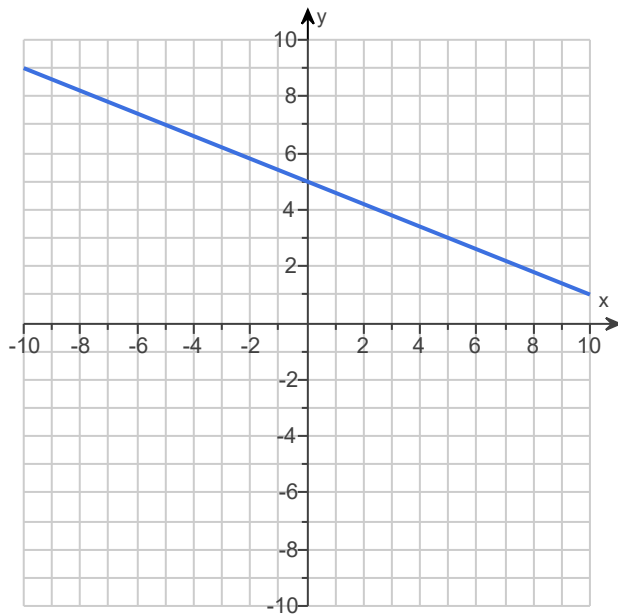
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41. $y + 3 = \frac{7}{5}(x + 5)$

$$y = \frac{7}{5}x + 4$$

42. A. The slope is $-\frac{2}{5}$. (Simplify your answer. Type an integer or a fraction.)

A. The y-intercept is **5** . (Simplify your answer. Type an integer or a fraction.)

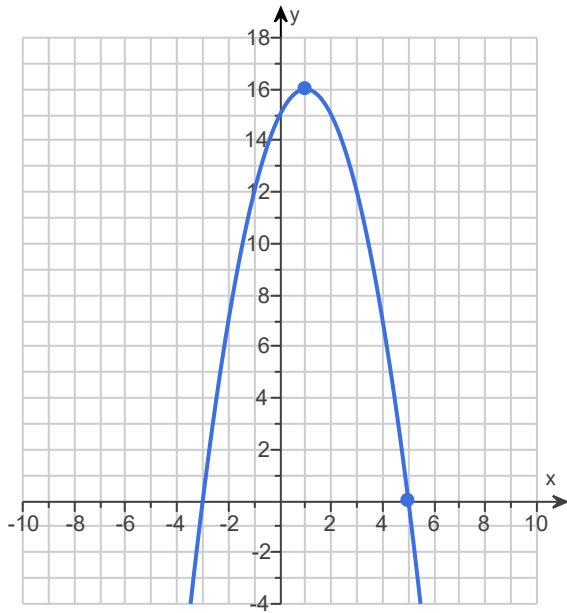


43. $3x + 1$

1

44. $(-2, -13)$

45.



$x = 1$

$(-\infty, \infty)$

$(-\infty, 16]$

46. 640

60

47. 3

48. 657

49. 33.7

56.3

42.85

50. B. There are infinitely many solutions. The solution set is $\{(x,y) \mid x = 8y - 1\}$ or $\{(x,y) \mid -3x + 24y = 3\}$.

Precalculus

Summer Review Topics List

#	Topic	Khan Academy Reference
1,2	Write and simplify algebraic expressions.	
3	Evaluate exponential expressions.	https://www.khanacademy.org/math/pre-algebra/pre-algebra-exponents-radicals/pre-algebra-exponents/a/introduction-to-exponents
4	Evaluate exponential expressions.	https://www.khanacademy.org/math/pre-algebra/pre-algebra-exponents-radicals/pre-algebra-exponents/a/introduction-to-exponents
5	Simplify exponential expressions.	https://www.khanacademy.org/math/algebra2/x2ec2f6f830c9fb89:exp#x2ec2f6f830c9fb89:exp-properties
6	Simplify exponential expressions.	https://www.khanacademy.org/math/algebra2/x2ec2f6f830c9fb89:exp#x2ec2f6f830c9fb89:exp-properties
7	Simplify square root expressions using the product and quotient rules.	https://www.khanacademy.org/math/algebra/x2f8bb11595b61c86:rational-exponents-radicals#x2f8bb11595b61c86:simplifying-square-roots
8	Simplify square root expressions using the product and quotient rules.	https://www.khanacademy.org/math/algebra/x2f8bb11595b61c86:rational-exponents-radicals#x2f8bb11595b61c86:simplifying-square-roots
9	Add and subtract square root expressions.	https://www.khanacademy.org/math/algebra-home/alg-exp-and-log/miscellaneous-radicals/v/adding-and-simplifying-radicals
10	Rationalize denominators.	https://www.khanacademy.org/math/algebra-home/alg-exp-and-log/miscellaneous-radicals/v/how-to-rationalize-a-denominator
11	Rationalize denominators.	https://www.khanacademy.org/math/algebra-home/alg-exp-and-log/miscellaneous-radicals/v/how-to-rationalize-a-denominator
12	Evaluate higher roots.	https://www.khanacademy.org/math/algebra-home/alg-exp-and-log/alg-simplify-higher-index-roots/v/radical-expressions-with-higher-roots
13	Simplify expressions using rational exponents.	https://www.khanacademy.org/math/algebra2/x2ec2f6f830c9fb89:exp#x2ec2f6f830c9fb89:exp-properties
14	Add and subtract polynomials.	https://www.khanacademy.org/math/algebra2/x2ec2f6f830c9fb89:poly-arithmetic#x2ec2f6f830c9fb89:poly-add-sub
15	Multiply polynomials of one variable.	https://www.khanacademy.org/math/algebra2/x2ec2f6f830c9fb89:poly-arithmetic#x2ec2f6f830c9fb89:bi-by-poly
16	Perform more than one operation to simplify an expression.	https://www.khanacademy.org/math/algebra2/x2ec2f6f830c9fb89:poly-arithmetic#x2ec2f6f830c9fb89:bi-by-poly

17	Factor trinomials.	https://www.khanacademy.org/math/algebra2/x2ec2f6f830c9fb89:poly-factor
18	Factor trinomials.	https://www.khanacademy.org/math/algebra2/x2ec2f6f830c9fb89:poly-factor
19	Factor trinomials.	https://www.khanacademy.org/math/algebra2/x2ec2f6f830c9fb89:poly-factor
20	Use a general strategy for factoring polynomials.	https://www.khanacademy.org/math/algebra2/x2ec2f6f830c9fb89:poly-factor#x2ec2f6f830c9fb89:factor-high-deg
21	Use a general strategy for factoring polynomials.	https://www.khanacademy.org/math/algebra2/x2ec2f6f830c9fb89:poly-factor#x2ec2f6f830c9fb89:factor-high-deg
22	Simplify rational expressions and specify numbers that must be excluded from the domain.	https://www.khanacademy.org/math/algebra2/x2ec2f6f830c9fb89:rational#x2ec2f6f830c9fb89:cancel-common-factor
23	Simplify rational expressions and specify numbers that must be excluded from the domain.	https://www.khanacademy.org/math/algebra2/x2ec2f6f830c9fb89:rational#x2ec2f6f830c9fb89:cancel-common-factor
24	Add and subtract rational expressions.	https://www.khanacademy.org/math/algebra2/x2ec2f6f830c9fb89:rational#x2ec2f6f830c9fb89:rational-add-sub-not-factored
25	Solve linear equations in one variable.	https://www.khanacademy.org/math/algebra/x2f8bb11595b61c86:solve-equations-inequalities
26	Solve rational equations, and determine when the denominator is zero.	https://www.khanacademy.org/math/algebra2/x2ec2f6f830c9fb89:eq#x2ec2f6f830c9fb89:rational-eq
27	Solve equations involving absolute value.	https://www.khanacademy.org/math/algebra-home/alg-absolute-value#alg-absolute-value-equations
28	Solve quadratic equations.	https://www.khanacademy.org/math/algebra/x2f8bb11595b61c86:quadratic-functions-equations#x2f8bb11595b61c86:completing-square-quadratics
29	Solve quadratic equations.	https://www.khanacademy.org/math/algebra/x2f8bb11595b61c86:quadratic-functions-equations#x2f8bb11595b61c86:completing-square-quadratics
30	Solve quadratic equations.	https://www.khanacademy.org/math/algebra/x2f8bb11595b61c86:quadratic-functions-equations#x2f8bb11595b61c86:completing-square-quadratics
31	Solve radical equations.	https://www.khanacademy.org/math/algebra2/x2ec2f6f830c9fb89:eq#x2ec2f6f830c9fb89:sqrt-eq
32	Use the discriminant to determine the number and type of solutions to a given quadratic equation.	https://www.khanacademy.org/math/algebra/x2f8bb11595b61c86:quadratic-functions-equations/x2f8bb11595b61c86:quadratic-formula-a1/a/discriminant-review
33	Solve applications involving linear equations.	https://www.khanacademy.org/math/algebra/x2f8bb11595b61c86:forms-of-linear-equations/x2f8bb11595b61c86:writing-slope-intercept-equations/v/construct-linear-equation-context
34	Solve applications involving linear equations.	https://www.khanacademy.org/math/algebra/x2f8bb11595b61c86:forms-of-linear-equations/x2f8bb11595b61c86:writing-slope-intercept-equations/v/construct-linear-equation-context

35	Solve applications involving linear equations.	https://www.khanacademy.org/math/algebra/x2f8bb11595b61c86:forms-of-linear-equations/x2f8bb11595b61c86:writing-slope-intercept-equations/v/construct-linear-equation-context
36	Solve linear inequalities.	https://www.khanacademy.org/math/algebra-home/alg-basic-eg-ineq/alg-multi-step-inequalities/v/multi-step-inequalities-3
37	Solve absolute value inequalities.	https://www.khanacademy.org/math/algebra-home/alg-absolute-value#alg-absolute-value-inequalities
38	Calculate a line's slope.	https://www.khanacademy.org/math/algebra/x2f8bb11595b61c86:linear-equations-graphs
39	Identify the domain, range, intercepts, and values of a function from its graph.	https://www.khanacademy.org/math/algebra/x2f8bb11595b61c86:functions#x2f8bb11595b61c86:introduction-to-the-domain-and-range-of-a-function
40	Evaluate functions.	https://www.khanacademy.org/math/algebra/x2f8bb11595b61c86:functions#x2f8bb11595b61c86:evaluating-functions
41	Write the point-slope form and slope-intercept form of the equation of a line.	https://www.khanacademy.org/math/algebra/x2f8bb11595b61c86:forms-of-linear-equations#x2f8bb11595b61c86:point-slope-form
42	Identify the slope and y-intercept and graph the line.	https://www.khanacademy.org/math/algebra/x2f8bb11595b61c86:forms-of-linear-equations#x2f8bb11595b61c86:intro-to-slope-intercept-form
43	Use long division to divide polynomials.	https://www.khanacademy.org/math/algebra2/x2ec2f6f830c9fb89:poly-div#x2ec2f6f830c9fb89:poly-div-by-linear
44	Determine the vertex of a parabola defined by a quadratic function.	https://www.khanacademy.org/math/algebra/x2f8bb11595b61c86:quadratic-functions-equations#x2f8bb11595b61c86:standard-form-quadratic
45	Graph parabolas.	https://www.khanacademy.org/math/algebra/x2f8bb11595b61c86:quadratic-functions-equations#x2f8bb11595b61c86:vertex-form
46	Solve applications involving variation.	https://www.khanacademy.org/math/algebra-home/alg-rational-expr-eg-func#alg-direct-and-inverse-variation
47	Use like bases to solve exponential equations.	https://www.khanacademy.org/math/algebra2/x2ec2f6f830c9fb89:exp#x2ec2f6f830c9fb89:exp-eg-prop
48	Solve applications using right triangle trigonometry.	https://www.khanacademy.org/math/geometry/hs-geo-trig#hs-geo-modeling-with-right-triangles
49	Solve a right triangle.	https://www.khanacademy.org/math/geometry/hs-geo-trig/hs-geo-solve-for-an-angle/a/inverse-trig-functions-intro
50	Solve systems of linear equations in two variables using any method.	https://www.khanacademy.org/math/algebra/x2f8bb11595b61c86:systems-of-equations#x2f8bb11595b61c86:solving-systems-of-equations-with-substitution