Geometry Summer Math Packet

Students:

Enclosed are lessons to do this summer to help prepare you for geometry class.

Please do all work on graph paper or lined paper as needed.

Return all papers on the first day of school.

These papers will count as your first **Test Grade** for Geometry.

Enjoy your summer break. See you soon!

Prerequisite Skills

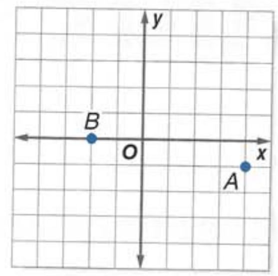
Prerequisite Skills

1 Graphing Ordered Pairs

Points in the coordinate plane are named by **ordered pairs** of the form (x, y). The first number, or **x-coordinate**, corresponds to a number on the x-axis. The second number, or **y-coordinate**, corresponds to a number on the y-axis.

EXAMPLE

1 Write the ordered pair for each point.



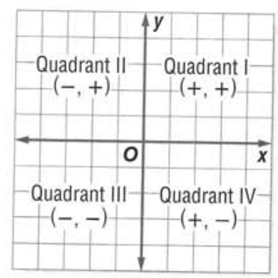
a. A

The x-coordinate is 4.
The y-coordinate is -1.
The ordered pair is $(4, -1)$.

b. B

The x-coordinate is -2.
The point lies on the x-axis,
so its y-coordinate is 0.
The ordered pair is $(-2, 0)$.

The x-axis and y-axis separate the coordinate plane into four regions, called **quadrants**. The point at which the axes intersect is called the **origin**. The axes and points on the axes are not located in any of the quadrants.

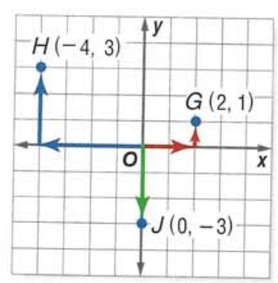


EXAMPLE

2 Graph and label each point on a coordinate plane. Name the quadrant in which each point is located.

a. $G(2, 1)$

Start at the origin. Move 2 units right, since the x-coordinate is 2. Then move 1 unit up, since the y-coordinate is 1. Draw a dot, and label it G. Point $G(2, 1)$ is in Quadrant I.



b. $H(-4, 3)$

Start at the origin. Move 4 units left, since the x-coordinate is -4. Then move 3 units up, since the y-coordinate is 3. Draw a dot, and label it H. Point $H(-4, 3)$ is in Quadrant II.

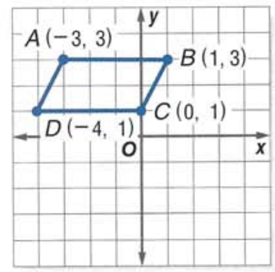
c. $J(0, -3)$

Start at the origin. Since the x-coordinate is 0, the point lies on the y-axis. Move 3 units down, since the y-coordinate is -3. Draw a dot, and label it J. Because it is on one of the axes, point $J(0, -3)$ is not in any quadrant.

EXAMPLE

3 **Graph a polygon with vertices $A(-3, 3)$, $B(1, 3)$, $C(0, 1)$, and $D(-4, 1)$.**

Graph the ordered pairs on a coordinate plane. Connect each pair of consecutive points. The polygon is a parallelogram.



EXAMPLE

4 **Graph four points that satisfy the equation $y = 4 - x$.**

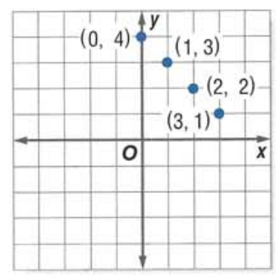
Make a table.

Choose four values for x.

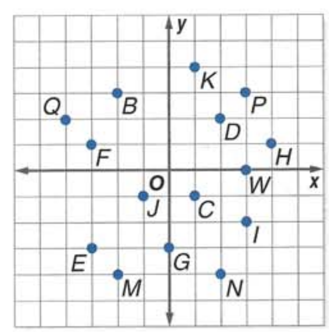
Evaluate each value of x for $4 - x$.

x	$4 - x$	y	(x, y)
0	4 − 0	4	(0, 4)
1	4 − 1	3	(1, 3)
2	4 − 2	2	(2, 2)
3	4 − 3	1	(3, 1)

Plot the points.



Exercises **Write the ordered pair for each point shown at the right.**



1. B **2.** C **3.** D
4. E **5.** F **6.** G
7. H **8.** I **9.** J
10. K **11.** W **12.** M
13. N **14.** P **15.** Q

Graph and label each point on a coordinate plane. Name the quadrant in which each point is located.

16. $M(-1, 3)$ **17.** $S(2, 0)$ **18.** $R(-3, -2)$ **19.** $P(1, -4)$
20. $B(5, -1)$ **21.** $D(3, 4)$ **22.** $T(2, 5)$ **23.** $L(-4, -3)$

Graph the following geometric figures.

24. a square with vertices $W(-3, 3)$, $X(-3, -1)$, $Y(1, -1)$, and $Z(1, 3)$

25. a polygon with vertices $J(4, 2)$, $K(1, -1)$, $L(-2, 2)$, and $M(1, 5)$

26. a triangle with vertices $F(2, 4)$, $G(-3, 2)$, and $H(-1, -3)$

Graph four points that satisfy each equation.

27. $y = 2x$ **28.** $y = 1 + x$ **29.** $y = 3x - 1$ **30.** $y = 2 - x$

2 Changing Units of Measure within Systems

Metric Units of Length
1 kilometer (km) = 1000 meters (m)
1 m = 100 centimeters (cm)
1 cm = 10 millimeters (mm)

Customary Units of Length
1 foot (ft) = 12 inches (in.)
1 yard (yd) = 3 ft
1 mile (mi) = 5280 ft

- To convert from larger units to smaller units, multiply.
- To convert from smaller units to larger units, divide.

EXAMPLE

1 State which metric unit you would use to measure the length of your pen.

Since a pen has a small length, the *centimeter* is the appropriate unit of measure.

EXAMPLE

2 Complete each sentence.

a. **4.2 km = __?__ m**

There are 1000 meters in a kilometer.
$4.2 \text{ km} \times 1000 = 4200 \text{ m}$

b. **39 ft = __?__ yd**

There are 3 feet in a yard.
$39 \text{ ft} \div 3 = 13 \text{ yd}$

EXAMPLE

3 Complete each sentence.

a. **17 mm = __?__ m**

There are 100 centimeters in a meter. First change *millimeters* to *centimeters.*

17 mm = __?__ cm — smaller unit → larger unit
$17 \text{ mm} \div 10 = 1.7 \text{ cm}$ — Since 10 mm = 1 cm, divide by 10.

Then change *centimeters* to *meters.*

1.7 cm = __?__ m — smaller unit → larger unit
$1.7 \text{ cm} \div 100 = 0.017 \text{ m}$ — Since 100 cm = 1 m, divide by 100.

b. **6600 yd = __?__ mi**

There are 5280 feet in one mile. First change *yards* to *feet.*

6600 yd = __?__ ft — larger unit → smaller unit
$6600 \text{ yd} \times 3 = 19{,}800 \text{ ft}$ — Since 3 ft = 1 yd, multiply by 3.

Then change *feet* to *miles.*

19,800 ft = __?__ mi — smaller unit → larger unit
$19{,}800 \text{ ft} \div 5280 = 3\frac{3}{4}$ or 3.75 mi — Since 5280 ft = 1 mi, divide by 5280.

Metric Units of Capacity
1 liter (L) = 1000 milliliters (mL)

Customary Units of Capacity	
1 cup (c) = 8 fluid ounces (fl oz)	1 quart (qt) = 2 pt
1 pint (pt) = 2 c	1 gallon (gal) = 4 qt

EXAMPLE

4 Complete each sentence.

a. $3.7 \text{ L} = \underline{\ ?\ } \text{ mL}$

There are 1000 milliliters in a liter.

$3.7 \text{ L} \times 1000 = 3700 \text{ mL}$

b. $16 \text{ qt} = \underline{\ ?\ } \text{ gal}$

There are 4 quarts in a gallon.

$16 \text{ qt} \div 4 = 4 \text{ gal}$

c. $7 \text{ pt} = \underline{\ ?\ } \text{ fl oz}$

There are 8 fluid ounces in a cup.

First change *pints* to *cups*.

$7 \text{ pt} = \underline{\ ?\ } \text{ c}$

$7 \text{ pt} \times 2 = 14 \text{ c}$

Then change *cups* to *fluid ounces*.

$14 \text{ c} = \underline{\ ?\ } \text{ fl oz}$

$14 \text{ c} \times 8 = 112 \text{ fl oz}$

d. $4 \text{ gal} = \underline{\ ?\ } \text{ pt}$

There are 4 quarts in a gallon.

First change *gallons* to *quarts*.

$4 \text{ gal} = \underline{\ ?\ } \text{ qt}$

$4 \text{ gal} \times 4 = 16 \text{ qt}$

Then change *quarts* to *pints*.

$16 \text{ qt} = \underline{\ ?\ } \text{ pt}$

$16 \text{ qt} \times 2 = 32 \text{ pt}$

The mass of an object is the amount of matter that it contains.

Metric Units of Mass
1 kilogram (kg) = 1000 grams (g)
1 g = 1000 milligrams (mg)

Customary Units of Weight
1 pound (lb) = 16 ounces (oz)
1 ton (T) = 2000 lb

EXAMPLE

5 Complete each sentence.

a. $5.47 \text{ kg} = \underline{\ ?\ } \text{ mg}$

There are 1000 milligrams in a gram.

Change *kilograms* to *grams*.

$5.47 \text{ kg} = \underline{\ ?\ } \text{ g}$

$5.47 \text{ kg} \times 1000 = 5470 \text{ g}$

Then change *grams* to *milligrams*.

$5470 \text{ g} = \underline{\ ?\ } \text{ mg}$

$5470 \text{ g} \times 1000 = 5{,}470{,}000 \text{ mg}$

b. $5 \text{ T} = \underline{\ ?\ } \text{ oz}$

There are 16 ounces in a pound.

Change *tons* to *pounds*.

$5 \text{ T} = \underline{\ ?\ } \text{ lb}$

$5 \text{ T} \times 2000 = 10{,}000 \text{ lb}$

Then change *pounds* to *ounces*.

$10{,}000 \text{ lb} = \underline{\ ?\ } \text{ oz}$

$10{,}000 \text{ lb} \times 16 = 160{,}000 \text{ oz}$

Exercises **State which metric unit you would probably use to measure each item.**

1. radius of a tennis ball
2. length of a notebook
3. mass of a textbook
4. mass of a beach ball
5. liquid in a cup
6. water in a bathtub

Complete each sentence.

7. 120 in. = __?__ ft
8. 18 ft = __?__ yd
9. 10 km = __?__ m
10. 210 mm = __?__ cm
11. 180 mm = __?__ m
12. 3100 m = __?__ km
13. 90 in. = __?__ yd
14. 5280 yd = __?__ mi
15. 8 yd = __?__ ft
16. 0.62 km = __?__ m
17. 370 mL = __?__ L
18. 12 L = __?__ mL
19. 32 fl oz = __?__ c
20. 5 qt = __?__ c
21. 10 pt = __?__ qt
22. 48 c = __?__ gal
23. 4 gal = __?__ qt
24. 36 mg = __?__ g
25. 13 lb = __?__ oz
26. 130 g = __?__ kg
27. 9.05 kg = __?__ g

Prerequisite Skills

3 Operations with Integers

The absolute value of any number n is its distance from zero on a number line and is written as $|n|$. Since distance cannot be less than zero, the absolute value of a number is always greater than or equal to zero.

EXAMPLE

1 Evaluate each expression.

a. $|3|$

$|3| = 3$ Definition of absolute value

b. $|-7|$

$|-7| = 7$ Definition of absolute value

c. $|-4 + 2|$

$|-4 + 2| = |-2|$ $-4 + 2 = -2$

$= 2$ Simplify.

To add integers with the same sign, add their absolute values. Give the result the same sign as the integers. To add integers with different signs, subtract their absolute values. Give the result the same sign as the integer with the greater absolute value.

EXAMPLE

2 Find each sum.

a. $-3 + (-5)$ Both numbers are negative, so the sum is negative.

$-3 + (-5) = -8$ Add $|-3|$ and $|-5|$.

b. $-4 + 2$ The sum is negative because $|-4| > |2|$.

$-4 + 2 = -2$ Subtract $|2|$ from $|-4|$.

c. $6 + (-3)$ The sum is positive because $|6| > |-3|$.

$6 + (-3) = 3$ Subtract $|-3|$ from $|6|$.

To subtract an integer, add its additive inverse.

EXAMPLE

3 Find each difference.

a. $4 - 7$

$4 - 7 = 4 + (-7)$ To subtract 7, add −7.

$= -3$

b. $2 - (-4)$

$2 - (-4) = 2 + 4$ To subtract −4, add 4.

$= 6$

The product of two integers with different signs is negative. The product of two integers with the same sign is positive. Similarly, the quotient of two integers with different signs is negative, and the quotient of two integers with the same sign is positive.

EXAMPLE

4 **Find each product or quotient.**

a. $4(-7)$ — The factors have different signs.
$4(-7) = -28$ — The product is negative.

b. $-64 \div (-8)$ — The dividend and divisor have the same sign.
$-64 \div (-8) = 8$ — The quotient is positive.

c. $-9(-6)$ — The factors have the same sign.
$-9(-6) = 54$ — The product is positive.

d. $-55 \div 5$ — The dividend and divisor have different signs.
$-55 \div 5 = -11$ — The quotient is negative.

e. $\frac{24}{-3}$ — The dividend and divisor have different signs.
$\frac{24}{-3} = -8$ — The quotient is negative.

To evaluate expressions with absolute value, evaluate the absolute values first and then perform the operation.

EXAMPLE

5 **Evaluate each expression.**

a. $|-3| - |5|$
$|-3| - |5| = 3 - 5$ — $|-3| = 3, |5| = 5$
$= -2$ — Simplify.

b. $|-5| + |-2|$
$|-5| + |-2| = 5 + 2$ — $|-5| = 5, |-2| = 2$
$= 7$ — Simplify.

Exercises

Evaluate each absolute value.

1. $|-3|$ **2.** $|4|$ **3.** $|0|$ **4.** $|-5|$

Find each sum or difference.

5. $-4 - 5$ **6.** $3 + 4$ **7.** $9 - 5$ **8.** $-2 - 5$
9. $3 - 5$ **10.** $-6 + 11$ **11.** $-4 + (-4)$ **12.** $5 - 9$
13. $-4 - (-2)$ **14.** $3 - (-3)$ **15.** $3 + (-4)$ **16.** $-3 - (-9)$

Evaluate each expression.

17. $|-4| - |6|$ **18.** $|-7| + |-1|$ **19.** $|1| + |-2|$ **20.** $|2| - |-5|$
21. $|-5 + 2|$ **22.** $|6 + 4|$ **23.** $|3 - 7|$ **24.** $|-3 - 3|$

Find each product or quotient.

25. $-36 \div 9$ **26.** $-3(-7)$ **27.** $6(-4)$ **28.** $-25 \div 5$
29. $-6(-3)$ **30.** $7(-8)$ **31.** $-40 \div (-5)$ **32.** $11(3)$
33. $44 \div (-4)$ **34.** $-63 \div (-7)$ **35.** $6(5)$ **36.** $-7(12)$
37. $-10(4)$ **38.** $80 \div (-16)$ **39.** $72 \div 9$ **40.** $39 \div 3$

Prerequisite Skills

4 Evaluating Algebraic Expressions

An expression is an algebraic expression if it contains sums and/or products of variables and numbers. To evaluate an algebraic expression, replace the variable or variables with known values, and then use the order of operations.

Order of Operations
Step 1 Evaluate expressions inside grouping symbols.
Step 2 Evaluate all powers.
Step 3 Do all multiplications and/or divisions from left to right.
Step 4 Do all additions and/or subtractions from left to right.

EXAMPLE 1

Evaluate each expression.

a. $x - 5 + y$ **if** $x = 15$ **and** $y = -7$

$x - 5 + y = 15 - 5 + (-7)$ Substitute.

$= 10 + (-7)$ Subtract.

$= 3$ Add.

b. $6ab^2$ **if** $a = -3$ **and** $b = 3$

$6ab^2 = 6(-3)(3)^2$ Substitute.

$= 6(-3)(9)$ $3^2 = 9$

$= (-18)(9)$ Multiply.

$= -162$ Multiply.

EXAMPLE 2

Evaluate if $m = -2$, $n = -4$, **and** $p = 5$.

a. $\frac{2m + n}{p - 3}$

$\frac{2m + n}{p - 3} = \frac{2(-2) + (-4)}{5 - 3}$ Substitute.

$= \frac{-4 - 4}{5 - 3}$ Multiply.

$= \frac{-8}{2}$ or -4 Subtract.

b. $-3(m^2 + 2n)$

$-3(m^2 + 2n) = -3[(-2)^2 + 2(-4)]$

$= -3[4 + (-8)]$

$= -3(-4)$ or 12

EXAMPLE 3

Evaluate $3|a - b| + 2|c - 5|$ **if** $a = -2$, $b = -4$, **and** $c = 3$.

$3|a - b| + 2|c - 5| = 3|-2 - (-4)| + 2|3 - 5|$ Substitute for a, b, and c.

$= 3|2| + 2|-2|$ Simplify.

$= 3(2) + 2(2)$ Find absolute values.

$= 10$ Simplify.

Exercises Evaluate each expression if $a = 2$, $b = -3$, $c = -1$, and $d = 4$.

1. $2a + c$ **2.** $\frac{bd}{2c}$ **3.** $\frac{2d - a}{b}$ **4.** $3d - c$

5. $\frac{3b}{5a + c}$ **6.** $5bc$ **7.** $2cd + 3ab$ **8.** $\frac{c - 2d}{a}$

Evaluate each expression if $x = 2$, $y = -3$, and $z = 1$.

9. $24 + |x - 4|$ **10.** $13 + |8 + y|$ **11.** $|5 - z| + 11$ **12.** $|2y - 15| + 7$

5 Solving Linear Equations

If the same number is added to or subtracted from each side of an equation, the resulting equation is true.

EXAMPLE

1 Solve each equation.

a. $x - 7 = 16$

$x - 7 = 16$	Original equation
$x - 7 + 7 = 16 + 7$	Add 7 to each side.
$x = 23$	Simplify.

b. $m + 12 = -5$

$m + 12 = -5$	Original equation
$m + 12 + (-12) = -5 + (-12)$	Add -12 to each side.
$m = -17$	Simplify.

c. $k + 31 = 10$

$k + 31 = 10$	Original equation
$k + 31 - 31 = 10 - 31$	Subtract 31 from each side.
$k = -21$	Simplify.

If each side of an equation is multiplied or divided by the same number, the resulting equation is true.

EXAMPLE

2 Solve each equation.

a. $4d = 36$

$4d = 36$	Original equation
$\frac{4d}{4} = \frac{36}{4}$	Divide each side by 4.
$x = 9$	Simplify.

b. $-\frac{t}{8} = -7$

$-\frac{t}{8} = -7$	Original equation
$-8\left(-\frac{t}{8}\right) = -8(-7)$	Multiply each side by -8.
$t = 56$	Simplify.

c. $\frac{3}{5}x = -8$

$\frac{3}{5}x = -8$	Original equation
$\frac{5}{3}\left(\frac{3}{5}\right)x = \frac{5}{3}(-8)$	Multiply each side by $\frac{5}{3}$.
$x = -\frac{40}{3}$	Simplify.

To solve equations with more than one operation, often called *multi-step equations*, undo operations by working backward.

Prerequisite Skills

EXAMPLE

3 **Solve each equation.**

a. $8q - 15 = 49$

$8q - 15 = 49$ Original equation

$8q = 64$ Add 15 to each side.

$q = 8$ Divide each side by 8.

b. $12y + 8 = 6y - 5$

$12y + 8 = 6y - 5$ Original equation

$12y = 6y - 13$ Subtract 8 from each side.

$6y = -13$ Subtract 6*y* from each side.

$y = -\frac{13}{6}$ Divide each side by 6.

When solving equations that contain grouping symbols, first use the Distributive Property to remove the grouping symbols.

EXAMPLE

4 **Solve $3(x - 5) = 13$.**

$3(x - 5) = 13$ Original equation

$3x - 15 = 13$ Distributive Property

$3x = 28$ Add 15 to each side.

$x = \frac{28}{3}$ Divide each side by 3.

Exercises **Solve each equation.**

1. $r + 11 = 3$

2. $n + 7 = 13$

3. $d - 7 = 8$

4. $\frac{8}{5}a = -6$

5. $-\frac{p}{12} = 6$

6. $\frac{x}{4} = 8$

7. $\frac{12}{5}f = -18$

8. $\frac{y}{7} = -11$

9. $\frac{6}{7}y = 3$

10. $c - 14 = -11$

11. $t - 14 = -29$

12. $p - 21 = 52$

13. $b + 2 = -5$

14. $q + 10 = 22$

15. $-12q = 84$

16. $5s = 30$

17. $5c - 7 = 8c - 4$

18. $2\ell + 6 = 6\ell - 10$

19. $\frac{m}{10} + 15 = 21$

20. $-\frac{m}{8} + 7 = 5$

21. $8t + 1 = 3t - 19$

22. $9n + 4 = 5n + 18$

23. $5c - 24 = -4$

24. $3n + 7 = 28$

25. $-2y + 17 = -13$

26. $-\frac{t}{13} - 2 = 3$

27. $\frac{2}{9}x - 4 = \frac{2}{3}$

28. $9 - 4g = -15$

29. $-4 - p = -2$

30. $21 - b = 11$

31. $-2(n + 7) = 15$

32. $5(m - 1) = -25$

33. $-8a - 11 = 37$

34. $\frac{7}{4}q - 2 = -5$

35. $2(5 - n) = 8$

36. $-3(d - 7) = 6$

6 Solving Inequalities in One Variable

Statements with greater than (>), less than (<), greater than or equal to (≥), or less than or equal to (≤) are inequalities.

If any number is added or subtracted to each side of an inequality, the resulting inequality is true.

EXAMPLE

1 Solve each inequality.

a. $x - 17 > 12$

$x - 17 > 12$	Original inequality
$x - 17 + 17 > 12 + 17$	Add 17 to each side.
$x > 29$	Simplify.

The solution set is $\{x \mid x > 29\}$.

b. $y + 11 \le 5$

$y + 11 \le 5$	Original inequality
$y + 11 - 11 \le 5 - 11$	Subtract 11 from each side.
$y \le -6$	Simplify.

The solution set is $\{y \mid y \le -6\}$.

If each side of an inequality is multiplied or divided by a positive number, the resulting inequality is true.

EXAMPLE

2 Solve each inequality.

a. $\frac{t}{6} \ge 11$

$\frac{t}{6} \ge 11$	Original inequality
$(6)\frac{t}{6} \ge (6)11$	Multiply each side by 6.
$t \ge 66$	Simplify.

The solution set is $\{t \mid t \ge 66\}$.

b. $8p < 72$

$8p < 72$	Original inequality
$\frac{8p}{8} < \frac{72}{8}$	Divide each side by 8.
$p < 9$	Simplify.

The solution set is $\{p \mid p < 9\}$.

If each side of an inequality is multiplied or divided by the same negative number, the direction of the inequality symbol must be *reversed* so that the resulting inequality is true.

EXAMPLE

3 Solve each inequality.

a. $-5c > 30$

$-5c > 30$	Original inequality
$\frac{-5c}{-5} < \frac{30}{-5}$	Divide each side by −5. Change > to <.
$c < -6$	Simplify.

The solution set is $\{c \mid c < -6\}$.

b. $-\frac{d}{13} \le -4$

$-\frac{d}{13} \le -4$	Original inequality
$(-13)\left(\frac{-d}{13}\right) \ge (-13)(-4)$	Multiply each side by −13. Change ≤ to ≥.
$d \ge 52$	Simplify.

The solution set is $\{d \mid d \ge 52\}$.

Inequalities involving more than one operation can be solved by undoing the operations in the same way you would solve an equation with more than one operation.

EXAMPLE

4 **Solve each inequality.**

a. $-6a + 13 < -7$

$-6a + 13 < -7$	Original inequality
$-6a + 13 - 13 < -7 - 13$	Subtract 13 from each side.
$-6a < -20$	Simplify.
$\frac{-6a}{-6} > \frac{-20}{-6}$	Divide each side by −6. Change < to >.
$a > \frac{10}{3}$	Simplify.

The solution set is $\left\{a \mid a > \frac{10}{3}\right\}$.

b. $4z + 7 \ge 8z - 1$

$4z + 7 \ge 8z - 1$	Original inequality
$4z + 7 - 7 \ge 8z - 1 - 7$	Subtract 7 from each side.
$4z \ge 8z - 8$	Simplify.
$4z - 8z \ge 8z - 8 - 8z$	Subtract 8z from each side.
$-4z \ge -8$	Simplify.
$\frac{-4z}{-4} \le \frac{-8}{-4}$	Divide each side by −4. Change ≥ to ≤ .
$z \le 2$	Simplify.

The solution set is $\{z \mid z \le 2\}$.

Exercises **Solve each inequality.**

1. $x - 7 < 6$

2. $4c + 23 \le -13$

3. $-\frac{p}{5} \ge 14$

4. $-\frac{a}{8} < 5$

5. $\frac{t}{6} > -7$

6. $\frac{a}{11} \le 8$

7. $d + 8 \le 12$

8. $m + 14 > 10$

9. $2z - 9 < 7z + 1$

10. $6t - 10 \ge 4t$

11. $3z + 8 < 2$

12. $a + 7 \ge -5$

13. $m - 21 < 8$

14. $x - 6 \ge 3$

15. $-3b \le 48$

16. $4y < 20$

17. $12k \ge -36$

18. $-4h > 36$

19. $\frac{2}{5}b - 6 \le -2$

20. $\frac{8}{3}t + 1 > -5$

21. $7q + 3 \ge -4q + 25$

22. $-3n - 8 > 2n + 7$

23. $-3w + 1 \le 8$

24. $-\frac{4}{5}k - 17 > 11$

7 Graphing Using Intercepts and Slope

The x-coordinate of the point at which a line crosses the x-axis is called the **x-intercept**. The y-coordinate of the point at which a line crosses the y-axis is called the **y-intercept**. Since two points determine a line, one method of graphing a linear equation is to find these intercepts.

EXAMPLE

1 Determine the x-intercept and y-intercept of $4x - 3y = 12$. Then graph the equation.

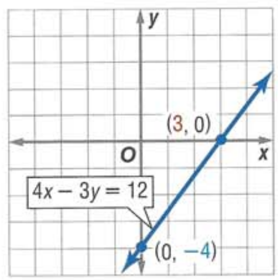
To find the x-intercept, let $y = 0$.

$4x - 3y = 12$	Original equation
$4x - 3(0) = 12$	Replace y with 0.
$4x = 12$	Simplify.
$x = 3$	Divide each side by 4.

To find the y-intercept, let $x = 0$.

$4x - 3y = 12$	Original equation
$4(0) - 3y = 12$	Replace x with 0.
$-3y = 12$	Divide each side by -3.
$y = -4$	Simplify.

Put a point on the x-axis at 3 and a point on the y-axis at -4. Draw the line through the two points.



A linear equation of the form $y = mx + b$ is in *slope-intercept* form, where m is the slope and b is the y-intercept.

EXAMPLE

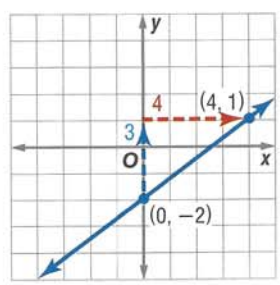
2 Graph $y = \frac{3}{4}x - 2$.

Step 1 The y-intercept is -2. So, plot a point at $(0, -2)$.

Step 2 The slope is $\frac{3}{4}$. $\frac{\text{rise}}{\text{run}}$

From $(0, -2)$, move up 3 units and right 4 units. Plot a point.

Step 3 Draw a line connecting the points.



Exercises **Graph each equation using both intercepts.**

1. $-2x + 3y = 6$
2. $2x + 5y = 10$
3. $3x - y = 3$

Graph each equation using the slope and y-intercept.

4. $y = -x + 2$
5. $y = x - 2$
6. $y = x + 1$

Graph each equation using either method.

7. $y = \frac{2}{3}x - 3$
8. $y = \frac{1}{2}x - 1$
9. $y = 2x - 2$
10. $-6x + y = 2$
11. $2y - x = -2$
12. $3x + 4y = -12$