Get Ready

Substitute and Evaluate

Evaluate $3x - 2y + 1$ when $x = 4$ and $y = -3$.

$$\begin{aligned} & 3x - 2y + 1 \\ = \ & 3(4) - 2(-3) + 1 \\ = \ & 12 + 6 + 1 \\ = \ & 19 \end{aligned}$$

1. Evaluate each expression when $x = -2$ and $y = 3$.

a) $3x + 4y$

b) $2x - 3y + 5$

c) $4x - y$

d) $-x - 2y$

e) $\frac{1}{2}x + y$

f) $\frac{2}{3}y - \frac{1}{2}x$

2. Evaluate each expression when $a = 4$ and $b = -1$.

a) $a + b - 3$

b) $-2a - 3b + 7$

c) $3b - 5 + a$

d) $1 + 2a - 3b$

e) $\frac{3}{4}a + b$

f) $b - \frac{1}{2}a$

Simplify Expressions

Simplify $3(x + y) - 2(x - y)$.

$$\begin{aligned} & 3(x + y) - 2(x - y) && \text{Use the distributive property to expand.} \\ = \ & 3(x) + 3(y) - 2(x) - 2(-y) \\ = \ & 3x + 3y - 2x + 2y && \text{Collect like terms.} \\ = \ & x + 5y \end{aligned}$$

3. Simplify.

a) $5x + 2(x - y)$

b) $3a - 2b + 4a - 9b$

c) $2(x - y) + 3(x - y)$

4. Simplify.

a) $5(2x + 3y) - 4(3x - 5y)$

b) $x - 2(x + 3y) - (2x + 3y) - 4(x + y)$

c) $3(a + 2b - 2) - 2(2a - 5b - 1)$

Graph Lines

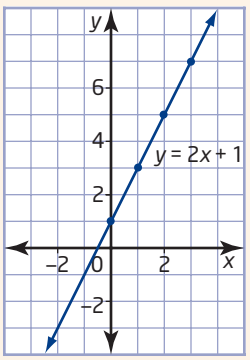
Method 1: Use a Table of Values

Graph the line $y = 2x + 1$.

x	y
0	1
1	3
2	5
3	7

Choose simple values for x. Calculate each corresponding value for y.

Plot the points. Draw a line through the points.



Graph Lines

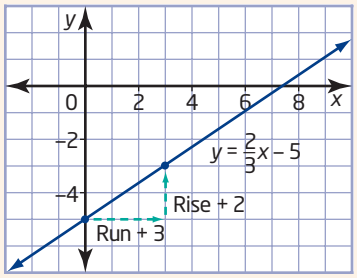
Method 2: Use the Slope and the y-Intercept

Graph the line $y = \frac{2}{3}x - 5$.

The equation is in the form $y = mx + b$.

The slope, m, is $\frac{2}{3}$. So, $\frac{\text{rise}}{\text{run}} = \frac{2}{3}$.

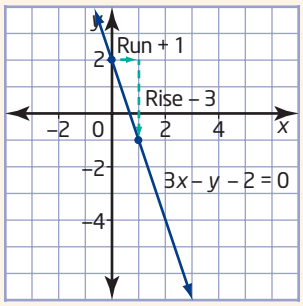
The y-intercept, b, is -5. So, a point on the line is $(0, -5)$.
Start on the y-axis at $(0, -5)$.
Then, use the slope to reach another point on the line.



Graph the line $3x + y - 2 = 0$.
First rearrange the equation to write it in the form $y = mx + b$.

$$3x + y - 2 = 0$$
$$y = -3x + 2$$

The slope is -3, so $\frac{\text{rise}}{\text{run}} = \frac{-3}{1}$. The y-intercept is 2.
Use these facts to graph the line.



Method 3: Use Intercepts

Graph the line $3x - 4y = 12$.
At the x-intercept, $y = 0$.

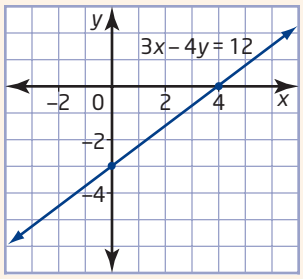
$$3x - 4(0) = 12$$
$$3x = 12$$
$$x = 4$$

The x-intercept is 4. A point on the line is $(4, 0)$.

At the y-intercept, $x = 0$.

$$3(0) - 4y = 12$$
$$-4y = 12$$
$$y = -3$$

The y-intercept is -3. A point on the line is $(0, -3)$.



NOTE: For questions 5 draw ONE large set of axes in your notes. Then answer parts a, b, c, d on that set of axes. Do this for questios 6, 7, 8 as well.

5. Graph each line. Use a table of values or the slope y-intercept method.

a) $y = x + 2$ **b)** $y = 2x + 3$

c) $y = \frac{1}{2}x - 5$ **d)** $y = -\frac{2}{5}x + 6$

6. Graph each line by first rewriting the equation in the form $y = mx + b$.

a) $x - y + 1 = 0$ **b)** $2x + y - 3 = 0$

c) $-x - y + 7 = 0$ **d)** $5x + 2y + 2 = 0$

7. Graph each line by finding the intercepts.

a) $x + y = 3$ **b)** $5x - 3y = 15$

c) $7x - 3y = 21$ **d)** $4x - 8y = 16$

8. Graph each line. Choose a convenient method.

a) $-x - y - 1 = 0$ **b)** $2x - 5y = 20$

c) $2x + 3y + 6 = 0$ **d)** $y = \frac{3}{4}x - 1$

Use a Graphing Calculator to Graph a Line

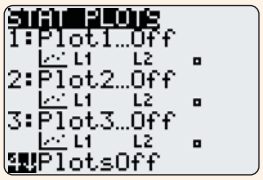
Graph the line $y = \frac{2}{3}x - 5$.

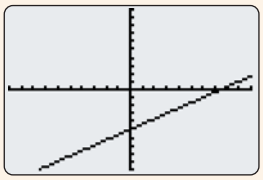
First, ensure that STAT PLOTs are turned off:
Press [2nd] [Y=] to access the STAT PLOT menu.
Select **4:PlotsOff**, and press [ENTER].
Press [Y=].
If you see any equations, clear them.

Enter the equation $y = \frac{2}{3}x - 5$:

Press [2] [÷] [3] [X,T,θ,n] [−] [5].
Press [GRAPH].

To change the scale on the x- and y-axes, refer to page 489 of the Technology Appendix for details on the window settings.





9. Graph each line in question 5 using a graphing calculator.

10. Use your rewritten equations from question 6 to graph each line using a graphing calculator.

Percent

Calculate the amount of salt in 10 kg of a 25% salt solution.

25% means $\frac{25}{100}$ or 0.25.

25% of 10 kg $= 0.25 \times 10$ kg
$= 2.5$ kg
The solution contains 2.5 kg of salt.

How much simple interest is earned in 1 year on \$1000 invested at 5%/year?
Interest $= \$1000 \times 0.05$
$= \$50$
In 1 year, \$50 interest is earned.

11. Calculate each amount.

a) the volume of pure antifreeze in 12 L of a 35% antifreeze solution

b) the mass of pure gold in 3 kg of a 24% gold alloy

c) the mass of silver in 400 g of an 11% silver alloy

12. Find the simple interest earned after 1 year on each investment.

a) \$2000 invested at 4%/year

b) \$1200 invested at 2.9%/year

c) \$1500 invested at 3.1%/year

d) \$12 500 invested at 4.5%/year

Did You Know?

An alloy is a mixture of two or more metals, or a mixture of a metal and a non-metal. For example, brass is an alloy of copper and zinc.

Answers

Chapter 1

Get Ready, pages 4–7

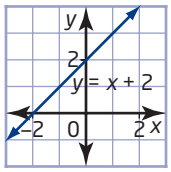
1. **a)** 6 **b)** −8 **c)** −11
d) −4 **e)** 2 **f)** 3

2. **a)** 0 **b)** 2 **c)** −4
d) 12 **e)** 2 **f)** −3

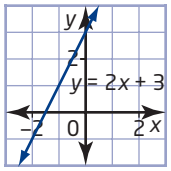
3. **a)** $7x - 2y$ **b)** $7a - 11b$ **c)** $5x - 5y$

4. **a)** $-2x + 35y$ **b)** $-7x - 13y$ **c)** $-a + 16b - 4$

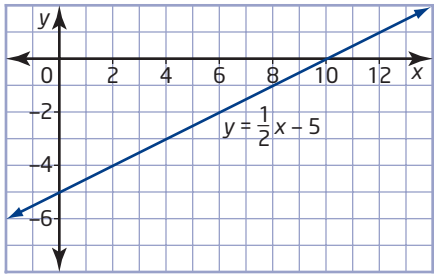
5. **a)**



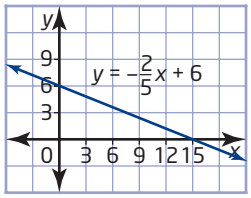
b)



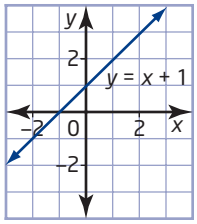
c)



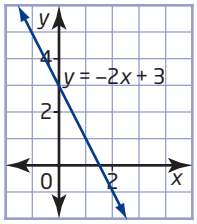
d)



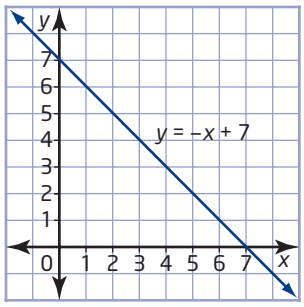
6. **a)** $y = x + 1$



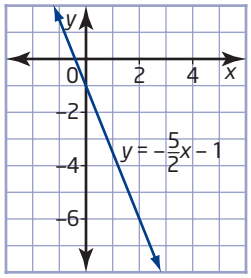
b) $y = -2x + 3$



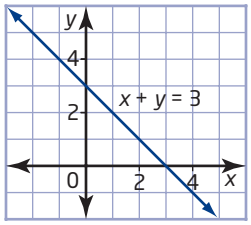
c) $y = -x + 7$



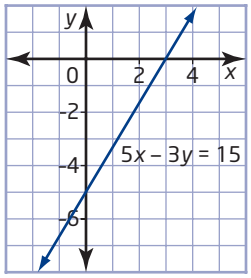
d) $y = -\frac{5}{2}x - 1$



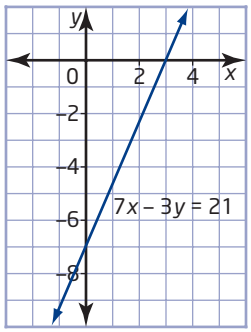
7. **a)** x-intercept 3, y-intercept 3



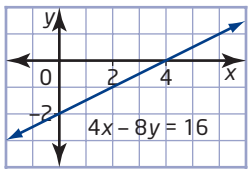
b) x-intercept 3, y-intercept -5



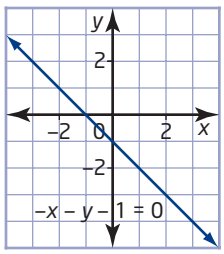
c) x-intercept 3, y-intercept -7



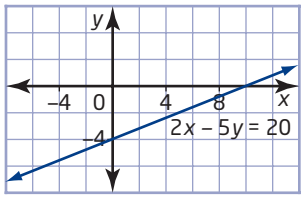
d) x-intercept 4, y-intercept -2



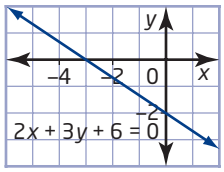
8. a)



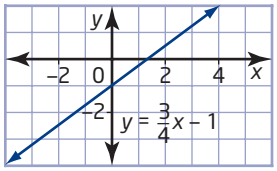
b)



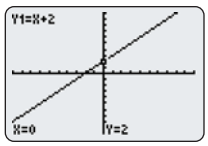
c)



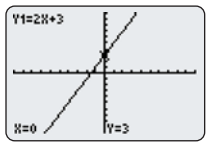
d)



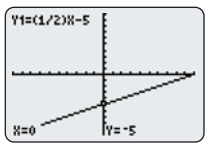
9. a)



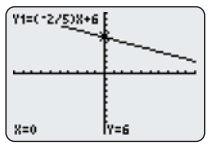
b)



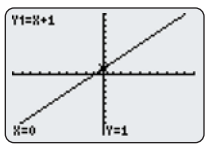
c)



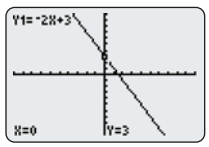
d)



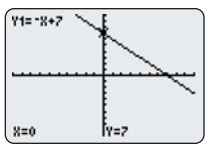
10. a)



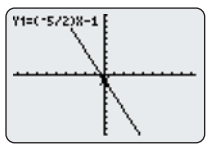
b)



c)



d)



11. a) 4.2 L **b)** 0.72 kg **c)** 44 g

12. a) \$80 **b)** \$34.80 **c)** \$46.50 **d)** \$562.50

13. a) 7 **b)** 2 **c)** −2

14. Answers will vary.

15. Answers will vary.

1.1 Connect English With Mathematics and Graphing Lines, pages 8–19

1. a) $2x - 7$ **b)** $\frac{1}{2}x + 4$ **c)** $(x - 6)y$ **d)** $x + \frac{2}{3}$

2. a) $2d$ **b)** $0.2n$ **c)** $2l$ **d)** $0.07p$

3. a) $\frac{1}{5}n - 17 = 41$ **b)** $5 - 2n = 7n + 3$

c) $5n = 825$ **d)** $l + w = 96$

4. a) decreased **b)** subtracted
c) minus **d)** less than or equal to

5. a) addition **b)** Answers will vary.

6. Answers may vary. For example: An expression is a combination of numbers, operations, and/or variables that can be evaluated. An equation equates two expressions.

7. C

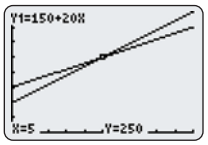
8. a) (2, 7) **b)** (−3, −4) **c)** (−20, −12) **d)** (3, 7)

9. a) (2, 1) **b)** (−2, −1) **c)** (2, −3) **d)** (2, 1)

10. a) (3, −2) **b)** (−4.67, 8)
c) (1.45, 4.73) **d)** (−1.29, 7.86)
e) (−1.49, 0.62) **f)** (1.26, −4.75)

11. a) $C = 150 + 20m$ **b)** $C = 100 + 30m$

c)



d) (5, 250)

e) Answers may vary. For example: The point of intersection represents the number of months it will take for the costs to be the same at both clubs.

f) Answers may vary. For example: You should join CanFit because it will be cheaper for 1 year.

12. a) $C = 10 + 3n$ **b)** $C = 7 + 4n$ **c)** (3, 19)

d) Answers may vary. For example: The cost is the same at both stores when you rent three video games. The cost is \$19.

13. a) $C = 15h$ **b)** $C = 150$ **c)** (10, 150)

d) Jeff charges the same price for 10 h of work as Hesketh's Snow Removal charges for the season.

14. a) $C = 5000 + 75n$

b) $C = 7500 + 50n$

c) 100

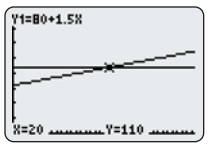
d) Limestone Hall is less expensive for fewer than 100 guests.

e) Answers will vary. For example: convenience of location, parking availability, reputation for good food, attractiveness of the hall

15. a) $E = 80 + 1.50n$

b) $E = 110$

c) 20 pairs of jeans

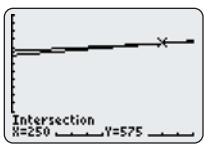


16. \$500 was invested in the account paying 5%/year interest and \$4500 was invested in the GIC paying 7.2%/year interest.

17. a) $C = 525 + 0.20d$

b) $C = 500 + 0.30d$

c)



d) The cost of \$575 is the same when the Clarkes rent the car from either of the two companies and drive 250 km.