1.1 Variables, Expressions, & Equations

Translating Words into Expressions

Student Logbook

1. right
2. area of the square; sum; area of the squares
3. $a^2 + b^2 = c^2$
4. letters; numbers
5. variable
6. numbers, variables, operation symbols
7. equality; expressions
8. equal
9. variable; value of the other

Your Turn

1. **a.** expression
   b. equation
   c. equation
   d. expression
   e. equation
2. $15 - 3x$
3. $z = 7x + 7y$
4. **a.** s (speed)
   b. s (speed) and t (time)
   c. No. In order to calculate the speed, you would need to know both the distance, d, and the time, t.

Applying Properties of Real Numbers

Student Logbook

1. order; answer
2. $4 + 3$, $b + a$
3. multiplication, addition
4. commutative; multiplication
5. $(a + b) + c$
6. changing the order in which they are written
7. parentheses; sum
8. $(a \times b) \times c$
9. $8(5 + 7)$, $8(5) + 8(7)$, $(8 \times 7) + (8 \times 5)$
10. $a(b) + a(c)$

Your Turn

1. **a.** $6 + 4 = 4 + 6$
   b. $3 \times 5 = 5 \times 3$
2. $(3 + 2) + 1 = 3 + (2 + 1)$
3. **a.** $5x + 5y$
   b. $6x + xy$
   c. $3(a - b)$
   d. $2(6m - 3)$, or $12(m - .5)$
4. **a.** $\neq$
   b. $\neq$
   c. $=$
   d. $\neq$

Evaluating & Simplifying Expressions

Student Logbook

1. equivalent or equal; substituting
2. Evaluate
3. term
4. $15n$, $12.5n$
5. coefficient
6. numerical coefficient
7. 15, 12.5, 27.5
8. adding; numerical coefficients
9. variable factors; exponents
10. 1
11. annulus
12. $p(35r^2)$; like terms

Your Turn

1. **a.** 2
   b. 4
   c. 1
   d. 3
2. **a.** $4x^2 + 2x$
   b. $2a + 2ab + 2b$
   c. $11x$
3. **a.** $v = s^3 + \frac{1}{3}(s^2h)$
   b. 1,100 feet^3
4. $c = \frac{1}{2}y(1 + x)$

Unit Assessment

1. **a.** $3n + 1$
   b. $2n^2$
   c. 2^2n^2 or $4n^2$ or $(2n)^2$
2. An algebraic expression is a collection of one or more variables, numbers, and operational symbols. An algebraic equation is a statement of equality between two algebraic expressions, and it must contain an equal sign.
3. **a.** the mass, m
   b. mass, m, and acceleration, a
4. total cost $= 17.90x + 1.00$
5. **a.** 180 square feet − 10 square feet(x)
   b. No. After two weeks, 40 square feet will remain.
6. **a.** $=$
   b. $=$
   c. $\neq$
   d. $\neq$
   e. $=$
7. **a.** $8y$
   b. $26c^3 + 2a^3$
   c. $7a + 3b$
   d. $20x^2$
8. **a.** $p = \$8c - \$95 - \$80e$
   b. \$281; \$153; \$161

Unit Investigation

1. **a.** Answers will vary, but the two numbers (for example $0.5f$ and $4t$) must add up to 250.
   b. $0.5f = x$, where f represents the number of plants and x is the space allocated for plants in step (a). This should be a number from step (a), not a variable, in students' equations.
   c. $4t = y$, where t represents the number of trees and y is the space allocated for trees in step (a). This should be a number from step (a), not a variable, in students' equations.
   d. Answers will vary. Be sure that students apply their equations from steps (b) and (c) correctly.
2. **a.** $0.5(300) + 4t = 250$, so $150 + 4t = 250$
   b. 25 trees
3. **a.** Cost = $5d + 6p + 8g + 10z$
   b. \$48
4. **a.** $12xy$
   b. $\$650 + \$250 + \$12xy$, where $y = 24(8)$, so total cost $= \$900 + \$2304x$
   c. \$5,508
   d. 3 employees would cost \$7,812

1.2 Linear Equations in One Variable

Applying Inverse Operations

Student Logbook

1. equal
2. 6
3. products; equal
4. nonzero
5. solution of an equation
6. subtract; add
7. additive inverse
8. equal
9. identity
10. multiplicative inverse, reciprocal

Your Turn

1. $4x$, or $4x + 6 + (-6)$
2. a, b
3. **a.** Subtract 5 or add -5.
   b. Add 24 or subtract -24.
   c. Multiply by 6 or divide by $\frac{1}{6}$.
   d. Divide by 4 or multiply by $\frac{1}{4}$.
4. $\frac{c}{y} = d$
5. **a.** $3x = \$51.84$
   b. $x = \$17.28$

Transforming Equations Using Multiple Operations

Student Logbook

1. initial
2. $32t = 256$
3. 50
4. property of equality
5. $6y - 15 = 12$
6. variable
7. identity
8. isolate

Your Turn

1. $x = 9$
2. Divide both sides by 15 or multiply both sides by $\frac{1}{15}$.
3. Divide both sides by 8 or use the distributive property on the left side of the equation.
4. c
5. **a.** $2(3b - 2) = 4(b + 0.5)$, or its simplified equivalent
   b. $b = 3$

Solving Absolute Value Equations

Student Logbook

1. grid
2. north; south; east; west
3. distance
4. Find the difference between the coordinates of its endpoints.
5. direction
6. zero
7. zero
8. difference
9. number; opposite
10. geometrically

Your Turn

1. **a.** 5.6
   b. 0.7
   c. 12.3
2. **a.** $n - 6$
   b. $-(n - 6)$
3. **a.** 5
   b. 2
   c. 7, 3
   d. Students' number lines will have the points 3 and 7 plotted.
4. **a.** $|p - 4| = 2$
   b. Students' number lines will have the points 2 and 6 plotted.

Unit Assessment

1. $y = 5$
2. $\frac{(p-2h)}{2} = b$
3. Subtract 5 from both sides; subtract $2w$ from both sides; divide both sides by 3.
4. $x = 21$
5. $15(x + 4) = 12(x + 10)$
6. $x = 20$
7. $x = 2.6$ or 2.4
8. **a.** $-(4x - 3)$
   b. $x = 10$ or -8.5
   c. Students' number lines will have the points 10 and -8.5 plotted.

Unit Investigation

1. **a.** $a = 240$ miles per hour
   b. addition property of equality
2. **a.** subtraction property of equality
   b. simplified
   c. division property of equality
   d. simplified
3. **a.** Divide both sides by 2 or multiply both sides by $\frac{1}{2}$.
   b. subtraction property of equality
   c. Divide both sides by $(l + h)$ or multiply both sides by $\frac{1}{(l + h)}$.
4. $2A = [\frac{(b_1 + b_2)h}{2}](2)$ multiplication property of equality
   $2A = (b_1 + b_2)h$ simplified
   $\frac{2A}{h} = \frac{(b_1 + b_2)h}{h}$ division property of equality
   $\frac{2A}{h} = b_1 + b_2$ simplified
   $\frac{2A}{h} - b_2 = b_1 + b_2 - b_2$ subtraction property of equality
   $\frac{2A}{h} - b_2 = b_1$ simplified
5. $d = 2.249$ or d = 2.251

2.1 The Rectangular Coordinate Plane

Graphing Ordered Pairs

Student Logbook

1. x
2. y
3. 0
4. upper right: I; upper left: II; lower left: III; lower right: IV
5. horizontal
6. vertical
7. independent; dependent
8. dependent; depends
9. correlation
10. positive; negative; no

Your Turn

1. A (−6, −3), III; B (7, 5), I; C (2, −8), IV
2. Graphs will vary: sample graph would have increments of 2 on the x-axis and increments of 5 on the y-axis; points should be labeled and correctly graphed.
3. negative correlation

Defining Slope

Student Logbook

1. 2
2. steepness
3. ratio; rise; run
4. rise; run
5. coordinates; difference; x-coordinates; y-coordinates
6. $\frac{(100 - 200)}{(2 - 4)}$ or $\frac{(200 - 100)}{(4 - 2)}$ $\frac{(y_1 - y_2)}{(x_1 - x_2)}$; $\frac{(y_2 - y_1)}{(x_2 - x_1)}$
7. positive; negative
8. 0
9. undefined; undefined

Your Turn

1. It will fall to the right.
2. **a.** time in hours
   b. test scores
   c. 20
   d. 0.5
   e. $\frac{20}{0.5}$
   f. 40
   g. increase; 40
   h. positive
3. **a.** −1
   b. 0
   c. undefined

Finding x- & y-intercepts

Student Logbook

1. linear; broken-line
2. vertical
3. horizontal

4. collinear; same

5. Calculate the slope between points A and B, and B and C. If the slopes are the same, they are collinear.

6. The cab was stopped.

7. $-\frac{1}{2}$; returned to its starting place

8. 2

Your Turn

1. a. The vertical intercept is 500.

   b. The horizontal intercept is 6.

   c. 1,500; 1,000; 500; 0; −1,000; −2,500

   d. None of the points are collinear.

   e. 2,500 feet (they began at 500 feet)

   f. The hikers remained at the same elevation. If they hiked, they did not change their elevation.

   g. The negative slope indicates that the hikers were returning to their starting altitude.

Unit Assessment

1. A (4, 2), I; B (1, −3), IV; C (−3, 1), II; D (−2, −5), III

2. no correlation; negative correlation

3. a. 3

   b. −4

4. line a: zero slope; line b: negative slope; line c: undefined

5. a. x-intercept = 5; y-intercept = 1

   b. x-intercept = 6; y-intercept = 3

6. a. No

   b. Yes

   c. If the slopes are equal, then the points are collinear.

7. a. 1,500 feet

   b. 30 minutes

   c. −50

   d. The plane is descending.

Unit Investigation

1. a. Graphs will vary; linear if slopes are all the same, broken-line if not.

   b. quadrant I

   c. Answers will vary; however, $0 < x < 5$ and $0 < y$.

   d. Answers will vary.

   e. Slopes will vary; however, the slope should be positive since the temperatures are steadily increasing.

   f. Answers will vary; however, the y-intercept is at the starting point, and the x-intercepts could be multiple.

2. a. Graphs will vary; linear if slopes are all the same, broken-line if not.

   b. quadrant IV

   c. Answers will vary; however, at no time is $x \geq 0$ because all the temperatures are negative.

   d. Answers will vary.

   e. Answers will vary.

   f. Answers will vary; however, the y-intercept is at the beginning, and there should be no x-intercepts.

   Descriptions of graphs will vary. Characteristics such as slope, collinear points, and x- and y- intercepts should be discussed in terms of the temperature.

   Yes. Though all temperatures are below zero, the temperature could still increase on a daily basis.

3. This graph would have temperatures that are both above and below 0°F; therefore, the coordinates would lie in quadrants I and IV. The graph could be a linear or a broken-line graph. The slope and the x- and y-intercepts would depend on the actual temperatures. There may be more than one x-intercept if the temperature equals 0 more than once.

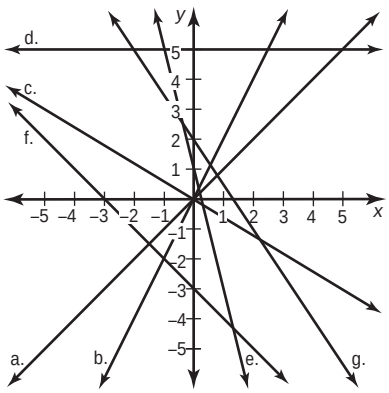
2.2 Introduction to Functions

Exploring the Slope-Intercept Equation of a Line

Student Logbook

1. collinear
2. Find the slopes between the pairs of points. If the slopes are the same, then the points are collinear.
3. slope; parallel
4. Use the slope formula to find the slope of the line between (0, 0) and the chosen point. Use the value of the slope for m in the equation $y = mx$.
5. m; y-intercept; b
6. Use the slope formula to find the slope of the line, m, and find the y-intercept, then use these values for m and b in the equation $y = mx + b$.
7. 0; b; 0
8. 0; m; 0; $y = b$; y-intercept

Your Turn

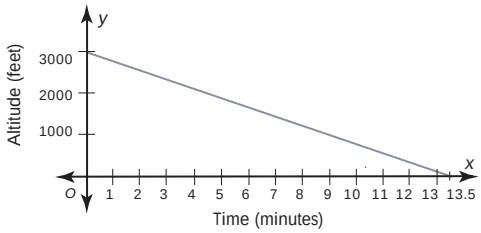
1. **a.** 1; 0 **b.** 2; 0 **c.** $-\frac{3}{5}$; 0
   d. 0; 5 **e.** -4; 1 **f.** -1; -3
   g. $-\frac{3}{2}$; 2
2. 

Exploring the Point-Slope Equation of a Line

Student Logbook

1. horizontal, or x
2. vertical, or y
3. slope; line
4. Add the rise (numerator of the slope) to the y-value of the point, and add the run (denominator of the slope) to the x-value.
5. collinear
6. The difference between the x-values cannot be equal to zero. (That is, the x-values cannot be the same.)
7. point-slope; line; a specific point; the slope; any point on the line
8. 0; x; simplifying into slope-intercept form
9. Substitute the value for x, and solve the equation for y.

Your Turn

1. -200
2. Sample: (1, 2,500)
3. 2,700; y-intercept
4. $y - 2{,}500 = -200(x - 1)$
5. 13.5 minutes
6. 

Relations & Functions

Student Logbook

1. function; 1
2. domain; function
3. range; function
4. linear
5. no; some values may not be in the function's range.
6. range; domain (or y; x)
7. the distance from 0
8. one; two; range; domain
9. relation; function
10. relations; relations; functions

Your Turn

1.

Slope	Point	Equation
$\frac{1}{2}$	(0, 5)	$f(x) = \frac{1}{2}x + 5$
-3	$(-5, -6)$	$f(x) = -3x - 21$
$-\frac{2}{3}$	(3, 0)	$f(x) = -\frac{2}{3}x + 2$
22	(0, 11)	$f(x) = 22x + 11$

2. domain: numbers between 0 and 16.67
range: numbers between 2.00 and 22.00

3. the amount spent if the price of the goods purchased was $10.00

4. $12.80

5. Solutions will vary. See students' graphs.

6. Solutions will vary. See students' graphs.

Unit Assessment

1. $y = 3x$

2. $y + 3 = -\frac{3}{5}(x - 5)$; or $y - 0 = -\frac{3}{5}(x - 0)$

3. 4; -12

4. $y = \frac{8}{3}x - 6$

5. Solutions will vary for the point on the line; examples are given.

Equation of the line	Slope	Point on the line
$y + 14 = 0.3(x - 78)$	0.3	(78, -14)
$y = \frac{5}{3}x + 2$	$\frac{5}{3}$	(0, 2)
$y - 7 = 7(x + 44)$	7	(-44, 7)

6. a special relation in which each first value (or x-value) has one second value (or y-value)

7. Graphs and explanations will vary.

8. a

9.

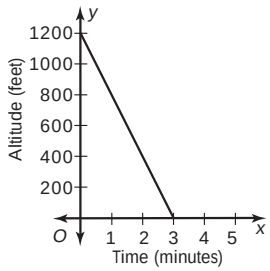
Linear function	$g(2) =$	$g(x) = 18$, $x =$
$g(x) = \frac{1}{2}x + 3$	4	30
$g(x) = 2(x - 2) + 1$	1	10.5
$g(x) = 18$	18	1

10. a. 1,200 feet

b. -400 feet per minute (or descending at 400 feet per minute)

c. altitude after 2 minutes

d.



Unit Investigation

1. The graphs of all functions will have a small positive slope (so the lines increase but are shallow). The graphs of all functions will have a positive y-intercept.

2. -2 to 6; -2 to 30

3.

Newborn	Length at birth (inches)	Rate of growth (inches/week)
A	17	0.50
B	19	0.45
C	21	0.30
D	20.5	0.35

4. a. length at birth

b. rate of growth

c. A: $h = 0.50w + 17$

d. C: $h = 0.30w + 21$

e. Solutions will vary. An example is: $h = 0.25w + 16$. (The slope must be less than 0.30 and y-intercept less than 17.)

5.

Week	*Length*	*Week*	*Length*
1	*17.5*	*5*	*19.5*
2	*18*	*6*	*20*
3	*18.5*	*7*	*20.5*
4	*19*	*8*	*21*

6. This models the early growth of infants. Sample: A 15-year-old has lived at least 780 weeks. The model for infant A would predict the 15-year-old to be 407 inches tall. The model does not predict height accurately.

3.1 Graphic Solutions of Linear Systems

Finding the Point of Intersection

Student Logbook

1. independent; dependent

2. solve; simultaneous equations

3. intersect

4. set; simultaneous equations

5. substitute

6. distance; location, or route

7. Step 1: Express each side as a function; Step 2: Find the point of intersection of the two lines; Step 3: Identify the value of the first coordinate as the solution.

Your Turn

1. a. $y = x - 2$, $y = -x + 4$; (3, 1)

b. $y = -2x + 3$, $y = \frac{1}{2}x - 2$; (2, −1)

c. $y = -2x + 4$, $y = 6x - 4$; (1, 2)

2. a. $d = \frac{1}{15}t$

b. $d = \frac{2}{15}t - 2$

c. (30, 2)

d. line a: $d = \frac{1}{15}t$; $2 = \frac{1}{15}(30)$; $2 = \frac{30}{15}$; $2 = 2$;
line b: $d = \frac{2}{15}t - 2$; $2 = \frac{2}{15}(30) - 2$;
$2 = \frac{60}{15} - 2$; $2 = 4 - 2$; $2 = 2$

3. a. $y = 2.9x - 5$ and $y = 3 - 0.3x$

b. (2.5, 2.25)

c. 2.5

Graphing Parallel & Perpendicular Lines

Student Logbook

1. perpendicular

2. x-axis; 0; y-axis; undefined

3. −1

4. negative reciprocal

5. They are negative reciprocals.

6. Parallel lines

7. They are equal.

8. vertical distance; constant

9. Sample answer: Find the absolute value of the difference between their y-intercepts.

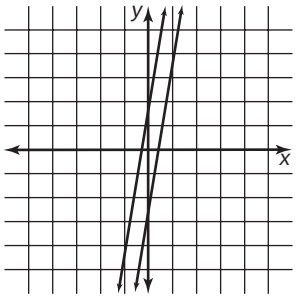
Your Turn

1. a: 3; b: −3; c: $-\frac{1}{3}$; d: $\frac{1}{3}$; e: $\frac{1}{3}$

2. lines d and e

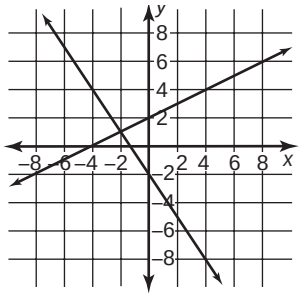
3. lines a and c, lines b and d, lines b and e

4. no



Unit Assessment

1. a.



b. (−2, 1)

2. a. Line a: $y = -x$; line b: $y = -2x + 4$

b. (4, −4)

c. $y = -x$
$-4 = -(4)$ $-4 = -4$
and
$y = -2x + 4$
$-4 = -2(4) + 4$
$-4 = -8 + 4$
$-4 = -4$

3. The point of intersection represents the number of items for which the production costs are equal for both Item A and Item B.

4. a. neither **b.** parallel

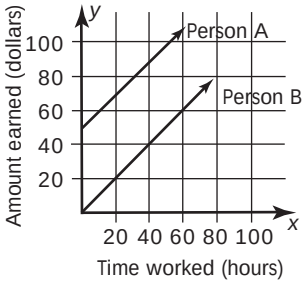
c. neither **d.** perpendicular

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

6. $y = \frac{3}{5}x - \frac{16}{5}$

7. No. Both employees earn the same hourly rate and employee A had already earned $50 when employee B began.
$y = 50 + 10x$ and $y = 10x$;

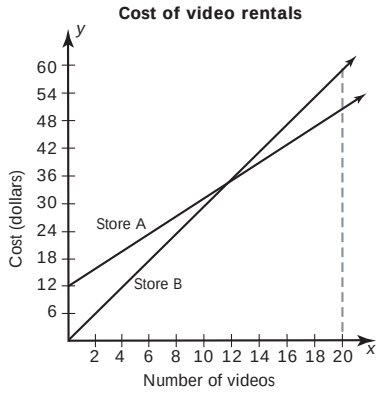
Money earned by two persons



Unit Investigation

1. $y = 2x + 12$; $y = 3x$

2.



3. \$32; \$30

4. Store B

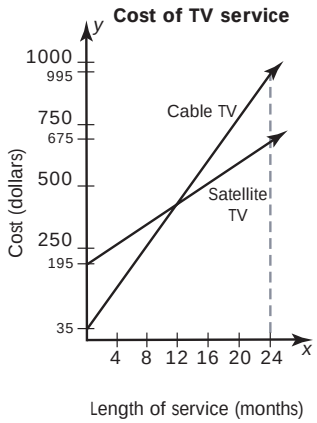
5. Store A; because it is less expensive

6. \$36, \$36

7. 12; at the point of intersection, (12, 36)

8. $y = 40x + 35$; $y = 20x + 195$

9.



10. \$115; \$235

11. Cable TV company

12. Satellite TV company because it is less expensive

13. \$355 for each one

14. 8; at the point of intersection, (8, 355)

3.2 Algebraic Solutions of Linear Systems

Using Substitution to Eliminate a Variable

Student Logbook

1. graph; axis

2. solution; point of intersection; equal; intersection

3. the equation of the two lines

4. Simplify the equation on each side, then isolate *t*.

5. You can find the *c*-coordinate (cost). Substitute the value of *t* into the equation.

6. substitute; identity

7. Substitute *y* for the value of $4x$ in the second equation, and then solve for *x*.

Your Turn

1. a. (20, 30)

b. (20.25, 30.25)

2. a. $x = -\frac{6}{7}$

b. $y = -\frac{18}{7}$

c. $x = -\frac{6}{7}$, $y = -\frac{18}{7}$

3. a. $d_1 = \frac{1}{2}t + 200$

b. $d_2 = 40t$

c. in 5.06 seconds, or $t = \frac{200}{39.5}$ seconds

Using Addition or Subtraction to Eliminate a Variable

Student Logbook

1. equal; same

2. quantities; quantities; equal

3. eliminate

4. Substitute the value of *x* into either of the original equations.

5. multiply; addition; subtraction

6. graphing

7. algebra

8. substitution; addition

Your Turn

1. $x = \frac{7}{3}$, $y = -\frac{1}{3}$
2. $x = -1$, $y = \frac{5}{4}$
3. -2
4. $y = -2$, $x = 11$
5. 5
6. $x = \frac{4}{5}$, $y = \frac{1}{25}$
7. \$50/day; \$25/day

Unit Assessment

1. (40, 20)
2. (−3, −5)
3. **a.** Substitute $3x$ for the value of y in the second equation. Now that the equation has only one variable, x, solve for x. Substitute the value for x into the original equation ($y = 3x$). Using simple arithmetic, solve for y. Check your solution by substituting the values of x and y into both equations and solving. The result should be an identity for each linear equation.

   b. Subtract or multiply by −1, then add the two equations together to cancel the y terms. Solve for x. Substitute the value of x into one of the equations and solve for y.

   c. Multiply one of the equations by −1, then add the equations to cancel the y terms. Substitute the value of x to solve for y.
4. (3, 9)
5. (−11, 10)
6. (1, −3)
7. **a.** 15 minutes

   b. 25 gallons
8. **a.** $2c + 3p = 180$

   b. $3c - 4p = 100$

   c. copper bowl: 60 marbles; porcelain bowl: 20 marbles

Unit Investigation

1. Graphs will vary; however, the point of intersection of the two lines should be (20, 4,000).
2. the line for Car A; The steeper the slope, the larger each payment is with respect to the overall cost of the car.
3. Estimates will vary but should be close to (20, 4,000). If they are not, the student should check to see if the lines are graphed correctly.
4. $m = 200m$; $4m = 600m + 4{,}000$, or $m = 150m + 1{,}000$
5. (20, 4,000)
6. Car A costs \$4,000, while Car B costs \$16,000. It takes 20 months to pay for both cars. Answers for comparisons will depend on how good the students' estimates for Question 3 are.
7. $17{,}000 - 3{,}000 = 200x$
8. 70 months, or 5 years and 10 months
9. $17{,}000 - 3{,}000 = 36m$
   $m \approx 388.89$
10. $3{,}000 + 200(12)(5) = p$
11. $15{,}000 = p$
12. $m \approx 333.33$

4.1 Inequalities in One Variable

Applying Inverse Operations

Student Logbook

1. polygon; equal
2. $<$, $>$
3. equal; not equal
4. greater than; less than
5. less than
6. $r < b$ or $r = b$ or $r > b$
7. equal; preserved
8. solution set
9. multiplying, dividing, negative
10. add 10 to both sides

Your Turn

1. **a.** $x < -\frac{11}{3}$ **b.** $x > 12$

   c. $x < -2$ **d.** $x > \frac{14}{3}$
2. Answers will include numbers from the following solutions.

   $r \geq -\frac{1}{3}$ $k < -4$ $p < 4$ $d \leq 7$

3. a. The gym must have at least 320 members to keep all six classes.

   b. 4 classes

Graphing Solutions on a Number Line

Student Logbook

1. number line
2. Number lines should have an empty circle at 5 with a shaded arrow pointing to the right.
3. endpoint
4. intersection; elements; both sets
5. compound inequality
6. intersect; no
7. empty set
8. union
9. union; intersection

Your Turn

1. a. Number lines should have a filled circle at -3 with a shaded arrow pointing to the right.

   b. Number lines should have an empty circle at -4 and a filled circle at 4, with the segment between them shaded.

   c. Number lines should have a filled circle at 6 with a shaded arrow pointing to the left and a circle at 8 with a shaded arrow pointing to the right.
2. $15 \leq s < 25$
3. Number lines for a–c should have filled circles at 15, 5, and 30 respectively, with shaded arrows pointing to the left from each point.

Solving Absolute Value Inequalities

Student Logbook

1. 63%; 67%
2. $63 \leq r \leq 67$
3. absolute value
4. $|r - 65| \leq 2$
5. inside; outside
6. midpoint
7. average; endpoints
8. complement
9. $|h - 16| \geq 8$
10. $h - 16$; $-(h - 16)$

Your Turn

1. a. $n > 7$ OR $n < -1$

   b. Number lines should have an empty circle at 7 with a shaded arrow pointing to the right and an empty circle on -1 with a shaded arrow pointing to the left.
2. $|t - 47| < 5$
3. $|p - 13.5| < 4.5$
4. $|d - 8| > 6$
5. $|t - 73| \leq 5$
6. $|c - 11| \leq 1$

Unit Assessment

1. a. $m < -8$

   b. $y \geq 7$

   c. $f < 5$

   d. $u \leq -1$
2. a. Number lines should have an empty circle at -1 and a shaded arrow pointing to the left.

   b. Number lines should have filled circles at 3 and 5 with the segment between them shaded.

   c. Number lines should have open circles at 6 and 10 with the segment between them shaded.
3. $t \leq 5$ OR $t > 15$
4. Number lines should have an empty circle at 5 and a filled circle at 15 with the segment between them shaded.
5. $|x - 75| \leq 4$
6. a. 7

   b. $|x - 7| \leq 3$
7. $|d - 75| < 45$
8. a. $3s < 80$, or $s < \frac{80}{3}$

   b. $c < \frac{140}{3}$

   c. $|s - 180| \leq 12$

Unit Investigation

1. Any weight greater than 0 and less than or equal to 50; $0 < x \leq 50$
2. Number lines should have an empty circle at 0 and a filled circle at 95 with the segment between them shaded.
3. $w > 120$
4. 2; sizes 4 and 5
5. $|d - 2| \leq 1$
6. Number lines should have filled circles at 1 and 10 with the segment between them shaded.
7. $25.85
8. 17 boxes

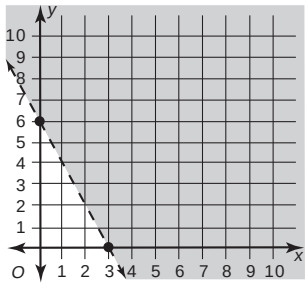
4.2 Inequalities in Two Variables

Graphing Solutions on a Rectangular Coordinate Plane

Student Logbook

1. half-plane
2. boundary
3. $y = -x + 16$
4. inequality
5. solution
6. shading
7. solid; dashed
8. boundary; region
9. substitute
10. solution; linear inequality, or a solution set

Your Turn

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

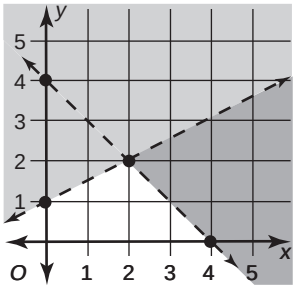
3. a. $y \leq -\frac{5}{2}x + 500$
   b. Answers will vary; see students' work.
   c. Answers will vary; see students' work.

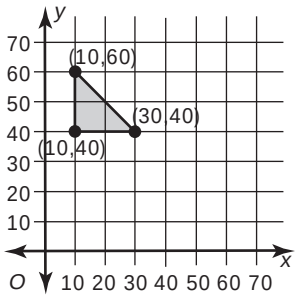
Solving Systems by Graphing

Student Logbook

1. more than
2. overlapping
3. satisfy
4. intersection
5. solution
6. Constraints
7. feasible region
8. Linear programming
9. vertices

Your Turn

1. 

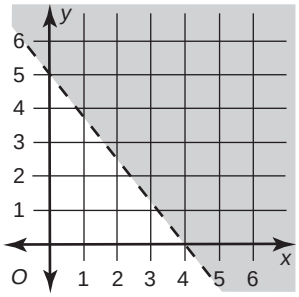
2. $2x + y \leq 8$; $2x + y \geq 4$; $x \geq 0$; $y \geq 0$
3. a. $x + y \leq 70$, $x \geq 10$, and $y \geq 40$
   b. 

   c. (10, 60), (10, 40), (30, 40)
   d. Only positive integer values make sense because it is not possible to have part of a shed.

Unit Assessment

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

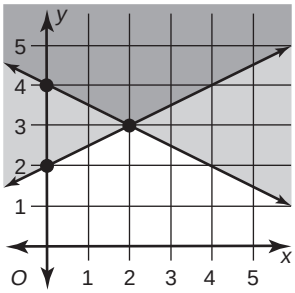
2.



3. B, C

4. $y = -\frac{2}{3}x + 4$ and $y = \frac{1}{2}x + 2$

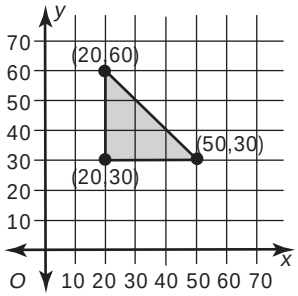
5.



6. a.–b. Answers will vary.

7. a. $d + t \leq 80$, $d \geq 20$, $t \geq 30$

b.



c. (20, 30), (20, 60), (50, 30)

d. 20 desks

e. 60 tables

f. $22,000

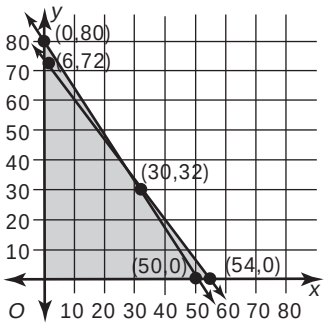
Unit Investigation

1. $40x + 30y \leq 2160$

2. $400x + 250y \leq 20{,}000$

3. $x \geq 0$, $y \geq 0$; because the firm cannot produce a negative number of a product

4.



5. (30, 32)

6. (0, 0), (50, 0), (30, 32), and (0, 72)

7. 72

8. $P = 300x + 220y$

9. $15,840

10. No. The company should produce 30 deluxe and 32 standard models in order to maximize profit. Student work should show substitution of coordinates of vertices into the profit equation to find the maximum.

11. $16,040

12. Answers will vary.