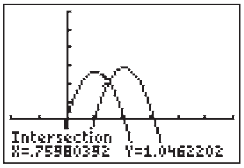
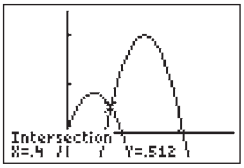
Chapter 8 Practice Test, pages 459 to 460

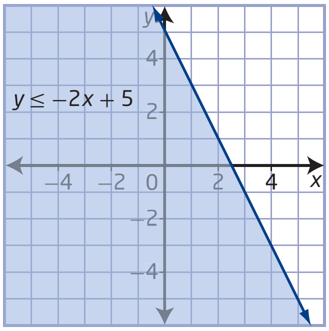
1. C
2. C
3. B
4. D
5. D
6. $n = -4$
7. a) $\left(\frac{3}{4}, -\frac{35}{16}\right)$ and $(-2, -7)$ **b)** $(1, -4)$
8. a)


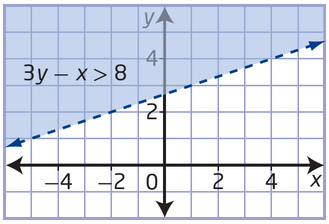
$(0.76, 1.05)$
b) Example: At this time, 0.76 s after Sophie starts her jump, both dancers are at the same height above the ground.
9. a) perimeter: $8y = 4x + 28$
area: $6y + 3 = x^2 + 14x + 48$
b) The perimeter is 16 m. The area is 15 m^2.
10. a) $y = \frac{1}{3}x^2$ and $y = \frac{1}{2}(x - 1)^2$
b) $(5.45, 9.90)$ and $(0.55, 0.10)$
11. a)


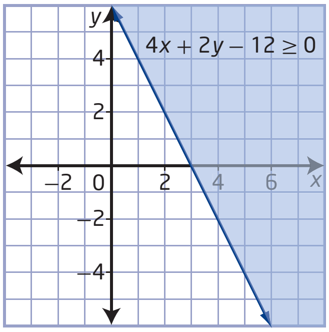
b) Example: At this point, a horizontal distance of 0.4 cm and a vertical distance of 0.512 cm from the start of the jump, the second part of the jump begins.
12. A$(-3.52, 0)$, B$(7.52, 0)$, C$(6.03, 14.29)$
area = 78.88 square units

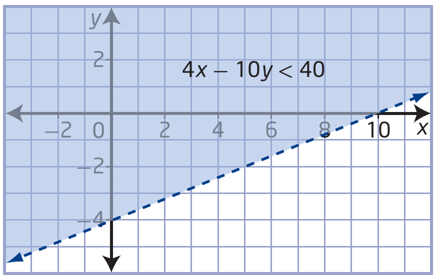
Chapter 9 Linear and Quadratic Inequalities

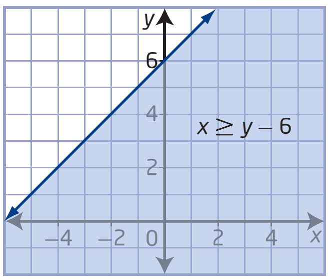
9.1 Linear Inequalities in Two Variables, pages 472 to 475

1. a) $(6, 7)$, $(12, 9)$
b) $(-6, -12)$, $(4, -1)$, $(8, -2)$
c) $(12, -4)$, $(5, 1)$ **d)** $(3, 1)$, $(6, -4)$
2. a) $(1, 0)$, $(-2, 1)$ **b)** $(-5, 8)$, $(4, 1)$
c) $(5, 1)$ **d)** $(3, -1)$
3. a) $y \leq x + 3$; slope of 1; y-intercept of 3; the boundary is a solid line.
b) $y > 3x + 5$; slope of 3; y-intercept of 5; the boundary is a dashed line.
c) $y > -4x + 7$; slope of -4; y-intercept of 7; the boundary is a dashed line.
d) $y \geq 2x - 10$; slope of 2; y-intercept of -10; the boundary is a solid line.
e) $y \geq -\frac{4}{5}x + 4$; slope of $-\frac{4}{5}$; y-intercept of 4; the boundary is a solid line.
f) $y > \frac{1}{2}x - 5$; slope of $\frac{1}{2}$; y-intercept of -5; the boundary is a dashed line.
4. a)


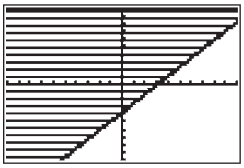
b)


c)


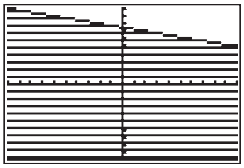
d)


e)


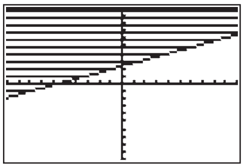
5. a) $y \geq \frac{6}{5}x - \frac{18}{5}$



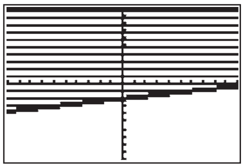
b) $y < -\frac{1}{4}x + \frac{15}{2}$



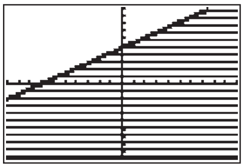
c) $y > \frac{5}{12}x + \frac{7}{3}$



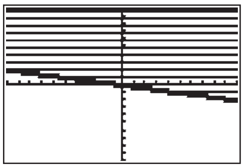
d) $y \geq \frac{1}{6}x - \frac{11}{6}$



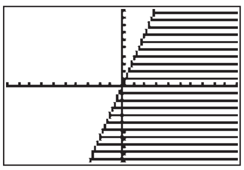
e) $y \leq \frac{36}{53}x + \frac{260}{53}$



6. $y \geq -\frac{1}{5}x$

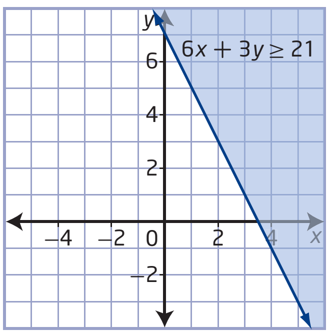


7. $y < \frac{7}{2}x$

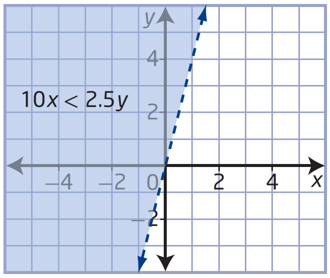


8. Examples:

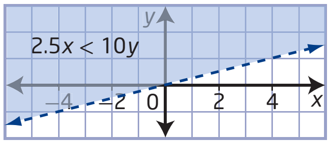
a) Graph by hand because the slope and the y-intercept are whole numbers.



b) Graph by hand because the slope and the y-intercept are whole numbers.

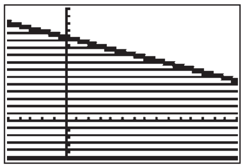


c) Graph by hand because the slope is a simple fraction and the y-intercept is 0.

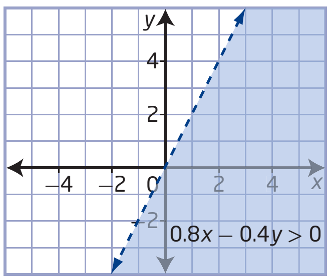


d) Graph using technology because the slope and the y-intercept are complicated fractions.

$y \leq -\frac{489}{1279}x + \frac{14\,500}{1279}$



e) Graph by hand because the slope and the y-intercept are whole numbers.



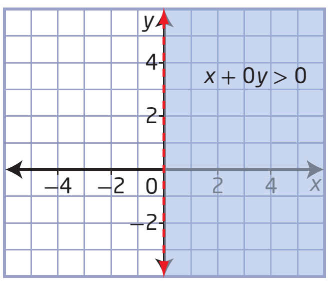
9. a) $y < \frac{1}{4}x + 2$

b) $y < -\frac{1}{4}x$

c) $y > \frac{3}{2}x - 4$

d) $y \leq -\frac{3}{4}x + 5$

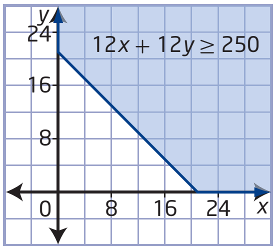
10.



The graph of this solution is everything to the right of the y-axis.

11. a) $12x + 12y \geq 250$, where x represents the number of moccasins sold, $x \geq 0$, and y represents the hours worked, $y \geq 0$.

b)

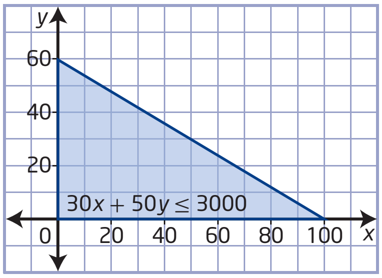


c) Example: (4, 20), (8, 16), (12, 12)

d) Example: If she loses her job, then she will still have a source of income.

12. a) $30x + 50y \leq 3000$, $x \geq 0$, $y \geq 0$, where x represents the hours of work and y represents the hours of marketing assistance.

b)



13. $0.3x + 0.05y \leq 100$, $x \geq 0$, $y \geq 0$, where x represents the number of minutes used and y represents the megabytes of data used; she should stay without a plan if her usage stays in the region described by the inequality.

14. $60x + 45y \leq 50$, $x \geq 0$, $y \geq 0$, where x represents the area of glass and y represents the mass of nanomaterial.

15. $125x + 55y \leq 7000$, $x \geq 0$, $y \geq 0$, where x represents the hours of ice rental and y represents the hours of gym rental.

16. Example:

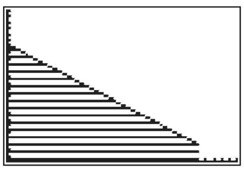
a) $y = x^2$ **b)** $y \geq x^2$; $y < x^2$

c) This does satisfy the definition of a solution region. The boundary is a curve not a line.

17. $y \geq \frac{3}{4}x + 384$, $0 \leq x \leq 512$; $y \leq -\frac{3}{4}x + 384$, $0 \leq x \leq 512$; $y \geq -\frac{3}{4}x + 1152$, $512 \leq x \leq 1024$; $y \leq \frac{3}{4}x - 384$, $512 \leq x \leq 1024$

18. Step 1 $60x + 90y \leq 35\ 000$

Step 2 $y \leq -\frac{2}{3}x + \frac{3500}{9}$, $0 \leq x \leq 500$, $y \geq 0$



(0, 0), approximately (0, 388.9) and (500, 55.6), and (500, 0); y-intercept: the maximum number of megawatt hours of wind power that can be produced; x-intercept: the maximum number of megawatt hours of hydroelectric power that can be produced

Step 3 Example: It would be very time-consuming to attempt to find the revenue for all possible combinations of power generation. You cannot be certain that the spreadsheet gives the maximum revenue.

Step 4 The maximum revenue is \$53 338, with 500 MWh of hydroelectric power and approximately 55.6 MWh of wind power.

19. Example:

	Example 1	Example 2	Example 3	Example 4
Linear Inequality	$y \geq x$	$y \leq x$	$y > x$	$y < x$
Inequality Sign	$\geq$	$\leq$	$>$	$<$
Boundary Solid/Dashed	Solid	Solid	Dashed	Dashed
Shaded Region	Above	Below	Above	Below

20. Example: Any scenario with a solution that has the form $5y + 3x \leq 150$, $x \geq 0$, $y \geq 0$ is correct.

21. a) 48 units^2

b) The y-intercept is the height of the triangle. The larger it gets, the larger the area gets.

c) The slope of the inequality dictates where the x-intercept will be, which is the base of the triangle. Steeper slope gives a closer x-intercept, which gives a smaller area.

d) If you consider the magnitude, then nothing changes.

9.2 Quadratic Inequalities in One Variable, pages 484 to 487

1. a) $\{x \mid 1 \leq x \leq 3, x \in \mathrm{R}\}$

b) $\{x \mid x \leq 1 \text{ or } x \geq 3, x \in \mathrm{R}\}$

c) $\{x \mid x < 1 \text{ or } x > 3, x \in \mathrm{R}\}$

d) $\{x \mid 1 < x < 3, x \in \mathrm{R}\}$

2. a) $\{x \mid x \in \mathrm{R}\}$ **b)** $\{x \mid x = 2, x \in \mathrm{R}\}$

c) no solution **d)** $\{x \mid x \neq 2, x \in \mathrm{R}\}$

3. a) not a solution **b)** solution

c) solution **d)** not a solution

4. a) $\{x \mid x \leq -10 \text{ or } x \geq 4, x \in \mathrm{R}\}$

b) $\{x \mid x < -12 \text{ or } x > -2, x \in \mathrm{R}\}$

c) $\left\{x \mid x < -\frac{5}{3} \text{ or } x > \frac{7}{2}, x \in \mathrm{R}\right\}$

d) $\left\{x \mid -2 - \frac{\sqrt{6}}{2} \leq x \leq 2 + \frac{\sqrt{6}}{2}, x \in \mathrm{R}\right\}$

5. a) $\{x \mid -6 \le x \le 3, x \in R\}$
b) $\{x \mid x \le -3 \text{ or } x \ge -1, x \in R\}$
c) $\left\{x \mid \frac{3}{4} < x < 6, x \in R\right\}$
d) $\{x \mid -8 \le x \le 2, x \in R\}$

6. a) $\{x \mid -3 < x < 5, x \in R\}$
b) $\{x \mid x < -12 \text{ or } x > -1, x \in R\}$
c) $\{x \mid x \le 1 - \sqrt{6} \text{ or } x \ge 1 + \sqrt{6}, x \in R\}$
d) $\left\{x \mid x \le -8 \text{ or } x \ge \frac{1}{2}, x \in R\right\}$

7. a) $\{x \mid -8 \le x \le -6, x \in R\}$
b) $\{x \mid x \le -4 \text{ or } x \ge 7, x \in R\}$
c) There is no solution.
d) $\{x \mid x < -\frac{7}{2} \text{ or } x > \frac{9}{2}, x \in R\}$

8. a) $\{x \mid 2 < x < 8, x \in R\}$
Example: Use graphing because it is a simple graph to draw.
b) $\left\{x \mid x \le -\frac{3}{4} \text{ or } x \ge \frac{5}{3}, x \in R\right\}$
Example: Use sign analysis because it is easy to factor.
c) $\{x \mid 1 - \sqrt{13} \le x \le 1 + \sqrt{13}, x \in R\}$
Example: Use test points and the zeros.
d) $\{x \mid x \ne 3, x \in R\}$
Example: Use case analysis because it is easy to factor and solve for the inequalities.

9. a) $\left\{x \mid \frac{13 - \sqrt{145}}{2} \le x \le \frac{13 + \sqrt{145}}{2}, x \in R\right\}$
b) $\{x \mid x < -12 \text{ or } x > 2, x \in R\}$
c) $\left\{x \mid x < \frac{5}{2} \text{ or } x > 4, x \in R\right\}$
d) $\left\{x \mid x \le -\frac{8}{3} \text{ or } x \ge \frac{7}{2}, x \in R\right\}$

10. a) Ice equal to or thicker than $\frac{5\sqrt{30}}{3}$ cm, or about 9.13 cm, will support the weight of a vehicle.
b) $9h^2 \ge 1500$
c) Ice equal to or thicker than $\frac{10\sqrt{15}}{3}$ cm, or about 12.91 cm, will support the weight of a vehicle.
d) Example: The relationship between ice strength and thickness is not linear.

11. a) $\pi x^2 \le 630\,000$, where x represents the radius, in metres.
b) $0 \le x \le \sqrt{\frac{630\,000}{\pi}}$ c) $0 \text{ m} \le x \le 447.81 \text{ m}$

12. a) 2 years or more
b) One of the solutions is negative, which does not make sense in this problem. Time cannot be negative.
c) $-t^2 + 14 \le 5$; $t \ge 3$; 3 years or more

13. $\frac{x^2}{2} + x \ge 4$; the shorter leg should be greater than or equal to 2 cm.

14. a) $a > 0$; $b^2 - 4ac \le 0$ b) $a < 0$; $b^2 - 4ac = 0$
c) $a \ne 0$; $b^2 - 4ac > 0$

15. Examples:
a) $x^2 - 5x - 14 \le 0$ b) $x^2 - 11x + 10 > 0$
c) $3x^2 - 23x + 30 \le 0$ d) $20x^2 + 19x + 3 > 0$
e) $x^2 + 6x + 2 \ge 0$ f) $x^2 + 1 > 0$
g) $x^2 + 1 < 0$

16. $\{x \mid x \le -\sqrt{6} \text{ or } -\sqrt{2} \le x \le \sqrt{2} \text{ or } x \ge \sqrt{6}, x \in R\}$

17. a) It is the solution because it is the set of values for which the parabola lies above the line.
b) $-x^2 + 13x - 12 \ge 0$
c) $\{x \mid 1 \le x \le 12, x \in R\}$
d) They are the same solutions. The inequality was just rearranged in part c).

18. They all require this step because you need the related function to work with.

19. Answers may vary.

20. a) The solution is incorrect. He switched the inequality sign when he added 2 to both sides in the first step.
b) $\{x \mid -3 \le x \le -2, x \in R\}$

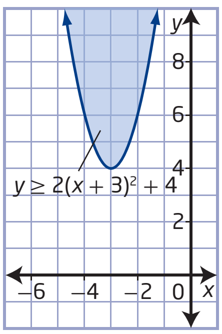
9.3 Quadratic Inequalities in Two Variables, pages 496 to 500

1. a) (2, 6), (−1, 3)
b) (2, −2), (0, −6), (−2, −15)
c) None
d) (−4, 2), (1, 3.5), (3, 2.5)

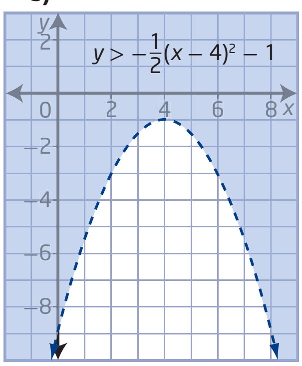
2. a) (0, 1), (1, 0), (3, 6), (−2, 15)
b) (−2, −3), (0, −8)
c) (2, 9)
d) (−2, 2), (−3, −2)

3. a) $y < -x^2 - 4x + 5$ b) $y \le \frac{1}{2}x^2 - x + 3$
c) $y \ge -\frac{1}{4}x^2 - x + 3$ d) $y > 4x^2 + 5x - 6$

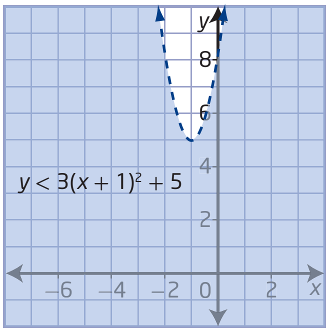
4. a)



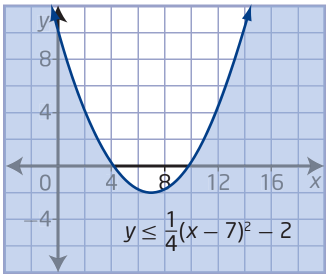
b)



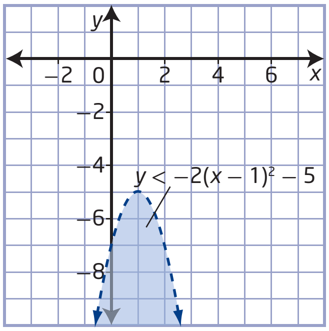
c)



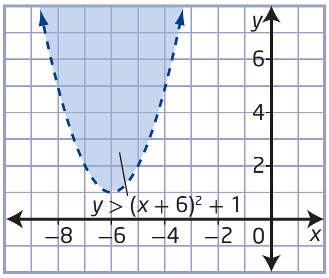
d)



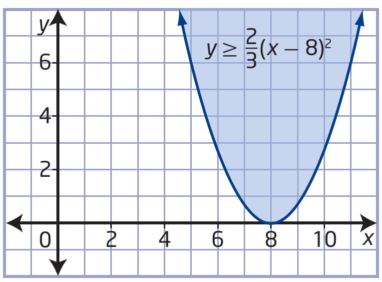
5. a)



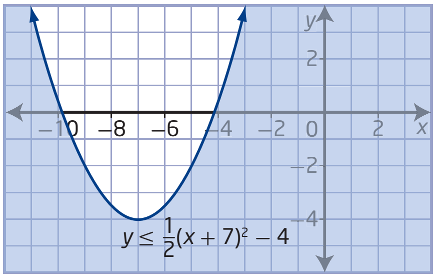
b)



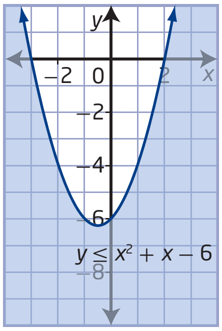
c)



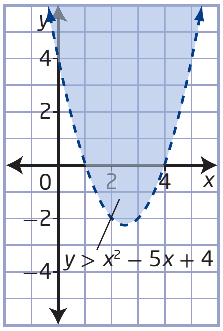
d)



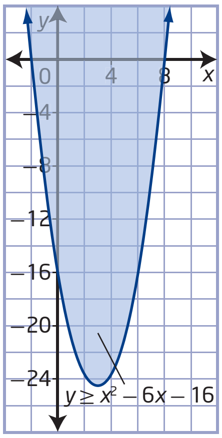
6. a)



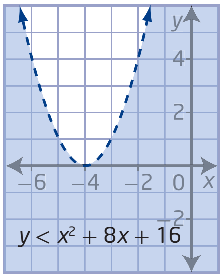
b)



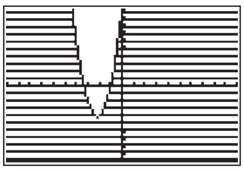
c)



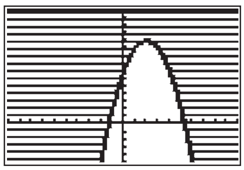
d)



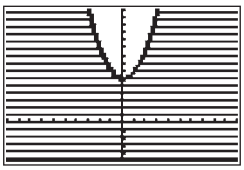
7. a) $y < 3x^2 + 13x + 10$



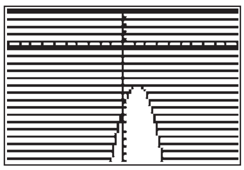
b) $y \geq -x^2 + 4x + 7$



c) $y \leq x^2 + 6$



d) $y > -2x^2 + 5x - 8$



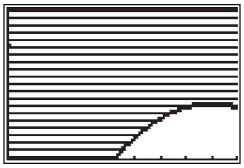
8. a) $y \geq \frac{1}{2}x^2 + 1$

b) $y > -\frac{1}{3}(x - 1)^2 + 3$

9. a) $y = -\frac{1}{625}(x - 50)^2 + 4$

b) $y < -\frac{1}{625}(x - 50)^2 + 4,\ 0 \le x \le 100$

10. a) $L \ge -0.000\,125a^2 + 0.040a - 2.442,$
$0 \le a \le 180,\ L \ge 0$



b) any angle greater than or equal to approximately 114.6° and less than or equal to 180°

11. a) $y < -0.03x^2 + 0.84x - 0.08$

b) $0 \le -0.03x^2 + 0.84x - 0.28$
$\{x \mid 0.337... \le x \le 27.662..., x \in \mathrm{R}\}$

c) The width of the river is 27.325 m.

12. a) $0 < -2.944t^2 + 191.360t - 2649.6$

b) Between 20 s and 45 s is when the jet is above 9600 m.

c) 25 s

13. a) $y = -0.04x^2 + 5$ **b)** $0 \le -0.04x^2 + 5$

14. a) $y \le -x^2 + 20x$ or $y \le -1(x - 10)^2 + 100$

b) $-x^2 + 20x - 50 \ge 0$; she must have between 3 and 17 ads.

15. $y \le -0.0001x^2 - 600$ and $y \ge -0.0002x^2 - 700$

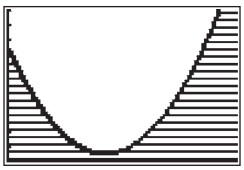
16. a) $y = (4 + 0.5x)(400 - 20x)$ or $y = -10x^2 + 120x + 1600$; x represents the number of \$0.50 increases and y represents the total revenue.

b) $0 \le -10x^2 + 120x - 200$; to raise \$1800 the price has to be between \$5 and \$9.

c) $0 \le -10x^2 + 120x$; to raise \$1600 the price has to be between \$4 and \$10.

17. a) $0 \le 0.24x^2 - 8.1x + 64$; from approximately 12.6 years to 21.1 years after the year 2000

b) $p \le 0.24t^2 - 8.1t + 74,\ t \ge 0,\ p \ge 0$



Only the portion of the graph from $t = 0$ to $t \approx 16.9$ and from $p = 0$ to $p = 100$ is reasonable. This represents the years over which the methane produced goes from a maximum percent of 100 to a minimum percent around 16.9 years.

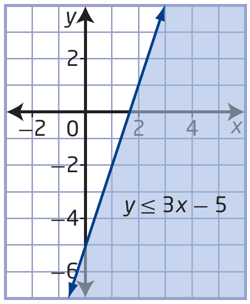
c) from approximately 12.6 years to 16.9 years after the year 2000

d) He should take only positive values of x from 0 to 16.9, because after that the model is no longer relevant.

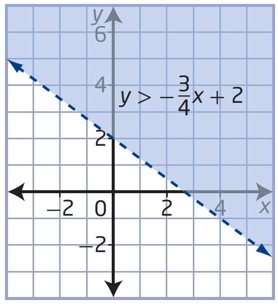
18. Answers may vary.

Chapter 9 Review, pages 501 to 503

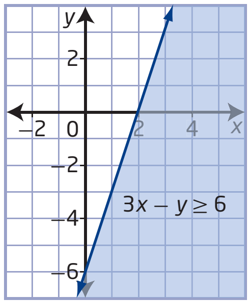
1. a)



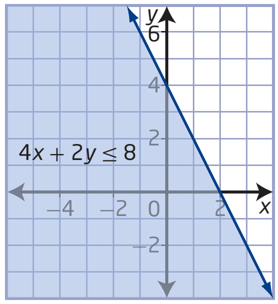
b)



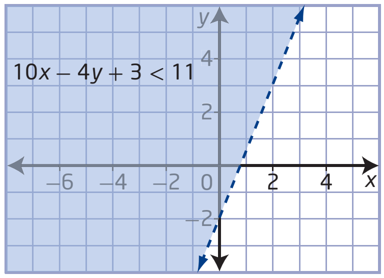
c)



d)



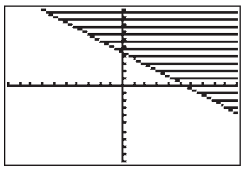
e)

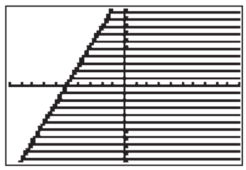


2. a) $y \ge 2x + 3$ **b)** $y > 0.25x - 1$

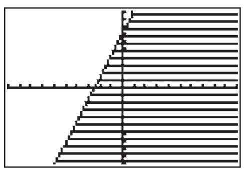
c) $y < -3x + 2$ **d)** $y \le -0.75x + 2$

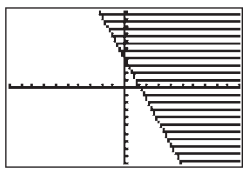
3. a) $y > -\frac{4}{5}x + \frac{22}{5}$ **b)** $y \le \frac{5}{2}x + 13$



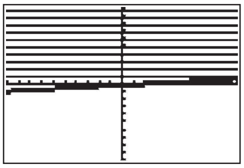


c) $y < \frac{32}{11}x + \frac{80}{11}$ **d)** $y > -\frac{31}{11}x + \frac{165}{44}$



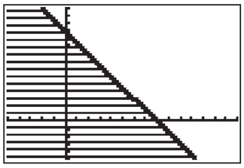


e) $y \geq \frac{1}{12}x$



4. a) $15x + 10y \leq 120$, where x represents the number of movies and y represents the number of meals.

b) $y \leq -1.5x + 12$

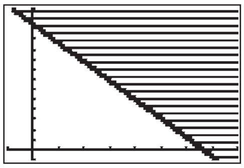


c) The region below the line in quadrant I ($x \geq 0$, $y \geq 0$) shows which combinations will work for her budget. The values of x and y must be whole numbers.

5. a) \$30 for a laptop and \$16 for a DVD player

b) $30x + 16y \geq 1000$, where x represents the number of laptops sold and y represents the number DVD player sold.

c) $y \geq -1.875x + 62.5$
The region above the line in quadrant I shows which combinations will give the desired commission. The values of x and y must be whole numbers.



6. a) $\{x \mid x < -7 \text{ or } x > 9, x \in \mathrm{R}\}$

b) $\{x \mid x \leq -2.5 \text{ or } x \geq 6, x \in \mathrm{R}\}$

c) $\{x \mid -12 < x < 4, x \in \mathrm{R}\}$

d) $\{x \mid x \leq 3 - \sqrt{5} \text{ or } x \geq 3 + \sqrt{5}, x \in \mathrm{R}\}$

7. a) $\left\{x \mid -\frac{4}{3} \leq x \leq \frac{1}{2}, x \in \mathrm{R}\right\}$

b) $\left\{x \mid \frac{5 - \sqrt{21}}{4} < x < \frac{5 + \sqrt{21}}{4}, x \in \mathrm{R}\right\}$

c) $\{x \mid -4 \leq x \leq 8, x \in \mathrm{R}\}$

d) $\left\{x \mid x \leq \frac{-6 - 2\sqrt{14}}{5} \text{ or } x \geq \frac{-6 + 2\sqrt{14}}{5}, x \in \mathrm{R}\right\}$

8. a) $\left\{x \mid \frac{6 - 2\sqrt{3}}{3} \leq x \leq \frac{6 + 2\sqrt{3}}{3}, x \in \mathrm{R}\right\}$

b) The path has to be between those two points to allow people up to 2 m in height to walk under the water.

9. The length can be anything up to and including 6 m. The width is just half the length, so it is a maximum of 3 m.

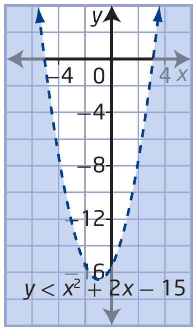
10. a) 104.84 km/h

b) $0.007v^2 + 0.22v \leq 50$

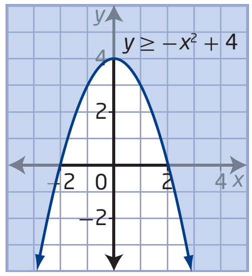
c) The solution to the inequality within the given context is $0 < v \leq 70.25$. The maximum stopping speed of 70.25 km/h is not half of the answer from part a) because the function is quadratic not linear.

11. a) $y \leq \frac{1}{2}(x + 3)^2 - 4$ **b)** $y > 2(x - 3)^2$

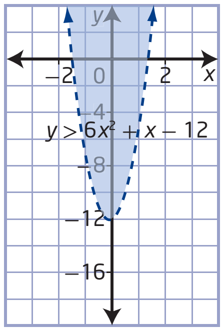
12. a)



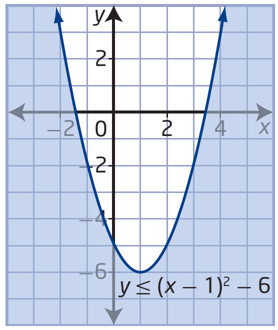
b)



c)



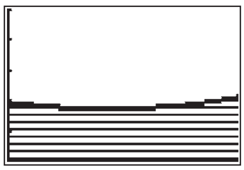
d)



13. a) $y < x^2 + 3$

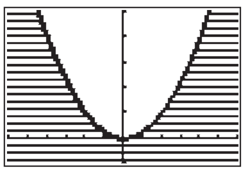
b) $y \leq -(x + 4)^2 + 2$

14. a) $y \leq 0.003t^2 - 0.052t + 1.986$,
$0 \leq t \leq 20$, $y \geq 0$



b) $0.003t^2 - 0.052t - 0.014 \leq 0$; the years it was at most 2 t/ha were from 1975 to 1992.

15. a) $r \leq 0.1v^2$
You cannot have a negative value for the speed or the radius. Therefore, the domain is $\{v \mid v \geq 0, v \in \mathrm{R}\}$ and the range is $\{r \mid r \geq 0, r \in \mathrm{R}\}$.



b) Any speed above 12.65 m/s will complete the loop.

16. a) $20 \leq \frac{1}{20}x^2 - 4x + 90$

b) $\{x \mid 0 \leq x \leq 25.86 \text{ or } 54.14 \leq x \leq 90, x \in \mathrm{R}\}$; the solution shows where the cable is at least 20 m high.

Chapter 9 Practice Test, pages 504 to 505

1. B

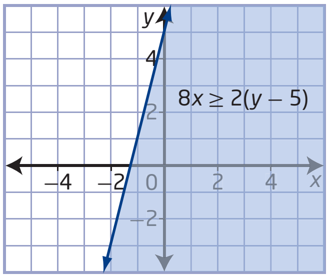
2. A

3. C

4. B

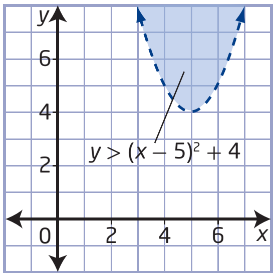
5. C

6.



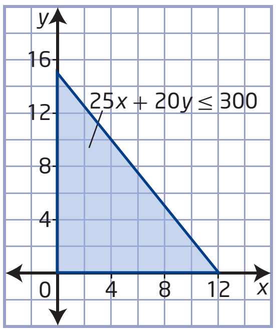
7. $\left\{x \mid -\frac{2}{3} < x < \frac{5}{4}, x \in \mathrm{R}\right\}$

8.



9. $y \geq 0.02x^2$

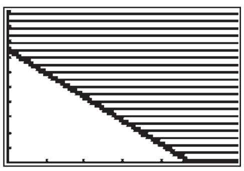
10. $25x + 20y \leq 300$, where x represents the number of hours scuba diving ($x \geq 0$) and y represents the number of hours sea kayaking ($y \geq 0$).



11. a) $50x + 80y \geq 1200$, where x represents the number of ink sketches sold ($x \geq 0$) and y represents the number of watercolours sold ($y \geq 0$).

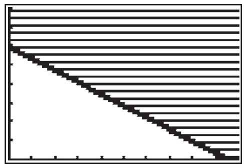
b) $y \geq -\frac{5}{8}x + 15$, $y \geq 0$, $x \geq 0$

Example: (0, 15), (2, 15), (8, 12)



c) $50x + 80y \geq 2400$, where x represents the number of ink sketches sold ($x \geq 0$) and y represents the number of watercolours sold ($y \geq 0$); the related line is parallel to the original with a greater x-intercept and y-intercept.

d) $y \geq -\frac{5}{8}x + 30$, $y \geq 0$, $x \geq 0$



12. a) Example: $f(x) = x^2 - 2x - 15$

b) Example: any quadratic function with two real zeros and whose graph opens upward

c) Example: It is easier to express them in vertex form because you can tell if the parabola opens upward and has a vertex below the x-axis, which results in two zeros.

13. a) $0.01a^2 + 0.05a + 107 < 120$

b) $\{x \mid -38.642 < x < 33.642, x \in \mathrm{R}\}$

c) The only solutions that make sense are those where x is greater than 0. A person cannot have a negative age.

Cumulative Review, Chapters 8–9, pages 508 to 509

1. a) B **b)** D **c)** A **d)** C

2. (−2.2, 10.7), (2.2, −2.7)

3. a) (−1, −4), (2, 5)

b) The ordered pairs represent the points where the two functions intersect.

4. a) $b > 3.75$ **b)** $b = 3.75$ **c)** $b < 3.75$

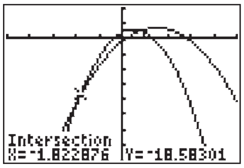
5.

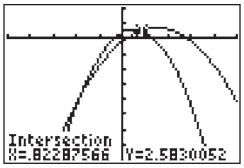
<table>
<tr><th colspan="3">Solving Linear-Quadratic Systems</th></tr>
<tr><th>Substitution Method</th><th colspan="2">Elimination Method</th></tr>
<tr><td>Determine which variable to solve for.</td><td>Determine which variable to eliminate.</td><td>Multiply the linear equation as needed.</td></tr>
<tr><td>Solve the linear equation for the chosen variable.</td><td colspan="2" rowspan="2">Add a new linear equation and quadratic equation.</td></tr>
<tr><td>Substitute the expression for the variable into the quadratic equation and simplify.</td></tr>
<tr><td colspan="3">Solve New Quadratic Equation</td></tr>
<tr><td>No Solution</td><td colspan="2">Substitute the value(s) into the original linear equation to determine the corresponding value(s) of the other variable.</td></tr>
</table>

6.

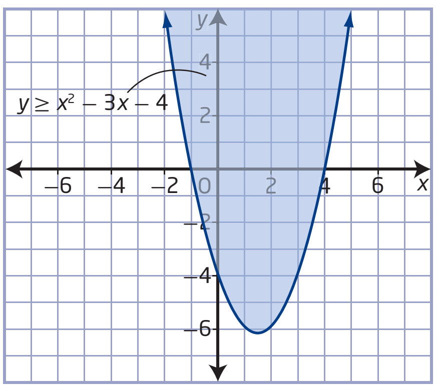
<table>
<tr><th colspan="3">Solving Quadratic-Quadratic Systems</th></tr>
<tr><th>Substitution Method</th><th colspan="2">Elimination Method</th></tr>
<tr><td>Solve one quadratic equation for the y-term.</td><td>Eliminate the y-term.</td><td>Multiply equations as needed.</td></tr>
<tr><td>Substitute the expression for the y-term into the other quadratic equation and simplify.</td><td colspan="2">Add new equations.</td></tr>
<tr><td colspan="3">Solve New Quadratic Equation</td></tr>
<tr><td>No solution.</td><td colspan="2">Substitute the value(s) into an original equation to determine the corresponding value(s) of x.</td></tr>
</table>

7. The two stocks will be the same price at \$34 and \$46.
8. Example: The number of solutions can be determined by the location of the vertex and the direction in which the parabola opens. The vertex of the first parabola is above the x-axis and it opens upward. The vertex of the second parabola is below the x-axis and it opens downward. The system will have no solution.
9. $(-1.8, -18.6)$, $(0.8, 2.6)$





10. **a)** $(1, 6)$ **b)** $(0, -5)$, $(1, 24)$
11. **a)** D **b)** A **c)** B **d)** C
12. **a)** $y > x^2 + 1$ **b)** $y \geq -(x + 3)^2 + 2$
13. **a)** Results in a true statement. Shade the region that contains the point $(0, 0)$.
    b) Results in a false statement. Shade the region that does not contain the point $(2, -5)$.
    c) The point $(-1, 1)$ cannot be used as a test point. The point is on the boundary line.
14. $y < -2x + 4$
15.



16. $\{x \mid x \leq -7 \text{ or } x \geq 2.5, x \in \mathrm{R}\}$
17. The widths must be between 200 m and 300 m.

Unit 4 Test, pages 511 to 513

1. C
2. C
3. B
4. B
5. D
6. D
7. A
8. B
9. A
10. 5
11. 3
12. 1 s
13. **a)** $(0, 0)$, $(2, 4)$
    b) The points are where the golfer is standing and where the hole is.
14. $g(x) = -(x - 6)^2 + 13$
15. $(-9, 256)$, $(-1, 0)$
16. **a)** Example: In the second step, she should have subtracted 2 from both sides of the inequality. It should be $3x^2 - 5x - 12 > 0$.
    b) $\left\{x \mid x < -\frac{4}{3} \text{ or } x > 3, x \in \mathrm{R}\right\}$
17. The ball is above 3 m for 1.43 s.