

2 Chapter Test

MULTIPLE CHOICE

1. In the figure shown, which angles are supplementary interior angles?

- A. $\angle h, \angle j$ B. $\angle g, \angle n$ C. $\angle h, \angle i$ D. $\angle h, \angle m$

2. Which angles are alternate interior angles?

- A. $\angle h, \angle j$ B. $\angle g, \angle n$ C. $\angle h, \angle i$ D. $\angle h, \angle m$

3. Which angles are supplementary exterior angles?

- A. $\angle h, \angle j$ B. $\angle g, \angle j$ C. $\angle h, \angle i$ D. $\angle h, \angle m$

4. In the figure shown, what is the measure of $\angle a$?

- A. 25° B. 35° C. 120° D. 145°

5. What is the measure of $\angle c$?

- A. 25° B. 35° C. 120° D. 145°

6. In the figure shown, what is the measure of $\angle CDE$?

- A. 75° B. 60° C. 120° D. 45°

7. What is the measure of $\angle CED$?

- A. 75° B. 60° C. 120° D. 45°

8. What is the measure of $\angle DEC$?

- A. 75° B. 60° C. 120° D. 45°

9. What is the sum of the measures of the interior angles of a polygon with 17 sides?

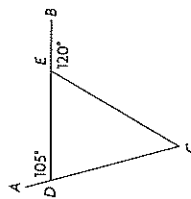
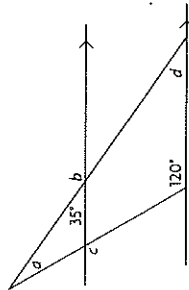
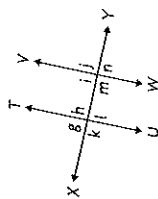
- A. 3060° B. 2880° C. 2700° D. 159°

10. What is the measure of each interior angle of a regular 18-sided polygon?

- A. 180° B. 175° C. 160° D. 150°

11. What is the measure of each exterior angle of a regular 17-sided polygon, to the nearest tenth?

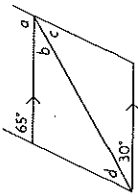
- A. 25.1° B. 21.2° C. 10.6° D. 8.1°



NUMERICAL RESPONSE

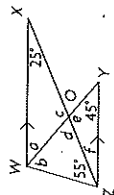
12. Determine the measures of angles a , b , c , and d .

$\angle a = \underline{\hspace{1cm}}^\circ$ $\angle b = \underline{\hspace{1cm}}^\circ$ $\angle c = \underline{\hspace{1cm}}^\circ$ $\angle d = \underline{\hspace{1cm}}^\circ$



13. Determine the measures of the unknown angles in figure $WXYZ$.

$\angle a = \underline{\hspace{1cm}}^\circ$ $\angle b = \underline{\hspace{1cm}}^\circ$ $\angle c = \underline{\hspace{1cm}}^\circ$ $\angle d = \underline{\hspace{1cm}}^\circ$
 $\angle e = \underline{\hspace{1cm}}^\circ$ $\angle f = \underline{\hspace{1cm}}^\circ$



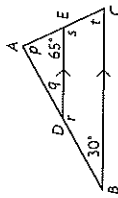
14. a) Determine the sum of the interior angles of a regular 18-sided polygon.

b) Determine the measure of an interior angle of a regular 18-sided polygon, to the nearest tenth.

c) Determine the measure of an exterior angle of a regular 18-sided polygon, to the nearest tenth.

WRITTEN RESPONSE

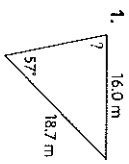
15. Determine the measures of angles p , q , r , s , and t . Give reasons.



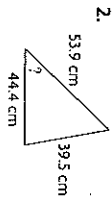
3 Chapter Test

MULTIPLE CHOICE

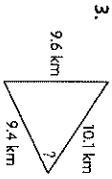
Determine the measure of the indicated angle, to the nearest degree.



- A. 59° C. 44°
 B. 46° D. 79°

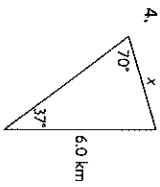


- A. 54° C. 80°
 B. 46° D. 41°

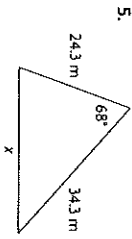


- A. 31° C. 59°
 B. 64° D. 22°

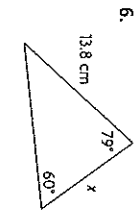
Determine the indicated side length, to the nearest tenth of a unit.



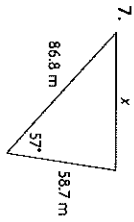
- A. 3.8 km C. 4.6 km
 B. 4.2 km D. 5.0 km



- A. 27.2 m C. 22.2 m
 B. 33.8 m D. 38.3 m



- A. 15.6 cm C. 12.2 cm
 B. 7.8 cm D. 10.5 cm



- A. 102.2 m C. 90.4 m
 B. 85.5 m D. 73.7 m

NUMERICAL RESPONSE

8. Determine the indicated side length, to the nearest tenth of a unit, or angle measure, to the nearest degree.

a) In $\triangle ABC$, $b = 14.0$ m, $c = 9.3$ m, and $\angle A = 66^\circ$.

Therefore, $a =$ _____ m.

b) In $\triangle VWX$, $v = 60$ cm, $x = 85$ cm, and $\angle W = 20^\circ$.

Therefore, $w =$ _____ cm.

c) In $\triangle DEF$, $d = 42.2$ cm, $e = 47.8$ cm, and $f = 50.1$ cm.

Therefore, $\angle D =$ _____ $^\circ$.

9. A canoe leaves a dock on Lake Claire and heads in a direction $N71^\circ E$ for 1.9 km. At the same time, a second canoe travels in a direction $S28^\circ E$ from the dock for 3.1 km.

The distance between the canoes is _____ km, to the nearest tenth of a kilometre.

10. In a parallelogram, two adjacent sides measure 4.2 cm and 5.9 cm. The shorter diagonal is 2.6 cm.

The larger angles in the parallelogram measure _____ $^\circ$, to the nearest degree.

~~11.~~ An atmospheric scientist is trying to determine the altitude (height above Earth's surface) of a circular cloud directly above him. The scientist measures the angle of elevation to the north end of the cloud to be 89° and the angle of elevation to the south end of the cloud to be 85° . The scientist knows that this cloud has a diameter of about 150 m.

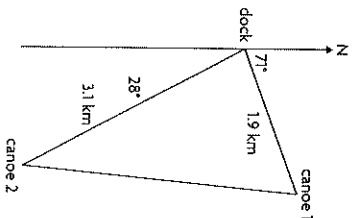
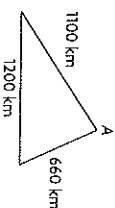
The altitude of the cloud, to the nearest metre, is _____ m.

~~12.~~ A bush pilot delivers supplies to an isolated village by flying 470 km in the direction $N66^\circ E$. While at the village, the pilot decides that she must refuel at a camp located 35 km $S11^\circ E$ of the village.

By the time she returns to her starting point, the pilot will have flown a total distance of _____ km, to the nearest kilometre.

WRITTEN RESPONSE

13. Two airplanes leave Hay River airport at the same time. One flies at 550 km/h. The other flies at 330 km/h. About 2 h later, they are 1200 km apart. Determine the angle between their paths, to the nearest degree.



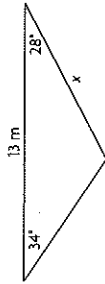
4 Chapter Test

MULTIPLE CHOICE

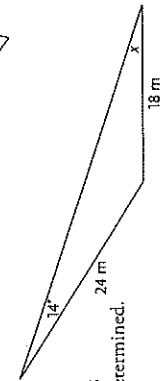
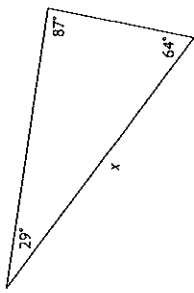
- Which of the following equations is true?
 - $\sin 60^\circ = \sin 120^\circ$
 - $\sin 80^\circ = -\sin 80^\circ$
 - $\sin 45^\circ = -\sin 135^\circ$
 - all of these
- Calculate $\tan 78^\circ$ to four decimal places. Predict another expression that equals $\tan 78^\circ$.
 - -4.7046 ; $\tan 102^\circ$
 - 4.7046 ; $-\tan 78^\circ$
 - -4.7046 ; $-\tan 78^\circ$
 - none of these
- Which law or combination of laws would you use to determine the measure of x in this triangle?
 - the cosine law, once
 - the sine law, twice
 - both the sine law and the cosine law
 - neither the sine law nor the cosine law
- Determine the length of x , to the nearest metre.
 - 118 m
 - 15 m
 - 11 m
 - 8 m
- Which set of measurements could result in two possible triangles?
 - $\angle A = 25^\circ$, $a = 2.5$ m, $b = 6.2$ m
 - $\angle A = 135^\circ$, $a = 3.8$ m, $b = 4.0$ m
 - $\angle A = 96^\circ$, $a = 5.2$ m, $b = 5.0$ m
 - $\angle A = 48^\circ$, $a = 7.4$ m, $b = 7.1$ m

Which statement is true for this set of measurements?

- This is an SSA situation; no triangle is possible.
- This is an SSA situation; only one triangle is possible.
- This is an SSA situation; two triangles are possible.
- This is not an SSA situation; only one triangle is possible.



- Which would you use to determine the length of x ?
 - the primary trigonometric ratios
 - the sine law
 - the cosine law
 - None of the above; x cannot be determined.



- Determine the measure of x , to the nearest degree.
 - 10°
 - 19°
 - 11°
 - None of these; x cannot be determined.

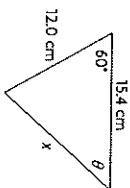
NUMERICAL RESPONSE

- Determine the length of x , to the nearest tenth of a centimetre.
 - $x = \underline{\hspace{2cm}}$ cm
 - $x = \underline{\hspace{2cm}}$ cm

- Determine the measure of θ , to the nearest degree.

$\theta = \underline{\hspace{2cm}}^\circ$

11. Determine the length of x to the nearest tenth of a centimetre and the measure of θ to the nearest degree.



$x =$ _____ cm $\theta =$ _____ °

WRITTEN RESPONSE

12. In $\triangle ABC$, $\angle A = 47^\circ$, $a = 3.5$ cm, and $b = 5.0$ cm. Determine the number of triangles (zero, one, or two) that are possible. Draw a diagram to support your answer.

13. A mass is suspended on a length of cord. The ends of the cord are attached to the ceiling 1.4 m apart. The angles formed by the ceiling and the cord are 26° and 32° . Determine the length of the cord, to the nearest tenth of a metre.

5 Chapter Test

MULTIPLE CHOICE

- Which measure would be best for comparing marks on several math tests?
 - range
 - mean
 - median
 - mode
- For this set of data, what are the mean, median, and mode, respectively, to one decimal place?

2, 4, 6, 6, 7, 8, 10, 12, 15

 - 7.0, 7.8, 6
 - 7.8, 7, 6
 - 6, 7, 7.8
 - 7.1, 7, 6
- Which of these is a feature of a histogram but not of a frequency polygon?
 - Data is organized into 5 to 12 equal-sized intervals.
 - The frequencies of values that fall within each interval are recorded.
 - The frequency data is plotted on the vertical axis.
 - The data is represented by bars.
- What is the expression for calculating the standard deviation of a set of data?
 - $\sqrt{\frac{\sum(x - \bar{x})^2}{n}}$
 - $\sqrt{\frac{\sum(\bar{x} - x)^2}{n}}$
 - $\frac{\sum(x - \bar{x})^2}{n}$
 - $(x - \bar{x})^2$
- Which set of percents correctly describes the distribution of data one, two, and three standard deviations about the mean in a normal distribution?
 - 34%, 50%, 52.35%
 - 68%, 95%, 100%
 - 68%, 95%, 99.7%
 - 95%, 99.7%, 100%
- Which is the correct formula for calculating a z -score?
 - $z = \frac{x - \mu}{\sigma}$
 - $z = \frac{\mu - x}{\sigma}$
 - $z = \frac{x}{\sigma}$
 - $z = \frac{x - \sigma}{\mu}$
- The mean of a set of data is 4.5, with a standard deviation of 0.6. What is the z -score for a value of 10.9?
 - 10.7
 - 0.4
 - 10.7
 - 2.3
- Which is the correct expression for the confidence interval "twenty-one percent with a two point four percent margin of error"?
 - $21\% \pm 2.4$
 - $21 \pm 2.4\%$
 - 21 ± 2.4
 - $21\% \pm 2.4\%$
- What is the range for the confidence interval $47.8\% \pm 3.7\%$?
 - 47.8%
 - 44.1% to 51.5%
 - 44.1% to 47.8%
 - 47.8% to 51.5%

10. The results of a poll are accurate 19 out of 20 times. What is the confidence level for these results?

A. 19% B. 90% C. 95% D. 100%

NUMERICAL RESPONSE

11. The durability of two brands of performance cycling tires was tested. The distances covered, in thousands of kilometres, before the tires became bald were recorded in the table. What is the mean distance covered by each brand of tire?

Brand A: _____ km Brand B: _____ km

Brand A (10 ³ km)	Brand B (10 ³ km)
2.0	2.1
2.5	2.0
1.0	1.5
1.3	1.9
1.9	2.2
2.2	1.6

12. The widths of the trunks of 30 redwood trees in a forest were measured. The data was organized into intervals.

Which range of trunk widths occurs most frequently? _____ m.

Which ranges of trunk widths occur least frequently?

_____ m and _____ m.

Width (m)	Frequency
4.5–5.0	2
5.0–5.5	4
5.5–6.0	8
6.0–6.5	9
6.5–7.0	5
7.0–7.5	2

13. Nancy grooms cats and dogs. The time she spends grooming animals, in hours, over one month are shown.

2.5 3.0 3.5 2.0 3.0 1.5 4.0 5.0
 8.0 4.0 5.0 6.0 3.0 3.5 4.5 2.5
 4.0 5.0 4.0 3.5 4.0 3.0 3.5 7.0

Suggest an interval width that will give a good representation of how the data is distributed, and determine how many intervals this interval width creates.

_____ intervals of width _____

14. Using a z-score table, determine the percent of data to the right of a z-score of 0.98.

_____ % of the data is to the right of 0.98.

15. A poll determined that 76% of the people buying gasoline felt that \$1.09/L was a fair price. The results of the survey are accurate within 3.4% percent points.

The confidence interval is _____ % \pm _____ %, or from _____ % to _____ %.

WRITTEN RESPONSE

16. Tom researched the price of two different brands of 100 pack of DVDs at four different stores.

a) What is the mean price and standard deviation for each brand?

Store	DVD A (\$)	$(x - \bar{x})^2$	DVD B (\$)	$(x - \bar{x})^2$
1	32.94	5.06	34.59	9.30
2	31.97	10.37	38.99	1.82
3	35.92	0.53	36.99	0.42
4	39.93	22.47	39.99	5.52
Σ	140.76	38.43	150.56	17.06
\bar{x}				
$\sqrt{\frac{\Sigma(x - \bar{x})^2}{n}}$				

b) Compare the pricing of the two brands.

17. Gretchen plays the guitar. The numbers of hours in a day she spends practising over one month are shown.

2.5 3.0 3.5 2.0 3.0 1.5
 4.0 5.0 8.0 4.0 5.0 6.0
 3.0 3.5 4.5 2.5 4.0 5.0
 4.0 3.5 4.0 3.0 3.5 7.0

- a) Complete the frequency distribution table.
 b) Construct a frequency polygon of the data, using the grid provided.
 c) What is the mean number of hours?

d) What is the standard deviation?

e) Is the data normally distributed? Explain your answer.

Time (h)	Frequency
1.0–	



6 Chapter Test

18. The ages of members of a cycling club are normally distributed. The mean is 35 years, and the standard deviation is 5 years.
- a) What percent of members are between 25 and 40 years old?

- b) John is a member of the club and is 20 years old. What percent of members are less than 20 years old?

19. A manufacturer offers a warranty on its CD burners. The burner has a mean lifespan of 7 years, with a standard deviation of 0.5 years. For how long should the burners be covered by the warranty if the manufacturer wants to repair no more than 2.5% of the burners sold?

20. A survey of 200 shoppers at a grocery store indicated that 75% preferred smooth over chunky peanut butter. The results were accurate within 3.3 percent points, 9 times out of 10.

- a) State the confidence level.
- b) Determine the confidence interval.
- c) If there were 1000 shoppers that day, how many would prefer chunky peanut butter?

MULTIPLE CHOICE

1. Suppose you graph the linear inequality $2x + y < 4$. Which set of statements describes the graph of the linear inequality?
- A. The boundary line is a solid line. The plane is shaded above the line.
- B. The boundary line is a dashed line. The plane is shaded above the line.
- C. The boundary line is a dashed line. The plane is shaded below the line.
- D. The boundary line is a solid line. The plane is shaded below the line.

2. Which linear inequality is shown in the graph?

- A. $\{(x, y) \mid y - x \geq -2, x \in \mathbb{W}, y \in \mathbb{W}\}$ C. $\{(x, y) \mid y - x \geq -2, x \in \mathbb{R}, y \in \mathbb{R}\}$
- B. $\{(x, y) \mid y - x > -2, x \in \mathbb{W}, y \in \mathbb{W}\}$ D. $\{(x, y) \mid y - x > -2, x \in \mathbb{I}, y \in \mathbb{I}\}$

3. Which is a solution to the system of linear inequalities?

- $\{(x, y) \mid 2x + y > 5, x \in \mathbb{I}, y \in \mathbb{I}\}$
- $\{(x, y) \mid y - x < 4, x \in \mathbb{I}, y \in \mathbb{I}\}$
- A. (3, 1) B. (4.5, 0) C. (-2, 1) D. (-3, -1)

4. Consider this system:

$$\{(x, y) \mid 3y + x \geq 3, x \in \mathbb{R}, y \in \mathbb{R}\}$$

$$\{(x, y) \mid x - y < 4, x \in \mathbb{R}, y \in \mathbb{R}\}$$

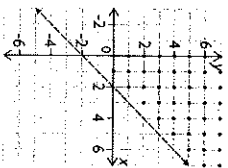
The boundaries for the two inequalities intersect at the point (3.75, -0.25). Which statement about this point is most accurate?

- A. The point is not in the solution set, because its coordinates are not whole numbers.
- B. The point is in the solution set, because it lies on both boundaries.
- C. The point is not in the solution set, because one of the inequality signs is $<$ or $>$.
- D. The point is in the solution set, because one of the inequality signs is \leq or \geq .

5. A sports equipment manufacturer produces snowboards and skis. It takes 4 h to cut and mould each board and 1 h to put on the finishes. It takes 4 h to cut and mould and 2 h to put on the finishes for a pair of skis. The total number of snowboards and pairs of skis produced per day is at most 15.

Let a represent the number of snowboards and b represent the number of pairs of skis made in one day or less. What are the restrictions on a and b ?

A. no restrictions B. $a \in \mathbb{N}, b \in \mathbb{N}$ C. $a \in \mathbb{I}, b \in \mathbb{I}$ D. $a \in \mathbb{W}, b \in \mathbb{W}$



6. Which algebraic model represents the situation in question 5?

- A. $\{(a, b) \mid a \geq 0, b \geq 0, a + b \leq 15, a \in \mathbb{R}, b \in \mathbb{R}\}$
 $\{(a, b) \mid a \geq 0, b \geq 0, 5a + 6b \leq 24, a \in \mathbb{R}, b \in \mathbb{R}\}$
 B. $\{(a, b) \mid a \geq 0, b \geq 0, a + b \leq 15, a \in \mathbb{I}, b \in \mathbb{I}\}$
 $\{(a, b) \mid a \geq 0, b \geq 0, 5a + 6b \leq 24, a \in \mathbb{I}, b \in \mathbb{I}\}$
 C. $\{(a, b) \mid a \geq 0, b \geq 0, a + b \leq 15, a \in \mathbb{W}, b \in \mathbb{W}\}$
 $\{(a, b) \mid a \geq 0, b \geq 0, 5a + 6b \leq 24, a \in \mathbb{W}, b \in \mathbb{W}\}$
 D. $\{(a, b) \mid a \geq 0, b \geq 0, a + b \leq 4, a \in \mathbb{N}, b \in \mathbb{N}\}$
 $\{(a, b) \mid a \geq 0, b \geq 0, 5a + 6b \leq 24, a \in \mathbb{N}, b \in \mathbb{N}\}$

NUMERICAL RESPONSE

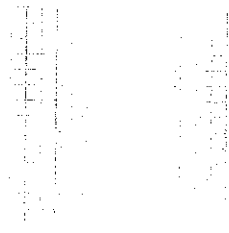
7. Consider the inequality $-3x - y \geq -1$.
 a) State a point that is a solution to the inequality: _____
 b) State a point that is not a solution to the inequality: _____
8. Consider this system of linear inequalities:
 $y + 3x \geq 9$
 $y < 2x - 3$
 a) Determine the point of intersection for the system of linear inequalities.
 Point of intersection: _____

b) Will the point be a solid dot or an open dot on a graph of the system?

A(n) _____ dot

9. Graph each system. Determine a solution for each.

- a) $\{(x, y) \mid y \geq 0.5x, x \in \mathbb{R}, y \in \mathbb{R}\}$
 $\{(x, y) \mid x + y < 7, x \in \mathbb{R}, y \in \mathbb{R}\}$
- b) $\{(x, y) \mid y - 2x > 2, x \in \mathbb{W}, y \in \mathbb{W}\}$
 $\{(x, y) \mid x + 2y < 12, x \in \mathbb{W}, y \in \mathbb{W}\}$

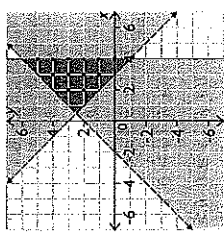


Solution: _____

Solution: _____

10. The graph of a system of linear inequalities is shown, where the objective function is $P = 1.5x + 4y$.

- a) Determine the vertices of the feasible region.
 _____, _____, _____, _____
- b) What is the minimum solution for the system? _____
- c) If P represents the amount of profit, in thousands of dollars, what is the minimum profit that can be made? \$ _____
- d) What is the maximum solution for the system? _____
- e) If P represents the amount of profit, in thousands of dollars, what is the maximum profit that can be made? \$ _____



11. A snack machine sells granola bars and bags of trail mix.

- The machine holds, at most, 200 units of snacks.
- At least 4 granola bars are sold for each bag of trail mix.
- Each granola bar sells for \$1.00, and each bag of trail mix sells for \$1.25.

Let g represent the number of granola bars and t represent the number of bags of trail mix.

a) Write a linear inequality to represent the number of units of snacks the machine holds.

$\{(g, t) \mid \underline{\hspace{1cm}} + \underline{\hspace{1cm}} \leq \underline{\hspace{1cm}}, g \in \underline{\hspace{1cm}}, t \in \underline{\hspace{1cm}}\}$

b) Write a linear inequality to represent the number of granola bars sold compared to bags of trail mix.

$\{(g, t) \mid \underline{\hspace{1cm}}, g \in \underline{\hspace{1cm}}, t \in \underline{\hspace{1cm}}\}$

c) Write an objective function for the revenue, R , from snack sales.

$R = \underline{\hspace{2cm}}$

WRITTEN RESPONSE

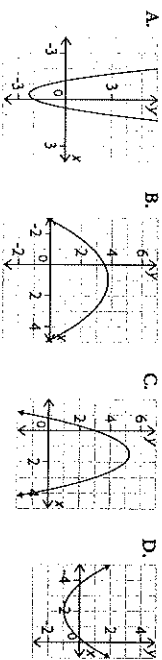
12. Lite Lights manufactures two types of book light: type A is a solar-powered light; type B requires batteries. In one day, the company can make at most 55 of type A and 65 of type B. Type A requires 4 h to produce, and type B requires 2 h to produce. The production team can work a total of 240 hours each day.

a) Define the variables for this situation. State any restrictions.

7 Chapter Test

MULTIPLE CHOICE

1. Which parabola corresponds to the greatest value of c , the constant coefficient in the function $y = ax^2 + bx + c$?

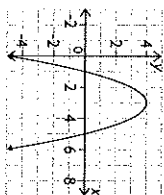


2. Which of these equations represents the parabola shown?

A. $y = -x(x - 5) + 1$ C. $y = -x^2 + 6x - 5$
 B. $y = -x^2 - 6x + 5$ D. $y = -(x - 5)^2 + 1$

3. What is the vertex of $f(x) = -0.5(x + 4)^2 - 2$?

A. (4, -2) B. (-2, -4) C. (2, -4) D. (-4, -2)



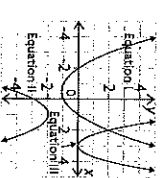
4. What is the equation of the axis of symmetry of $f(x) = -5x(x - 7) + 21$?

A. $x = 7$ B. $x = 0$ C. $x = 3.5$ D. $x = -7$

5. Which equation is a quadratic equation in standard form?

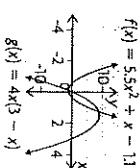
A. $-3x^2 + 2x - 5 = 0$ B. $2x^2 - 5x = 15$ C. $f(x) = 2x^2 + 3x - 5$

6. Select the one correct statement about the quadratic equations corresponding to these graphs.



D. Equation II has two solutions.

7. The graphs of $f(x) = 5.5x^2 + x - 1.1$ and $g(x) = 4x(3 - x)$ are shown.



Estimate the roots of $5.5x^2 + x - 1.1 = 4x(3 - x)$.

A. $x = -0.1$ and $x = -1.2$ C. $x = -0.1$ and $x = 1.3$

B. $x = 1.3$ and $x = 8.8$ D. $x = -1.2$ and $x = 8.8$

8. Which of the following are roots of $x^2 - 9x - 52 = 0$?

A. $x = -4$ and $x = -13$ C. $x = -4$ and $x = 13$

B. $x = 4$ and $x = -13$ D. $x = 4$ and $x = 13$

b) Write a system of linear inequalities to model this situation.

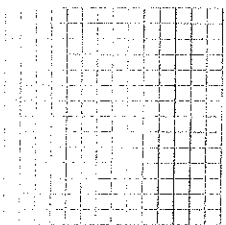
c) Graph the system of linear inequalities on the grid provided.

d) Determine the vertices of the feasible region.

e) Which of the following are solutions to the system?

(55, 65), (25, 25), (45, 50)

What does each solution mean?



13. Jenna and Rhiana sell tacos and burritos from a food cart.

• No more than 50 tacos and 75 burritos can be made each day.

• Jenna and Rhiana can make no more than 110 items, in total, each day.

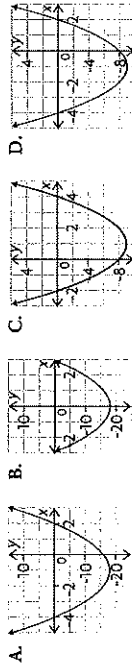
• It costs \$0.75 to make a taco and \$1.25 to make a burrito.

Create an optimization model and use it to determine the maximum and minimum costs to produce the food items.

9. A quadratic function has the vertex $(-2, 9)$. Which of the following is a possible equation for this function?

- A. $y = -x(x-5) + 1$
 B. $y = -x^2 - 4x + 5$
 C. $y = -x^2 + 4x - 5$
 D. $y = -(x-5)^2 + 1$

10. Which parabola corresponds to the quadratic function $y = 2x^2 + 4x - 16$?



11. Can you solve $x^2 + 14x - 19 = 0$ by factoring? How do you know?

- A. No; $14^2 - 4(1)(-19) = 272$, which is not a perfect square.
 B. Yes; $14^2 - 4(1)(-19) = 272 > 0$.
 C. Yes; because $14^2 - 4(1)(-19) = 272$, which is a perfect square.
 D. It is not possible to answer this question.

12. Use the quadratic formula to determine which of the following are roots of the equation $4.4x^2 + 4.3x - 5 = 0$.

- A. $x = 0.68$ and $x = 1.66$
 B. $x = -0.68$ and $x = 1.66$
 C. $x = 0.68$ and $x = -1.66$
 D. $x = -0.68$ and $x = -1.66$

NUMERICAL RESPONSE

13. a) Identify the following information for the parabola shown.

x -intercepts: $(\underline{\hspace{1cm}}, 0), (\underline{\hspace{1cm}}, 0)$ y -intercept: $(0, \underline{\hspace{1cm}})$
 axis of symmetry: $x = \underline{\hspace{1cm}}$ vertex: $(\underline{\hspace{1cm}}, \underline{\hspace{1cm}})$

b) What is the range of the function corresponding to this parabola?

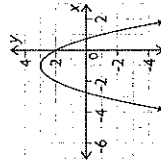
range: $\{y \mid y \leq \underline{\hspace{1cm}}, y \in \mathbb{R}\}$

14. The roots of $x^2 + 17x - 38 = 0$ are $x = \underline{\hspace{1cm}}$ and $x = \underline{\hspace{1cm}}$.

15. The roots of $x^2 - 2x = 323$ are $x = \underline{\hspace{1cm}}$ and $x = \underline{\hspace{1cm}}$.

16. The quadratic function $y = -5x(x + 4) + 7$ has been partially factored.

- a) Determine the equation of the axis of symmetry of the function: $x = \underline{\hspace{1cm}}$
 b) Locate the vertex of the function: $(\underline{\hspace{1cm}}, \underline{\hspace{1cm}})$
 c) Write the function in vertex form: $y = \underline{\hspace{1cm}}(x + \underline{\hspace{1cm}})^2 + \underline{\hspace{1cm}}$



17. Suppose you were to use the quadratic formula to solve these equations. What values of a , b , and c would you use in each case?

- a) $3x^2 - 2x + 1 = 0$ $a = \underline{\hspace{1cm}}, b = \underline{\hspace{1cm}}, c = \underline{\hspace{1cm}}$
 b) $-2(x-1)^2 - 1 = 0$ $a = \underline{\hspace{1cm}}, b = \underline{\hspace{1cm}}, c = \underline{\hspace{1cm}}$

18. Use the quadratic formula to determine the exact roots of each quadratic equation.

- a) $7x^2 + 3x - 2 = 0$ roots: $\underline{\hspace{1cm}}$ and $\underline{\hspace{1cm}}$
 b) $-4x^2 - 2x + 3 = 0$ roots: $\underline{\hspace{1cm}}$ and $\underline{\hspace{1cm}}$

19. Two consecutive integers are squared. The sum of these squares is 365. What are the integers?

$\underline{\hspace{1cm}}$ and $\underline{\hspace{1cm}}$ or $\underline{\hspace{1cm}}$ and $\underline{\hspace{1cm}}$

20. A right triangle has a perimeter of 93 cm. One side of the triangle is 36 cm long.

To the nearest whole centimetre, the hypotenuse is $\underline{\hspace{1cm}}$ long.
 The other side is $\underline{\hspace{1cm}}$ long.

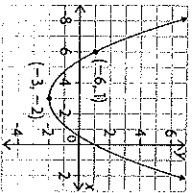
WRITTEN RESPONSE

21. Sketch the graph of the quadratic function $f(x) = -x^2 + 10x - 9$.

State its domain and range.

22. Jill braked to avoid an accident, creating skid marks 60 m long. For Jill's car on a dry road, the equation for stopping distance is $d = 0.0081t^2 + 0.137t$, where d is Jill's stopping distance in metres and t is her speed in kilometres per hour. How fast was Jill driving?

23. Write the equation in vertex form of the parabola shown.



24. Determine the real roots of each quadratic equation, if possible. Give an exact answer and an answer to two decimal places. If it is not possible, explain why.
- a) $2.6x^2 - 3.1x - 2 = 0$ b) $4.1x^2 - 2.7x + 3 = 0$

25. A midway ride launches passengers into free fall as they rise into the air, then fall until the brakes engage to bring them to a safe stop. The free-fall part of the ride starts at a height of 45 m, reaches a maximum height of 76.25 m after 2.5 s, and ends after 5.5 s.

a) Determine a quadratic model for the height of the ride after t seconds.

b) Determine the height above ground where the brakes engage.

8 Chapter Test

MULTIPLE CHOICE

1. The dosage of an antibiotic medicine for a person with a mass of 65 kg is 12 mL. Which equation determines the amount of medicine, P , in millilitres, needed for a person with a mass of 40 kg?

- A. $\frac{P}{65 \text{ kg}} = \frac{12 \text{ mL}}{40 \text{ kg}}$ C. $\frac{P}{40 \text{ kg}} = \frac{12 \text{ mL}}{65 \text{ kg}}$
 B. $\frac{P}{12 \text{ mL}} = \frac{65 \text{ kg}}{40 \text{ kg}}$ D. $\frac{P}{40 \text{ kg}} = \frac{65 \text{ kg}}{12 \text{ mL}}$

2. Data for triangle ABC is shown on the first line of the table. Triangle ABC is enlarged by a scale factor of 150%. Which triangle is the enlargement?

Triangle	Length of Base (cm)	Height of Triangle (cm)	Area (cm^2 , to nearest tenth)
A. ABC	5.00	3.00	7.5
B. DEF	7.50	4.50	16.9
C. GHI	5.50	3.50	9.6
D. JKL	15	9.00	67.5
E. MNO	2.00	1.20	1.20

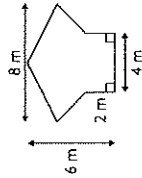
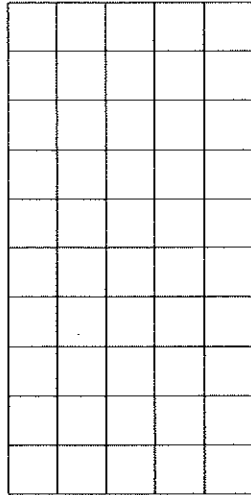
3. If a bar could fly at its top speed for 2.5 h, it would fly 62.5 km. If an elephant could run at its top speed for 15 min, it would run 10.0 km. Which animal is faster?

- A. A bar can fly at 25 km/h and an elephant can run at 40 km/h. The elephant is faster.
 B. A bar can fly at 40 km/h and an elephant can run at 25 km/h. The elephant is faster.
 C. A bar can fly at 25 km/h and an elephant can run at 40 km/h. The bar is faster.
 D. Both animals travel at the same speed.

NUMERICAL RESPONSE

4. It takes 3 h 20 min to fill a 5100 L water tank. Determine the time, to the nearest minute, it will take to fill a 6200 L tank.

5. Create a scale diagram of this garden, using a scale of 1 m : 200 m and the grid provided.



6. A chip truck sells french fries in two sizes of rectangular prism containers. The smaller container has a square base with 10 cm long sides and a height of 4 cm. The large container has a square base with 13 cm long sides and a height of 5.2 cm. Determine the factor by which the heights of the two containers differ. Answer to the nearest tenth.

7. A right hexagonal prism is enlarged by a scale factor of 5.7.

- a) Determine the value of $\frac{\text{Volume of large prism}}{\text{Volume of small prism}}$. Do not round.
- b) Determine the value of $\frac{\text{Surface area of large prism}}{\text{Surface area of a small prism}}$. Do not round.
8. A 1:30 scale model of a tractor is 0.3 ft tall, 0.2 ft wide, and 0.5 ft long. What are the dimensions of the actual tractor?

9. A 1:15 scale model of a statue is 13.5 cm tall, 1.2 cm wide, and 14.6 cm long. What are the dimensions of the actual statue?

10. Esther reduces this figure by a scale factor of $\frac{1}{3}$. Determine the area of the reduced figure, in square units. Round your answer to the nearest whole unit.



WRITTEN RESPONSE

11. Joan works 30 h every two weeks. She works 50 weeks each year. At this rate, how many hours will she work in one year? Explain how you could solve this problem using two different strategies.

12. The gas tank of Angus's car holds about 90 L. He can either buy gas in his town at \$1.39/L or travel across the U.S. border to fill up at US\$3.23/gal (1 U.S. gallon = 3.79 L). The current exchange rate is US\$1/CS\$1.04. Angus will use less than 2 L of gas to drive 15 min to his local gas station and one third of a tank to make the 1.5 h round trip to the nearest gas station across the border. Which option makes more sense? Justify your decision.

Year End Review

Factor each completely.

1) $k^3 - 12k^2 + 35k$

3) $2n^2 - 2$

5) $x^2 - 64$

7) $r^3 - 10r^2 + 24r$

9) $27p^2 + 66p - 45$

11) $54b^2 + 300b - 144$

13) $45v^2 - 350v - 80$

15) $30x^2 - 87x + 30$

17) $4b^2 - 25$

19) $v^2 - 16$

21) $n^2 - 9$

23) $18p^2 - 50$

2) $n^2 + 8n - 20$

4) $3r^2 - 3r - 60$

6) $n^4 - 9n^3 - 10n^2$

8) $x^3 - 10x^2 + 21x$

10) $6a^2 + 29a + 30$

12) $9k^2 + 73k - 72$

14) $24n^2 - 76n + 40$

16) $9x^2 + 22x + 8$

18) $32x^2 - 18$

20) $20a^2 - 5$

22) $64k^2 - 4$

24) $80x^2 - 45$

Solve each equation by factoring.

25) $8n^2 + 192 = 80n$

27) $r^2 + 24 = -11r$

29) $4x^2 - 8x = 96$

31) $7r^2 + 56 = 57r$

33) $40x^2 = -64 + 112x$

35) $7v^2 + 62v = -48$

26) $m^2 + 8m = -16$

28) $4n^2 = 192 - 8n$

30) $4b^2 = 44b - 112$

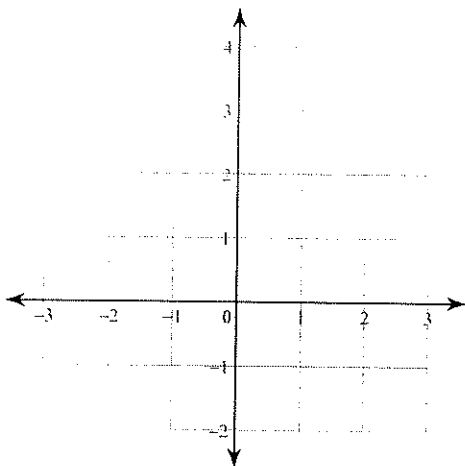
32) $7n^2 = 8n$

34) $8a^2 = -120 - 68a$

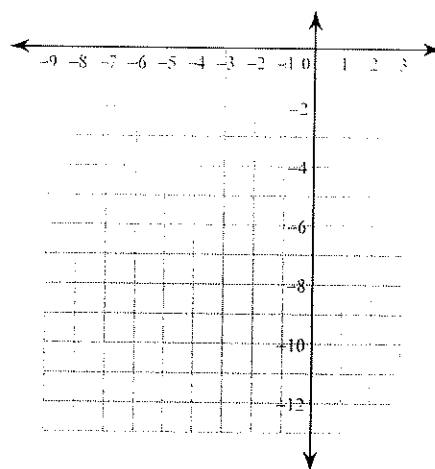
36) $3x^2 + 10x = -8$

Sketch the graph of each function.

37) $y = -(x + 1)^2 + 3$



38) $y = -2(x - 1)^2 - 4$



Year End Review

Factor each completely.

1) $k^3 - 12k^2 + 35k$

3) $2n^2 - 2$

5) $x^2 - 64$

7) $r^3 - 10r^2 + 24r$

9) $27p^2 + 66p - 45$

11) $54b^2 + 300b - 144$

13) $45v^2 - 350v - 80$

15) $30x^2 - 87x + 30$

17) $4b^2 - 25$

19) $v^2 - 16$

21) $n^2 - 9$

23) $18p^2 - 50$

2) $n^2 + 8n - 20$

4) $3r^2 - 3r - 60$

6) $n^4 - 9n^3 - 10n^2$

8) $x^3 - 10x^2 + 21x$

10) $6a^2 + 29a + 30$

12) $9k^2 + 73k - 72$

14) $24n^2 - 76n + 40$

16) $9x^2 + 22x + 8$

18) $32x^2 - 18$

20) $20a^2 - 5$

22) $64k^2 - 4$

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Solve each equation by factoring.

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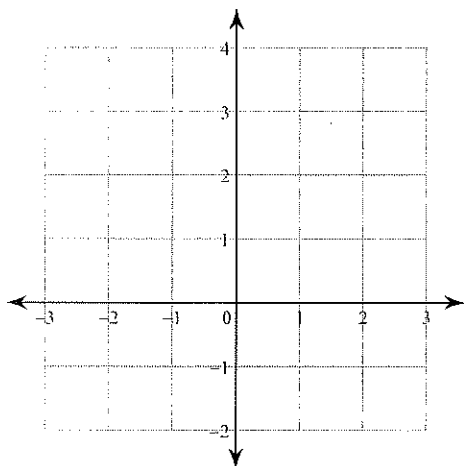
32) $7n^2 = 8n$

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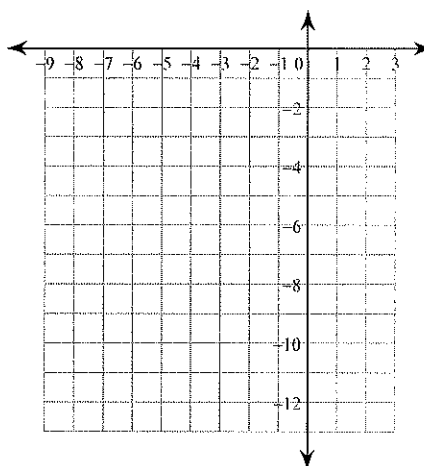
36) $3x^2 + 10x = -8$

Sketch the graph of each function.

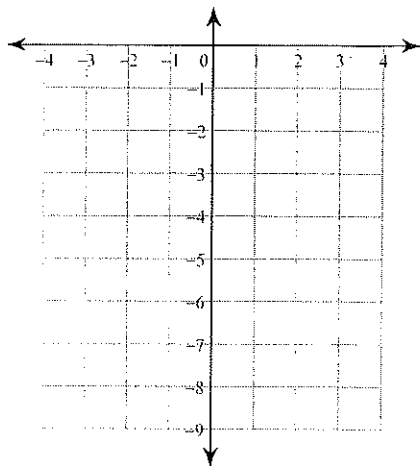
37) $y = -(x + 1)^2 + 3$



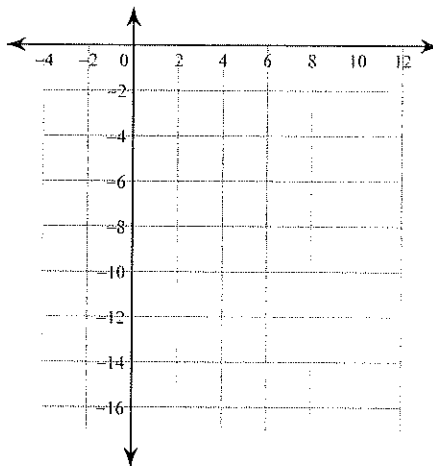
38) $y = -2(x - 1)^2 - 4$



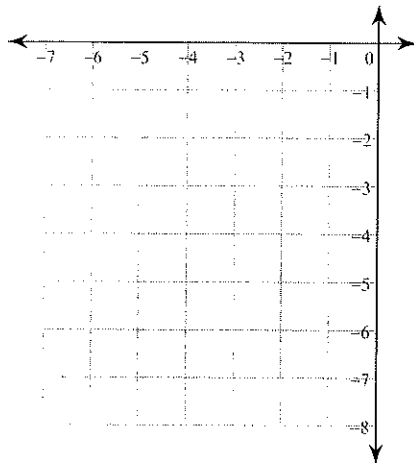
39) $y = -(x - 2)^2 - 4$



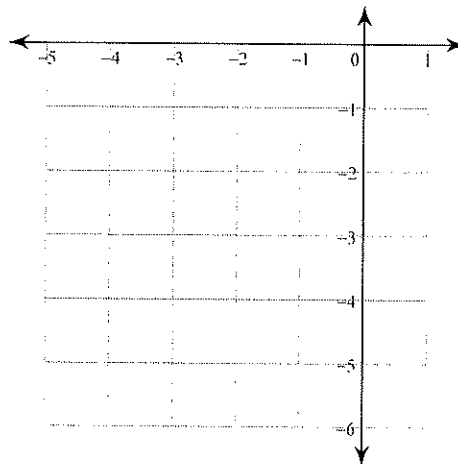
40) $y = -3(x - 1)^2 - 4$



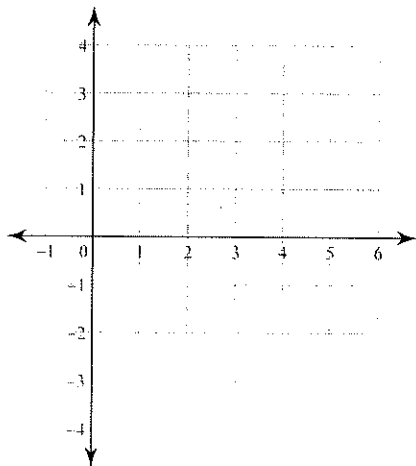
41) $y = -(x + 4)^2 - 3$



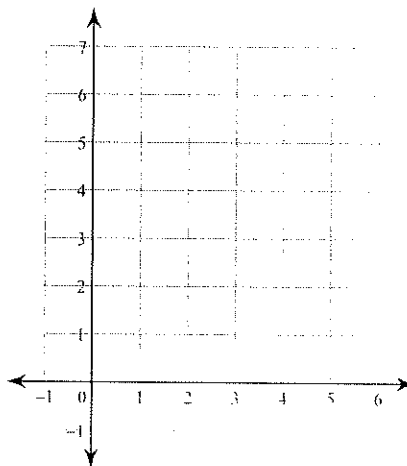
42) $y = -(x + 1)^2 - 1$



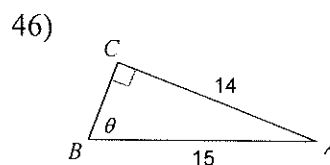
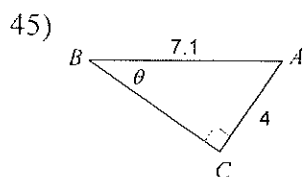
43) $y = -(x - 4)^2 + 2$



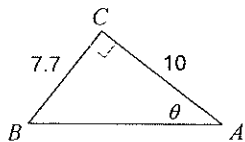
44) $y = (x - 4)^2 + 1$



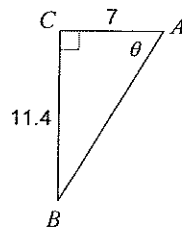
Find the measure of each angle indicated. Round to the nearest tenth.



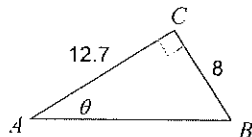
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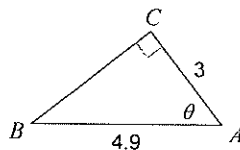
48)



49)

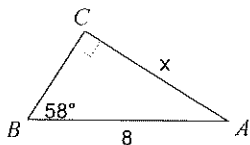


50)

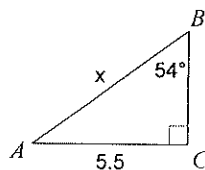


Find the measure of each side indicated. Round to the nearest tenth.

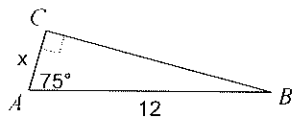
51)



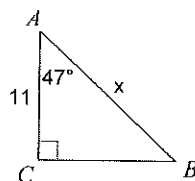
52)



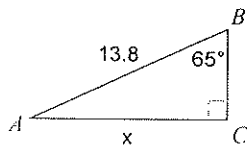
53)



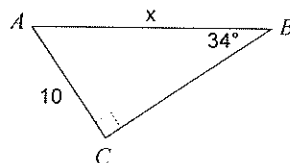
54)



55)



56)



Chapter 2 Test, page 55

- C
- D
- B
- A
- C
- A
- D
- B
- C
- C
- A
- B
- $\angle A = 115^\circ, \angle B = 30^\circ, \angle C = 35^\circ, \angle D = 35^\circ$
- $\angle A = 45^\circ, \angle B = 55^\circ, \angle C = 110^\circ$
- $\angle A = 70^\circ, \angle C = 110^\circ, \angle F = 95^\circ$
- 3880° b) 160° c) 40°
- $\angle A = 30^\circ$ corresponding interior angles
 $\angle I = 65^\circ$ corresponding interior angles
Interior angles
- $\angle I = 150^\circ$
 $\angle I + \angle J = 180^\circ$
 $\angle I = 115^\circ$
 $\angle J = 85^\circ$
- $\angle P + \angle Q + \angle R = 180^\circ$ supplementary angles
 $\angle RST = 70^\circ$
 $\angle RST + \angle RST + 30^\circ = 180^\circ$ Interior angles sum to 180°
 $\angle RST = 75^\circ$
 $\angle QPT = 80^\circ$
 $\angle QPT = \angle RST$ alternate exterior angles
 $\angle QPT \parallel \angle RST$ alternate exterior angles are equal

Therefore, $PQ \parallel RS$.

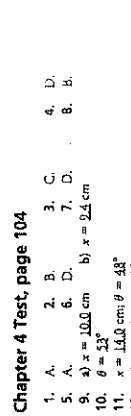
- $AB = AE$ given
 $\angle B = \angle E$ given
 $\angle BAC = \angle EAD$ given
 $\triangle ABC \cong \triangle AED$ ASA
 $AC = AD$ corresponding sides
 $\triangle ACD$ is isosceles.

Chapter 3 Test, page 81

- D
- B
- C
- A
- B
- D
- D
- $a = 13.3$ m, $b = 25.2$ cm, $c = 20.1$ m
- 3.4 cm
- 82°
- 317 m, 2985 m
- 153 m, 76°

Chapter 4 Test, page 104

- A
- B
- C
- D
- A
- D
- B
- $x = 10.0$ cm, $y = 2.4$ cm
- $\theta = 53^\circ$
- $x = 14.0$ cm; $\theta = 48^\circ$
- No triangle is possible.



Chapter 5 Test, page 136

- B
- B
- D
- A
- C
- A
- C
- D
- Brand A: 1873 km
Brand B: 1238 km
- Which range of trunk widths occurs most frequently? $6.0-6.5$ m
 $7.0-7.5$ m
- Intervals of width 1.1
- 16.3528
- The confidence interval is $26\% \pm 3.4\%$, or from 22.6% to 29.4% .
- What is the mean price and standard deviation for each brand?

Store	DVD A (\$)	($x - \bar{x}$) ²	DVD B (\$)	($x - \bar{y}$) ²
1	32.94	5.06	34.59	9.30
2	31.97	10.37	38.99	1.82
3	35.92	0.53	36.99	0.42
4	38.93	22.47	39.99	5.52
5	40.76	38.43	45.99	17.06
6	35.19	—	37.64	—
$\sqrt{\frac{\sum(x - \bar{x})^2}{n}}$	—	3.10	—	2.07

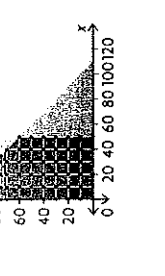
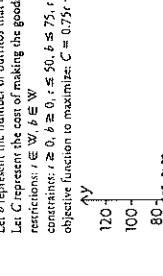
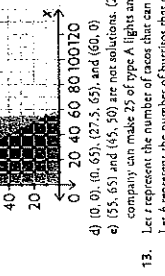
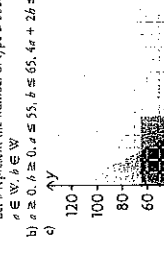
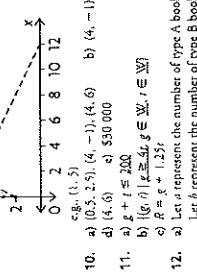
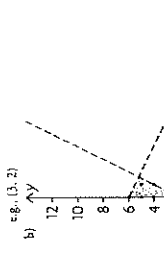
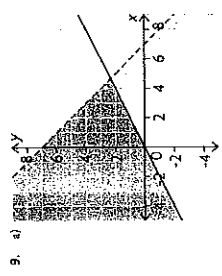
- e.g., Brand A is cheaper, but Brand B is more consistently priced.

Time (h)	Frequency
1.0-2.0	2
2.0-3.0	6
3.0-4.0	9
4.0-5.0	4
5.0-6.0	1
6.0-7.0	1
7.0-8.0	1

- e.g., The frequency polygon is not bell-shaped, so the data is not normally distributed.
- 82%
- 0.13%
- A 2.5% repair rate means that 97.5% of the burners do not need repairs. This represents three standard deviations from the mean, which is 5.5 years. The warranty should be for 5 years.
- 90% b) 75% c) 3.3% or 71.7% to 78.3% d) 71.7 to 78.3

Chapter 6 Test, page 174

- C
- B
- A
- D
- D
- C
- a) (2, 4), (3, 8) b) an open dot



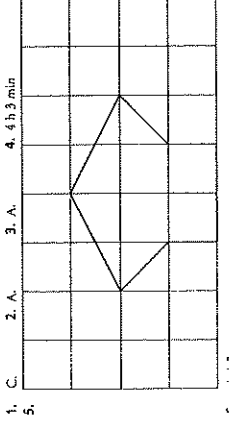
- e.g., (3, 2)
- e.g., (1, 5)
- e.g., (0.5, 2.5), (4, -1), (4, 6) b) (4, -1) c) \$2000
- (4, 6) e) \$30,000
- $x + y = 200$
- $10(x + y) \leq 66, x \leq 10, y \leq 10$
- Let x = number of type A books, y = number of type B books produced in one day.
Let R = revenue, C = cost.
 $R = 1.25x + 1.25y$
 $C = 0.75x + 1.25y$
Let P = profit.
 $P = R - C = 0.5x - 0.25y$
Restrictions: $x \geq 0, y \geq 0, x + y \leq 55, 4x + 2y \leq 240$
- $(0, 0), (0, 65), (27.5, 65),$ and $(60, 0)$
- (55, 65) and (45, 50) are not solutions. (25, 25) is a solution. So, the company can make 25 of type A lights and 25 of type B lights.
- Let x = number of type A lights and y = number of type B lights.
Let C represent the cost of making the goods.
Restrictions: $x \geq 0, y \geq 0, x + y \leq 125$
objective function to maximize: $C = 0.75x + 1.25y$

Their minimum cost will be \$0, if they make no tacos or burritos. Their maximum cost will be \$120, if they make 35 tacos and 75 burritos.

Chapter 7 Test, page 212

- D
- C
- D
- C
- D
- B
- C
- C
- B
- A
- A
- A
12. C
- a) x-intercepts: (-3, 0), (1, 0); y-intercept: (0, 2); axis of symmetry: $x = -1$; vertex: (-1, 3)
- b) range: $\{y \mid y \geq 2\}$
- $x = 2$ and $x = -19$
- $x = -17$ and $x = 19$
- a) $x = -2$ b) $(-2, 27)$ c) $y = -5(x + 2)^2 + 27$
- a) $d = 3, b = -2, c = 1$ b) $a = -2, b = 4, c = -3$
- a) $x = \frac{-3 \pm \sqrt{65}}{2}, x = \frac{-3 \pm \sqrt{65}}{2}$
- $x = \frac{-1 \pm \sqrt{19}}{4}, x = \frac{-1 \pm \sqrt{19}}{4}$
- 13 and 14 or -14 and -13
- 40 cm; 17 cm

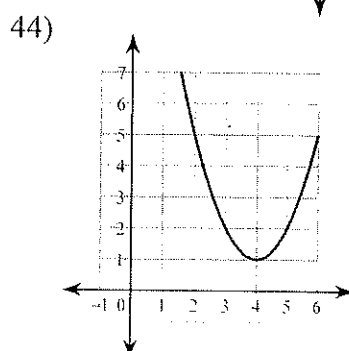
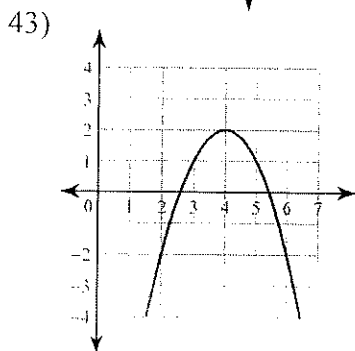
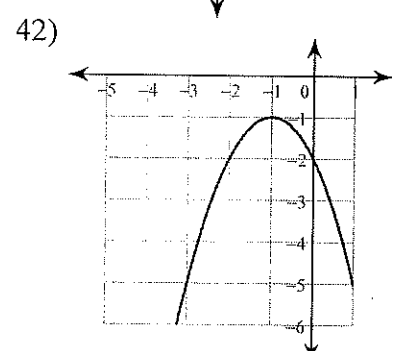
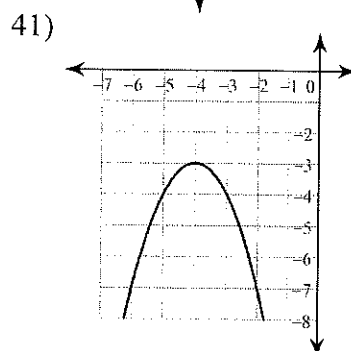
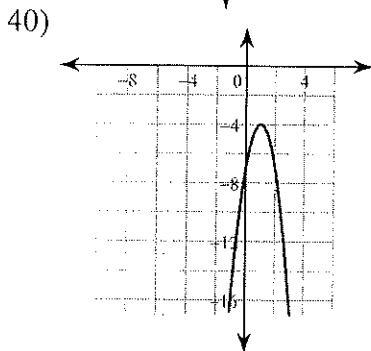
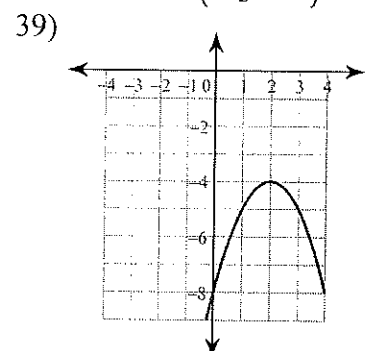
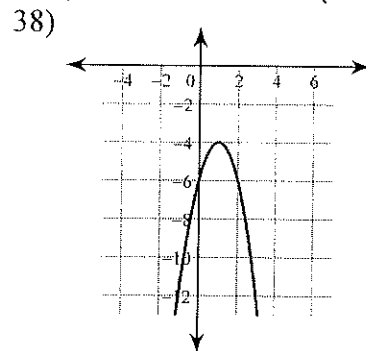
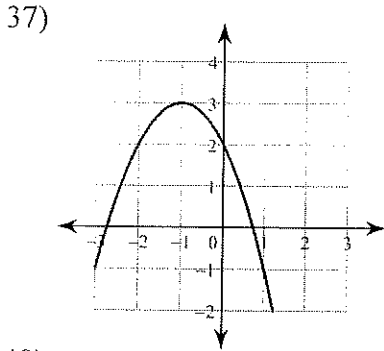
Chapter 8 Test, page 247



- C
- A
- A
- 4, 4, 3 min
- 1.3
- 185, 193 b) 32, 69
- 9 ft tall, 6 ft wide, 15 ft long
- 202.5 cm tall, 168 cm wide, 219 cm long
- 9 min^2
- strategy 1: Determine the unit rates, then multiply by 50 weeks/year.
strategy 2: Use equivalent ratios to solve for the number of hours worked, x , in 50 weeks.
750 h
- Filling up in Canada: unit rate is C\$1.39/L
Filling up in the U.S.: C\$79.77 for 60 L of gas, or unit rate of about \$1.33/L
e.g., \$1.33/L is a little less than \$1.39/L, but buying gas at home would take less time, waste less fuel, and be more convenient. So, buying gas at home makes more sense.

Answers to Year End Review

- | | | | |
|-------------------------------------|---------------------------------------|---------------------------------------|---------------------------------------|
| 1) $k(k-5)(k-7)$ | 2) $(n-2)(n+10)$ | 3) $2(n+1)(n-1)$ | 4) $3(r+4)(r-5)$ |
| 5) $(x+8)(x-8)$ | 6) $n^2(n-10)(n+1)$ | 7) $r(r-4)(r-6)$ | 8) $x(x-7)(x-3)$ |
| 9) $3(p+3)(9p-5)$ | 10) $(2a+3)(3a+10)$ | 11) $6(b+6)(9b-4)$ | 12) $(k+9)(9k-8)$ |
| 13) $5(v-8)(9v+2)$ | 14) $4(2n-5)(3n-2)$ | 15) $3(5x-2)(2x-5)$ | 16) $(x+2)(9x+4)$ |
| 17) $(2b+5)(2b-5)$ | 18) $2(4x+3)(4x-3)$ | 19) $(v+4)(v-4)$ | 20) $5(2a+1)(2a-1)$ |
| 21) $(n+3)(n-3)$ | 22) $4(4k+1)(4k-1)$ | 23) $2(3p+5)(3p-5)$ | 24) $5(4x+3)(4x-3)$ |
| 25) $\{4, 6\}$ | 26) $\{-4\}$ | 27) $\{-8, -3\}$ | 28) $\{-8, 6\}$ |
| 29) $\{-4, 6\}$ | 30) $\{4, 7\}$ | 31) $\left\{\frac{8}{7}, 7\right\}$ | 32) $\left\{\frac{8}{7}, 0\right\}$ |
| 33) $\left\{\frac{4}{5}, 2\right\}$ | 34) $\left\{-\frac{5}{2}, -6\right\}$ | 35) $\left\{-\frac{6}{7}, -8\right\}$ | 36) $\left\{-\frac{4}{3}, -2\right\}$ |



45) 34.3°

- | | | | |
|------------------|------------------|------------------|------------------|
| 46) 69° | 47) 37.6° | 48) 58.4° | 49) 32.2° |
| 50) 52.2° | 51) 6.8 | 52) 6.8 | 53) 3.1 |
| 54) 16.1 | 55) 12.5 | 56) 17.9 | |