

Academic

Grade 9 Assessment of Mathematics

2010

SAMPLE ASSESSMENT QUESTIONS

**Record your answers to the multiple-choice questions
on the Student Answer Sheet (2010, Academic).**

Education Quality and
Accountability Office

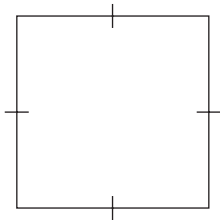


Please note: The format of this booklet is different from that used for the assessment. The items themselves remain the same.

1 What is the value of $6x^2$ when $x = \frac{1}{3}$?

- a $\frac{2}{9}$
- b $\frac{2}{3}$
- c 2
- d 4

2 Chris has a square garden with an area of 38.4 m^2 , as shown in the diagram.



He decreases the length of each side by 1.7 m to make a smaller garden.

Which is closest to the perimeter of the smaller garden?

- a 37 m
- b 32 m
- c 25 m
- d 18 m

3 The sum of the perimeters of two shapes is represented by $13x + 4y$.

The perimeter of one shape is represented by $4x - 2y$.

Which expression represents the perimeter of the other shape?

- a $9x + 2y$
- b $9x + 6y$
- c $17x + 2y$
- d $17x + 6y$

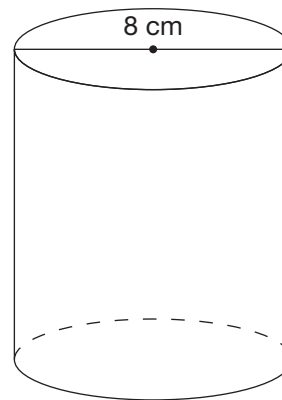
4 Consider the expression below.

$$3x^2(5x^2 - 2x + 1)$$

Which of the following is equivalent to this expression?

- a $8x^2 - 2x + 1$
- b $8x^2 + x + 4$
- c $15x^4 - 2x + 1$
- d $15x^4 - 6x^3 + 3x^2$

5 The cylinder below has a volume of 150 cm^3 .



Which of the following is closest to the area of the lateral surface of the cylinder?

Hint:

$$V_{\text{cylinder}} = \pi r^2 h$$

$$A_{\text{lateral surface}} = 2\pi r h$$

- a 38 cm^2
- b 75 cm^2
- c 150 cm^2
- d 300 cm^2

6 Part-Time Job

Ezre works part-time at a clothing store. He earns \$80 per week plus 6% of the value of his weekly sales.

This week Ezre earns \$119.

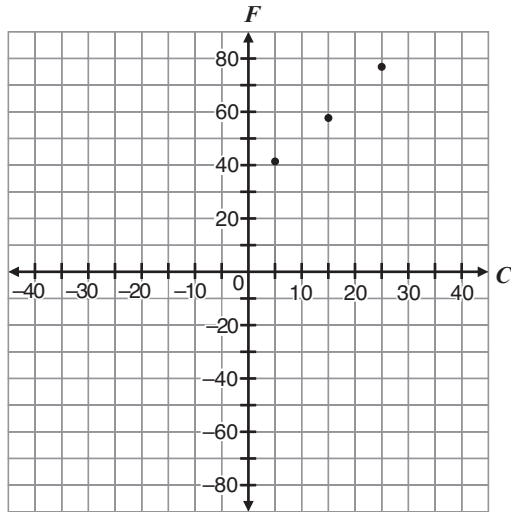
What is the total value of his sales this week?

Show your work.

The total value of his sales is _____.

7 Consider the following chart and graph.

Temperature in degrees Celsius, C	Temperature in degrees Fahrenheit, F
5°	41°
15°	59°
25°	77°



What temperature in degrees Celsius is equivalent to -20°F ?

- a -4°C
- b -18°C
- c -29°C
- d -40°C

8 A bus is rented for a class field trip. The transportation cost for the trip is made up of \$225 to rent the bus, \$50 for gas and \$2 for each bus seat.

Which relation below describes the total transportation cost for the trip if C is the total cost in dollars and n is the number of seats?

- a $C = -2n + 225$
- b $C = -2n + 275$
- c $C = 2n + 225$
- d $C = 2n + 275$

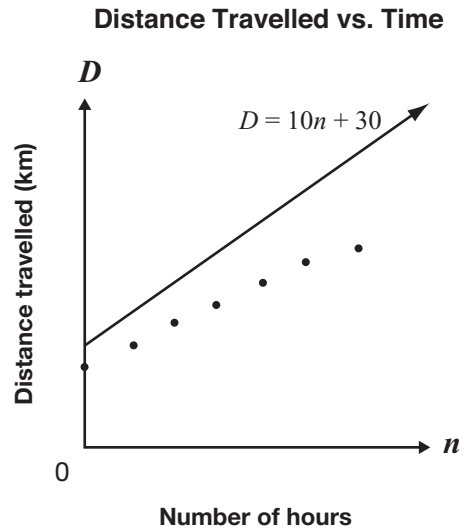
9 A sports company uses the equation $C = 8t + 5$ to represent the relationship between the total amount charged to rent a canoe, C , in dollars and the rental time, t , in hours.

What is the initial charge to rent a canoe?

- a \$0
- b \$5
- c \$8
- d \$13

10 Data on distance travelled and the number of hours spent travelling are shown on the graph below.

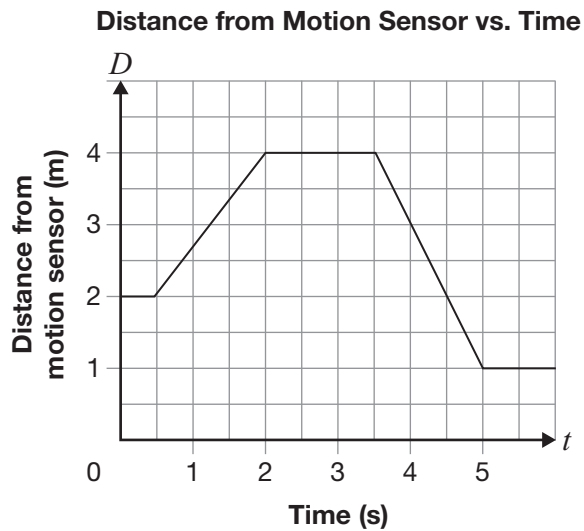
The line $D = 10n + 30$ is also shown on the graph.



Which equation best represents the line of best fit for the data shown?

- a $D = 5n + 33$
- b $D = 8n + 23$
- c $D = 10n + 18$
- d $D = 12n + 25$

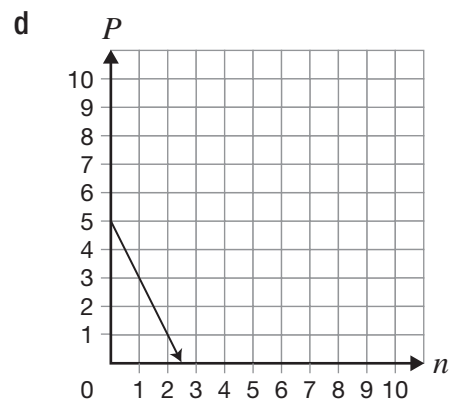
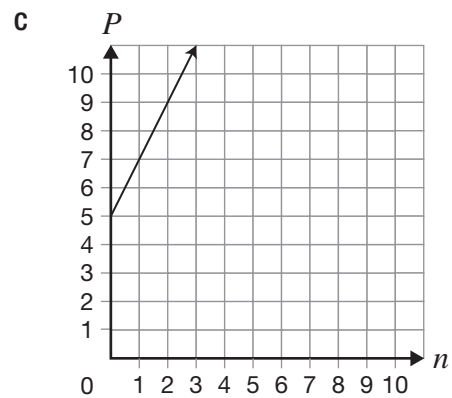
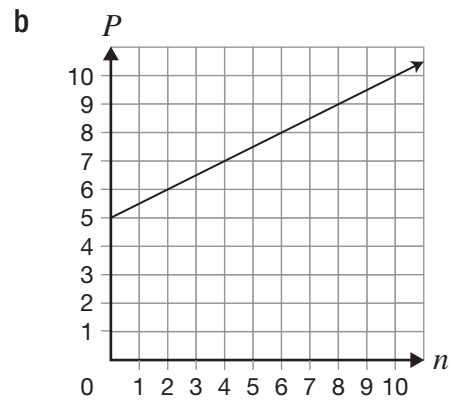
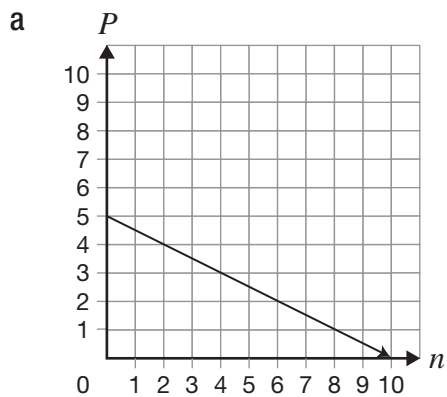
- 11** Tyler walks along a line leading from a motion sensor. The graph below shows information about Tyler's walk.



Which of the following is closest to Tyler's speed in metres per second as he walks toward the motion sensor?

- a 2.0
 b 1.3
 c 0.8
 d 0.5
- 12** Which graph represents the equation

$$P = -\frac{1}{2}n + 5$$



13 What's the Charge?

The table below represents the linear relationship between cost and repair time at an appliance store.

Repair time, t (h)	Cost, C (\$)
3	205
6	385
8	505

Determine the initial value of this relationship. Show your work.

Initial value: _____

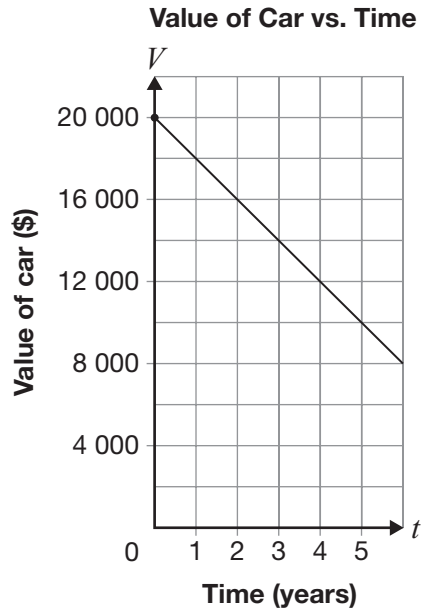
Is this relationship a direct or a partial variation?

Circle one: Direct variation Partial variation

Justify your answer.

14 Hot New Wheels

Cybelle and Peter each buy a car. The graph below represents the value of Cybelle's car over time.



Peter's car costs less than Cybelle's. The value of both cars changes at the same rate.

Determine a possible equation to represent the relationship between the value of Peter's car, V , in dollars, and time, t , in years.

$$V = \underline{\hspace{10em}}$$

Justify your equation.

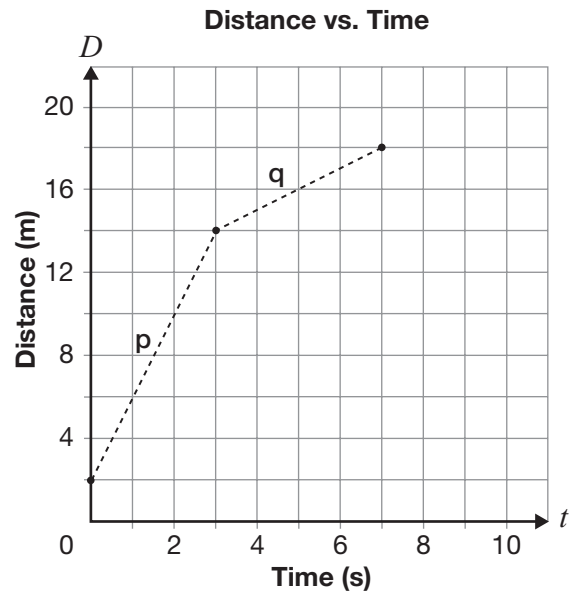
15 Which of the following represents an equation of a line?

- a $y = 2^x$
- b $y = x^2 - 5$
- c $x^2 + y^2 - 25 = 0$
- d $2x + 3y - 5 = 0$

16 What are the slope, m , and y -intercept, b , of the line represented by $3x - 2y + 16 = 0$?

- a $m = \frac{3}{2}, b = 8$
- b $m = \frac{2}{3}, b = -16$
- c $m = -\frac{2}{3}, b = -8$
- d $m = -\frac{3}{2}, b = 16$

17 The graph below represents the relationship between distance and time on Javier’s walk.



How much greater is Javier’s speed in section p than in section q?

- a 0.5 m/s
- b 1.5 m/s
- c 2.0 m/s
- d 3.0 m/s

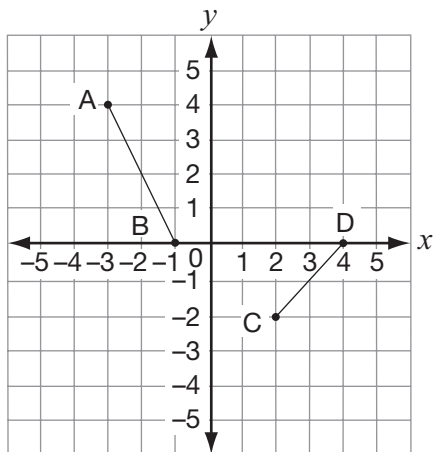
18 The total cost of hiring Beth’s Plumbing Services is represented by the equation $C = 50t + 70$, where C is the total cost in dollars and t is the time in hours.

Next month, the rate will change to \$60 per hour, but the initial charge will stay the same.

Which of the following describes how the graph of the relation will change?

- a The steepness of the line will increase.
- b The steepness of the line will decrease.
- c The vertical intercept will increase by 10 units.
- d The vertical intercept will decrease by 10 units.

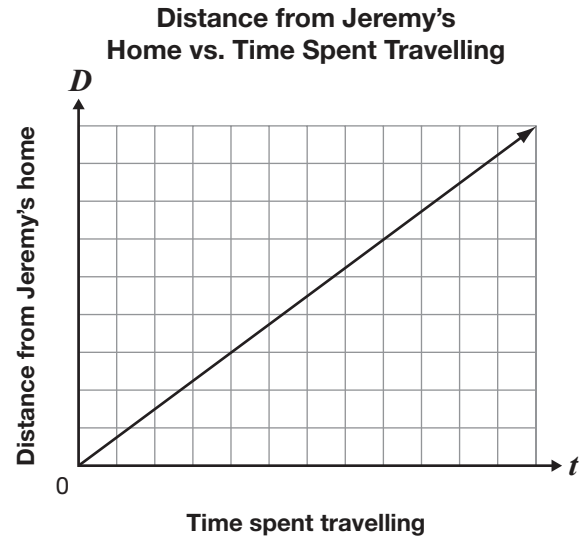
- 19 Consider the following graph.



Which statement is **false**?

- a The slope of AB is -2 .
 - b The slope of CD is 1 .
 - c The y -intercept of the line through CD is -4 .
 - d The y -intercept of the line through AB is -1 .
- 20 Janelle draws a line that passes through the points $(-1, 6)$ and $(0, 3)$. If Janelle writes the equation of the line in $y = mx + b$ form, what are the values of m and b ?
- a $m = -9$
 $b = 3$
 - b $m = -3$
 $b = 6$
 - c $m = -9$
 $b = 6$
 - d $m = -3$
 $b = 3$

- 21 Last weekend, Jeremy travelled from his home to a friend's house. The graph below represents the relation between D , the distance from Jeremy's home, and t , the time spent travelling to his friend's house.



This weekend, Jeremy travels to his friend's house but leaves from school. Jeremy's school is between his house and his friend's house.

If he travels at a faster rate this weekend, how will the line representing this trip compare to the line representing the previous trip?

This new line will

- a start at a higher point and be steeper.
- b start at a higher point and be less steep.
- c start at the current point and be steeper.
- d start at the current point and be less steep.

22 The New Line

A line has

- the same slope as the line represented by $4x - 3y + 15 = 0$ and
- the same y -intercept as the line represented by $2x + y + 6 = 0$.

Determine an equation of this line.

Show your work.

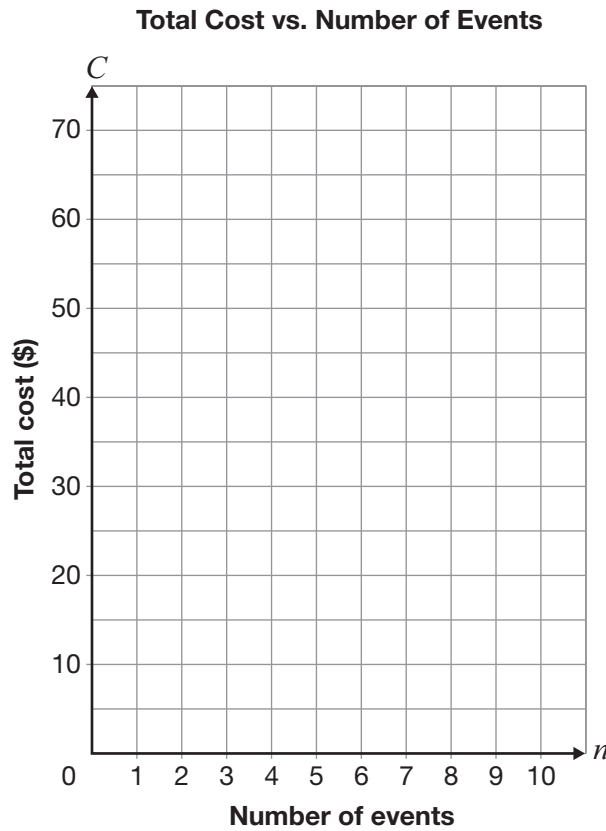
23 Event-full

At Lowell High School, the cost to attend special events depends on whether or not a student has purchased a \$10 discount card.

Option A: The student buys a discount card. The cost is \$5 per event.

Option B: The student does not buy a discount card. The cost is \$7.50 per event.

Graph the relationship between total cost and number of events for each option on the grid.



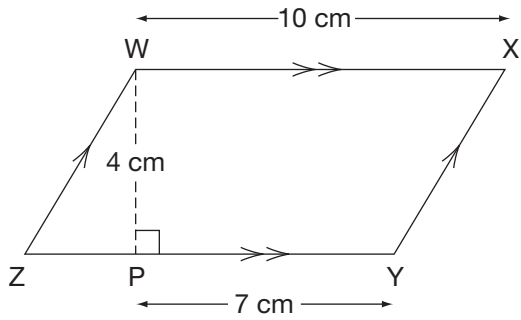
Determine the conditions under which a student at Lowell High School should choose each option.

Justify your answer.

- 24** Ella wants a rectangle with
- a perimeter of 100 cm and
 - the largest possible area.

What are the dimensions of the rectangle that satisfies her conditions?

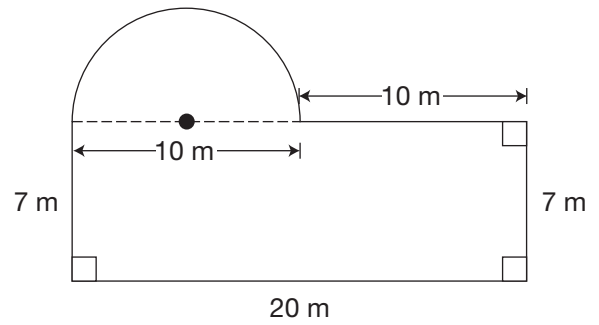
- a 10 cm × 10 cm
 - b 20 cm × 30 cm
 - c 25 cm × 25 cm
 - d 40 cm × 60 cm
- 25** Consider the parallelogram shown below.



What is the perimeter of WXYZ?

- a 28 cm
- b 30 cm
- c 31 cm
- d 34 cm

- 26** A garden is in the shape of a rectangle and a semicircle as shown below.



Which of the following is closest to the amount of fencing needed to enclose the garden?

- a 60 m
- b 70 m
- c 75 m
- d 85 m



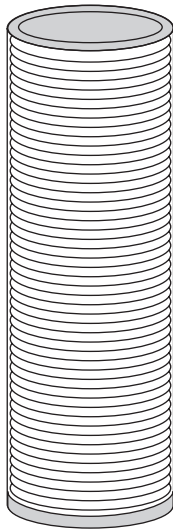
- 27** The playing chips of a board game are stored in cylindrical plastic cases. The plastic cases have a volume of $25\,120\text{ mm}^3$ and a diameter of 40 mm .

Playing Chip

← 40 mm →

**Plastic Case**

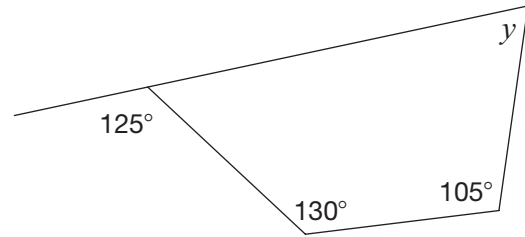
← 40 mm →



Which of the following is closest to the height of one playing chip if 50 playing chips can fit tightly into the plastic case as shown above?

- a 0.1 mm
- b 0.4 mm
- c 1.3 mm
- d 2.5 mm

- 28** Consider the diagram below.

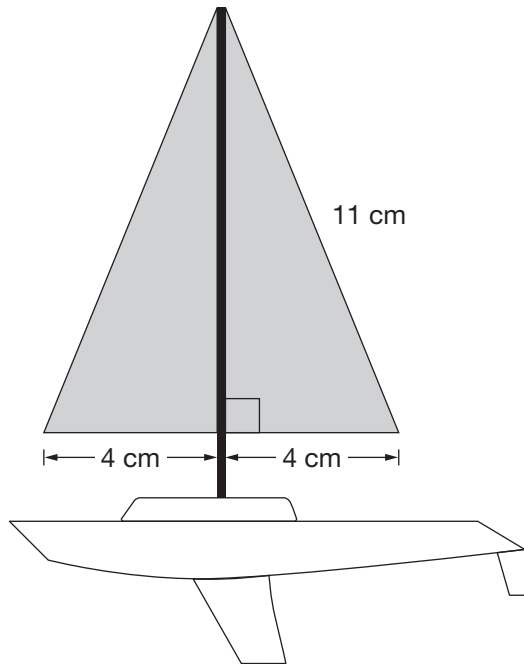


Which of the following is the value of y in the diagram?

- a 55°
 - b 70°
 - c 125°
 - d 130°
- 29** What is the sum of the interior angles of a 12-sided regular polygon?
- a 1080°
 - b 1800°
 - c 1980°
 - d 2160°

30 Toy Sailboats

Emelina makes toy sailboats as shown below.

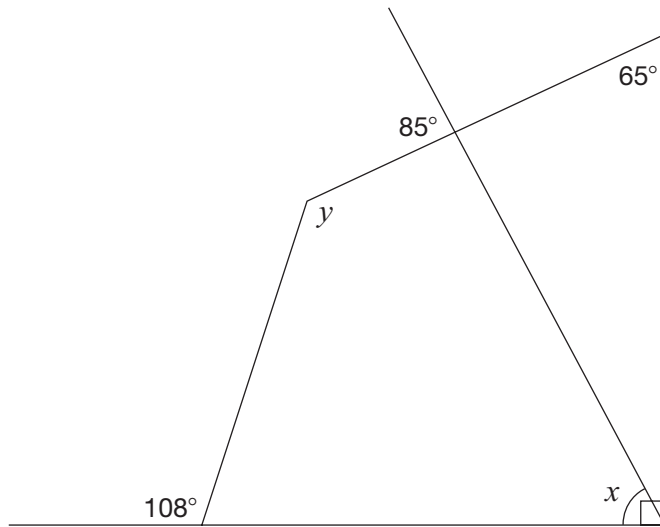


Determine the total area of the shaded sails.

Show your work.

31 What's Missing?

Consider the diagram below.



Complete the table below.

Justify your answers using geometric properties.

Angle measure	Justification
$x =$ _____	
$y =$ _____	

Sample Assessment Questions: Academic

Answer Key

1. (a) ● (c) (d)
2. (a) (b) (c) ●
3. (a) ● (c) (d)
4. (a) (b) (c) ●
5. (a) ● (c) (d)
6. Respond in booklet.
7. (a) (b) ● (d)
8. (a) (b) (c) ●

9. (a) ● (c) (d)
10. (a) ● (c) (d)
11. ● (b) (c) (d)
12. ● (b) (c) (d)
13. Respond in booklet.
14. Respond in booklet.
15. (a) (b) (c) ●
16. ● (b) (c) (d)

17. (a) (b) (c) ●
18. ● (b) (c) (d)
19. (a) (b) (c) ●
20. (a) (b) (c) ●
21. ● (b) (c) (d)
22. Respond in booklet.
23. Respond in booklet.
24. (a) (b) ● (d)

25. (a) ● (c) (d)
26. ● (b) (c) (d)
27. (a) ● (c) (d)
28. (a) ● (c) (d)
29. (a) ● (c) (d)
30. Respond in booklet.
31. Respond in booklet.

End of Assessment

Applied

Grade 9 Assessment of Mathematics

2010

SAMPLE ASSESSMENT QUESTIONS

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Please note: The format of
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the same.

- 1** Tommy uses the proportion below to determine the amount of butter, x , to use with 120 grams of sugar in his cookie recipe.

$$\frac{2}{3} = \frac{x}{120}$$

How many grams of butter does Tommy need?

- a 40
 - b 80
 - c 180
 - d 240
- 2** The chart below shows the mass and the cost for different brands of cookies.

Brand	Mass (g)	Cost (\$)
1	200	1.99
2	250	2.29
3	300	2.89
4	450	4.29

Which brand costs the least per gram?

- 3** Tierney goes to the movie theatre and has \$20 to spend on treats.

Soft drink	\$2.29
Chocolate bars	\$1.69
Popcorn	\$3.49

She buys two soft drinks, a chocolate bar and popcorn. She also pays 13% tax.

How much change should Tierney receive from her \$20?

- a \$8.97
 - b \$9.76
 - c \$11.03
 - d \$11.55
- 4** There are 260 Grade 9 students at a high school and 80% of these students attend a dance. Half the Grade 9 students who attend the dance buy their tickets at the door.
- How many Grade 9 students who attend the dance buy their tickets at the door?
- a 40
 - b 104
 - c 130
 - d 208
- 5** Which expression represents the volume of a cube with a side length of x ?
- a x^2
 - b x^3
 - c $3x$
 - d $6x$

- 6** What is the value of the expression $\left(\frac{x}{3}\right)^2$ when $x = 18$?
- a 2
 - b 12
 - c 36
 - d 108
- 7** The cost of a phone call at a hotel is determined by the formula $C = 0.35t + 0.6$ where C is the cost, in dollars, and t is the length of the call, in minutes.
- What is the length of a call that costs \$5.85?
- a 3 minutes
 - b 6 minutes
 - c 15 minutes
 - d 18 minutes



8 Fill 'Er Up

The table below shows the cost of water for three customers. They each pay the same cost per litre.

Amount (L)	Cost (\$)
10 000	8.60
20 000	17.20
30 000	25.80

Frank pays \$36.12 for water at the same rate.

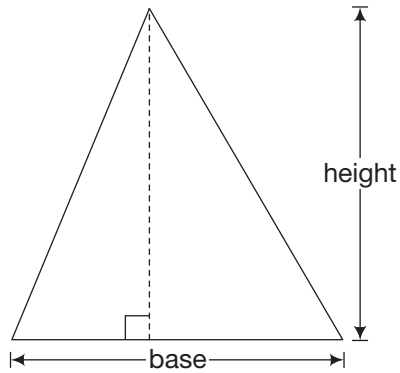
Determine the number of litres of water that he purchases.

Show your work.



9 Sail Away

Alain designs a sail in the shape of a triangle for a boat.



The base and height are equal. The area of the sail is 18 m^2 .

Determine the height of the sail.

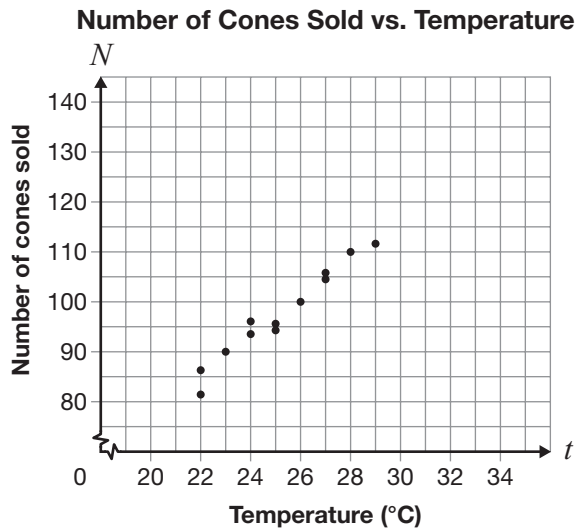
Hint:

$$A = \frac{bh}{2}$$

Show your work.

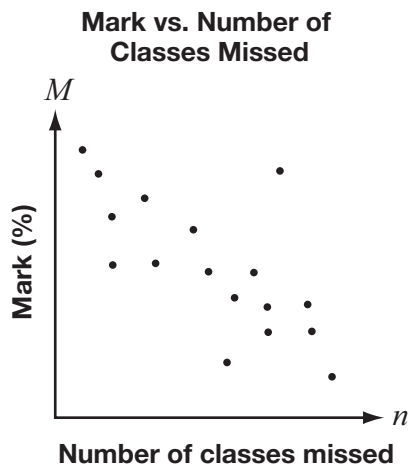
The height of the sail is _____.

- 10** Malia records the number of ice cream cones she sells each day and the maximum daily temperature, as shown on the graph below.

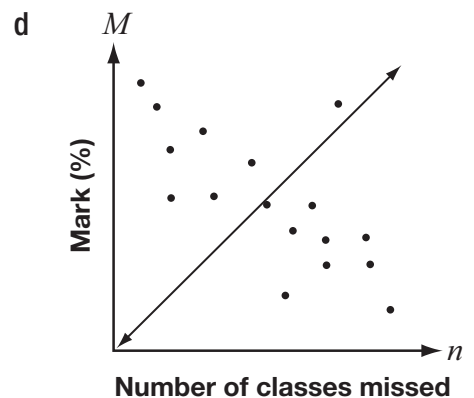
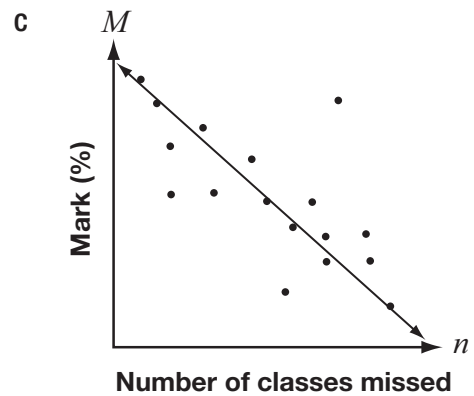
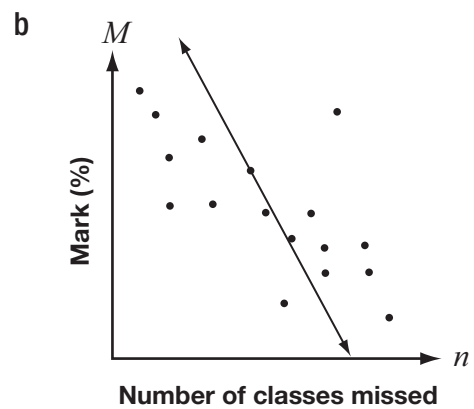
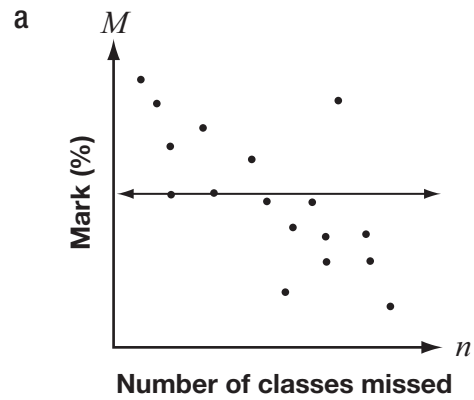


According to this graph, approximately how many ice cream cones will Malia sell on a day when the maximum temperature is 36°?

- a 80
 - b 110
 - c 115
 - d 135
- 11** This graph shows the relationship between students' marks and the number of classes that they have missed.



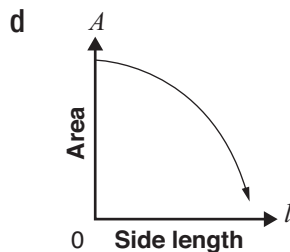
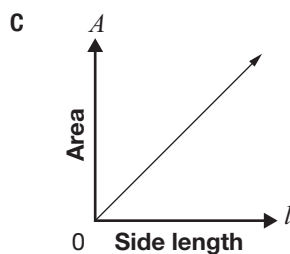
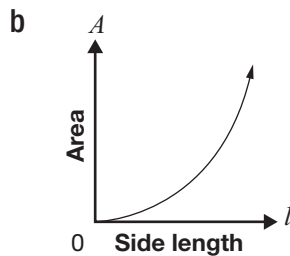
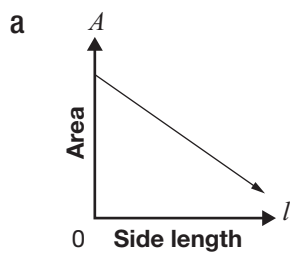
Which line of best fit is most appropriate for the data?



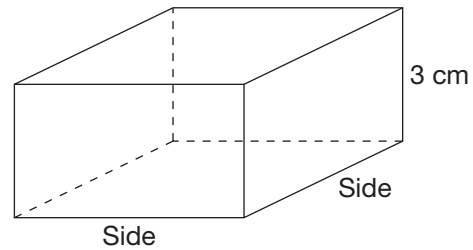
- 12** A student creates a table to show the relationship between the side length of a square and its area.

Side length	Area
1	1
2	4
3	9
4	16
5	25

Which of the graphs below best represents this relationship?



- 13** The square-based prism below has a height of 3 cm.



Hint:

$$V = (\text{area of base})(\text{height})$$

Which table represents the relationship between the side length and the volume of this prism?

a

Side length (cm)	Volume (cm ³)
1	3
2	12
3	27
4	48
5	75

b

Side length (cm)	Volume (cm ³)
1	3
2	6
3	9
4	12
5	15

c

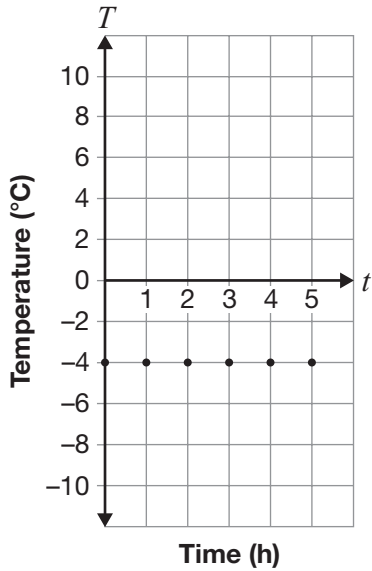
Side length (cm)	Volume (cm ³)
1	1
2	4
3	9
4	16
5	25

d

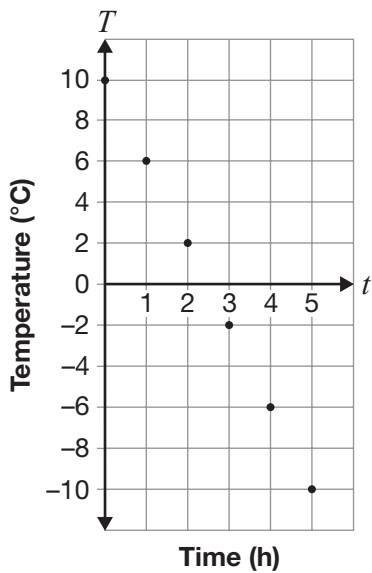
Side length (cm)	Volume (cm ³)
1	1
2	8
3	27
4	64
5	125

14 The following graphs represent a linear relationship between temperature and time.
Which graph has a rate of change of $-4\text{ }^{\circ}\text{C}$ per hour?

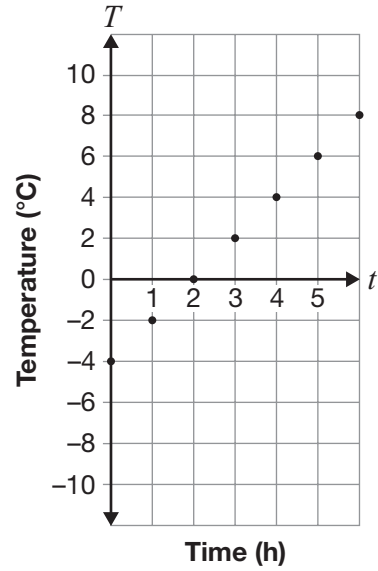
a Temperature vs. Time



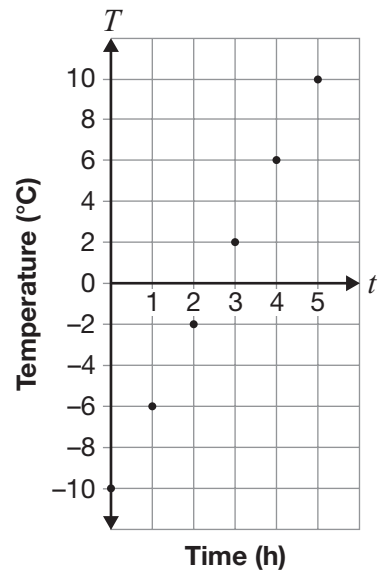
b Temperature vs. Time



c Temperature vs. Time



d Temperature vs. Time



- 15** Sarah is running a 40 km race at a steady pace of 10 km/h.

Which equation represents the distance Sarah has left to run after she starts if D is the distance in kilometres and t is the time in hours since she started the race?

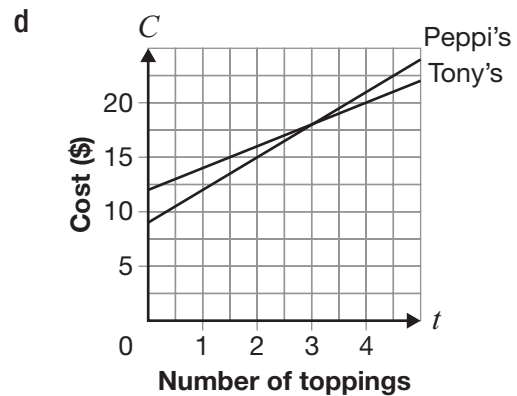
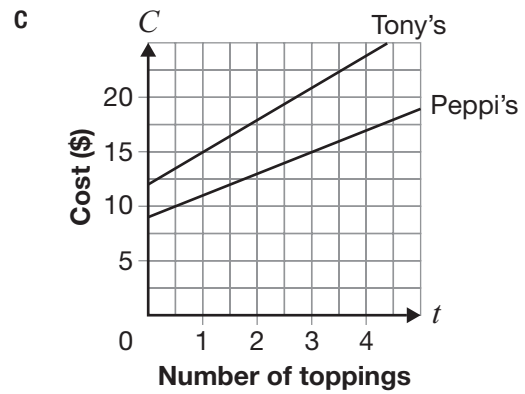
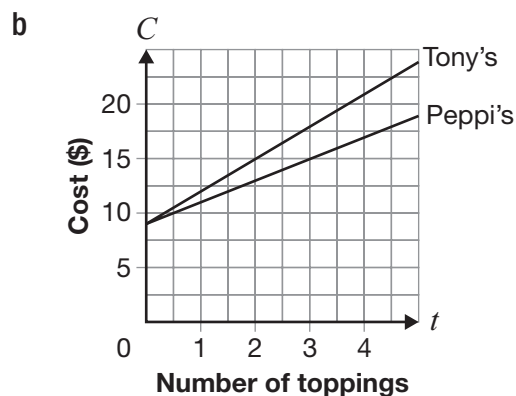
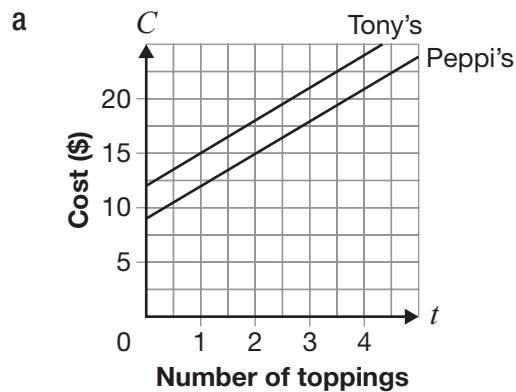
- a $D = 40 - 10t$
 b $D = 40 + 10t$
 c $D = 10 - 40t$
 d $D = 10 + 40t$

- 16** The equations for the cost of a pizza at two restaurants are shown below, where C represents the cost in dollars and t represents the number of toppings.

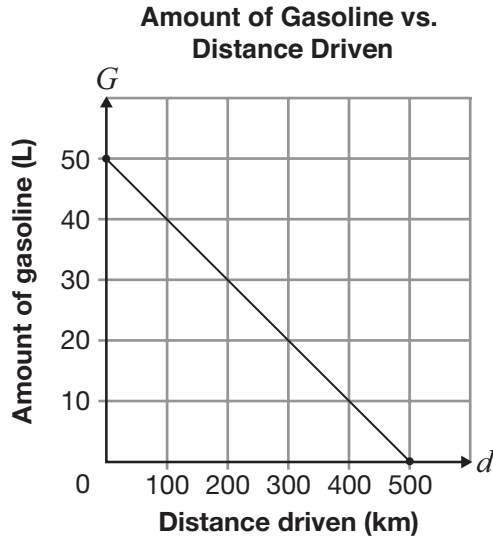
Peppi's Pizzeria $C = 9 + 3t$

Tony's Pizza $C = 12 + 2t$

Which graph best represents the cost of a pizza at each restaurant?



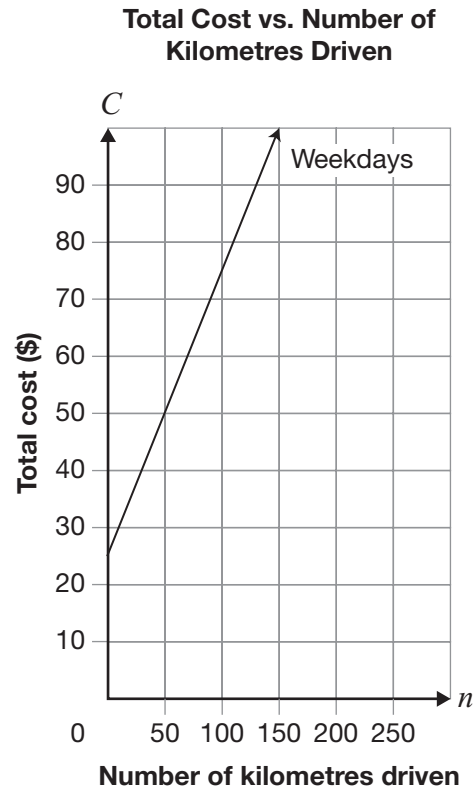
- 17** The graph below illustrates the relationship between the distance driven and the amount of gasoline in the tank of a car.



How many litres of gasoline are in the car's tank when the distance driven is 300 km?

- a 10
 - b 20
 - c 40
 - d 50
- 18** One day, the temperature at 5 p.m. is 4°C . For the next 6 hours, the temperature drops 2°C every hour. What is the temperature at 11 p.m.?
- a 2°C
 - b -2°C
 - c -6°C
 - d -8°C

- 19** The total cost of renting a car on weekdays is represented by the graph below.



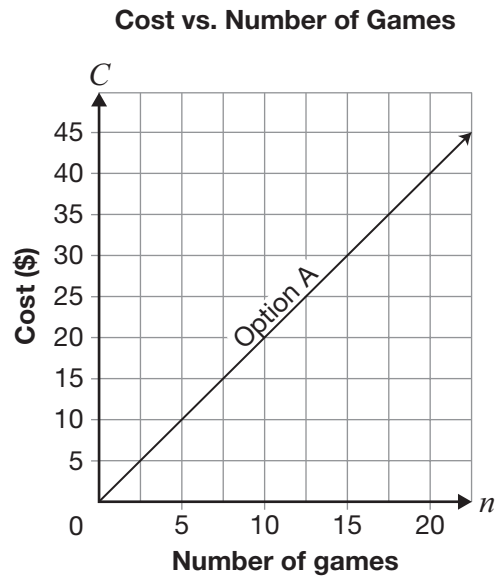
On weekends, the flat fee remains the same but the cost per kilometre is less.

Which of the following statements is true about the graph for weekends?

- a The weekend graph goes through the point $(0, 0)$.
- b The weekend graph stays the same as the weekday graph.
- c The initial cost is the same but the weekend graph is steeper than the weekday graph.
- d The initial cost is the same but the weekend graph is less steep than the weekday graph.

- 20** Parallel Pines Bowling Alley offers two options.

A graph representing the cost of Option A is shown below.



Option B charges \$30 for unlimited bowling.

Which of the following is true?

- a Option A is always cheaper.
- b Option B is always cheaper.
- c Option A is cheaper for fewer than 15 games.
- d Option B is cheaper for fewer than 15 games.



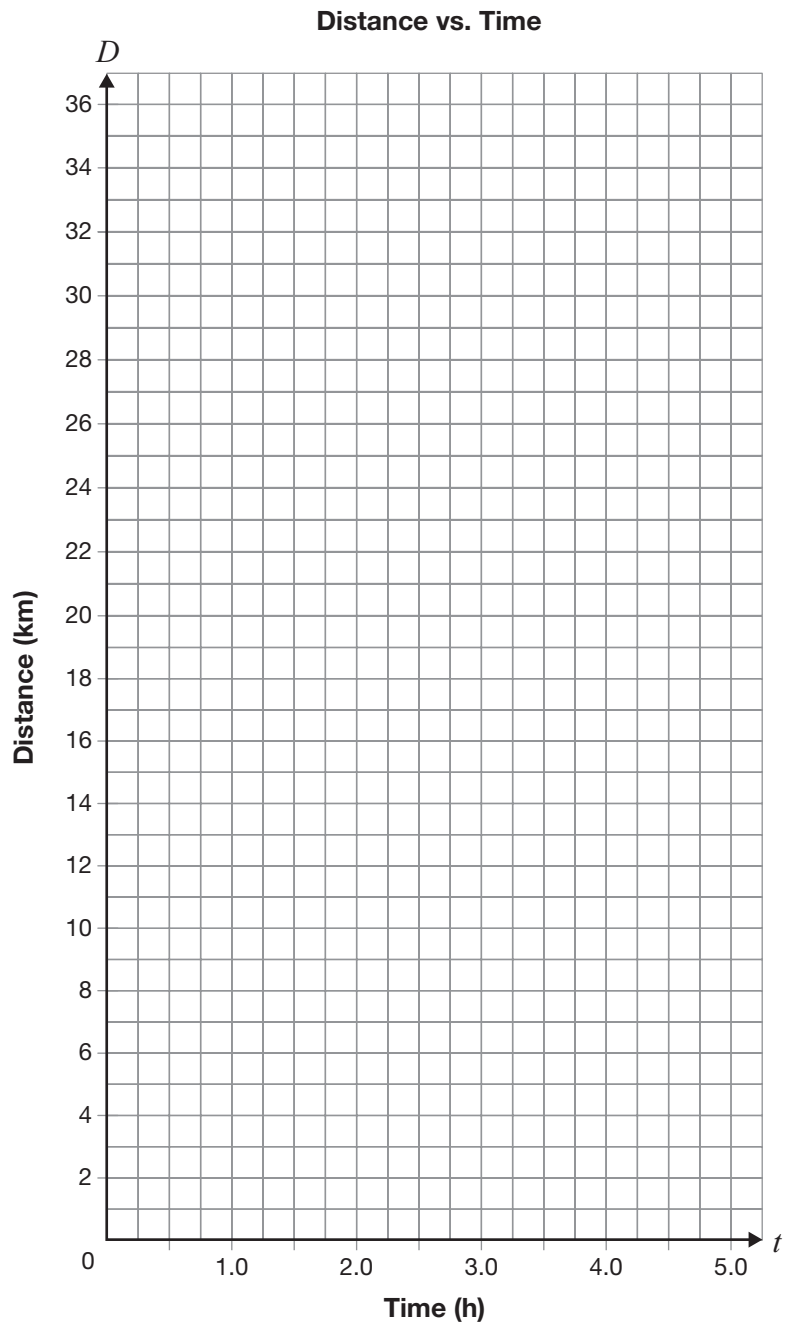
21 **Marathon Man**

Manny is running a race at a constant rate. He records his distance from the starting line at particular times as shown below.

Complete the table for this linear relationship.

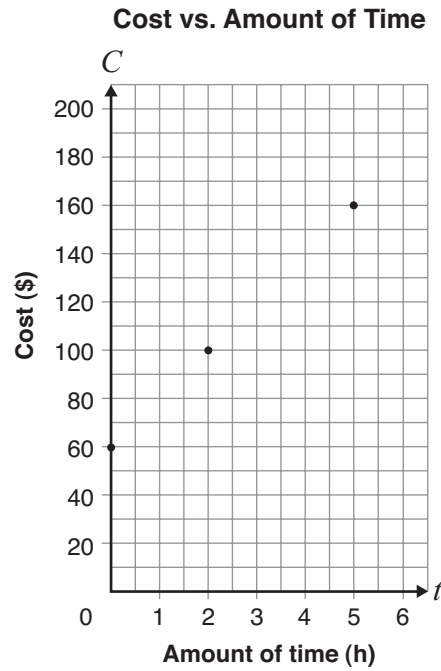
Time, t (h)	Distance, D (km)
0.5	3.5
1.0	
1.5	10.5
2.0	14.0
3.0	
5.0	

Graph this relationship on the grid.



22 Gym Time

The graph below shows the relationship between the cost of renting a gym and the amount of time the gym is used.



Determine the hourly rental rate.

The hourly rental rate is _____.

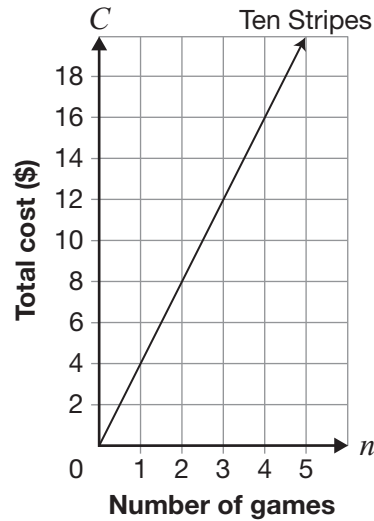
Show your work.

23 Bowling Variations

There are two bowling alleys in town.

The total cost of bowling at Ten Stripes Bowling is represented by the graph below. Ten Stripes offers free shoe rental.

Total Cost vs. Number of Games

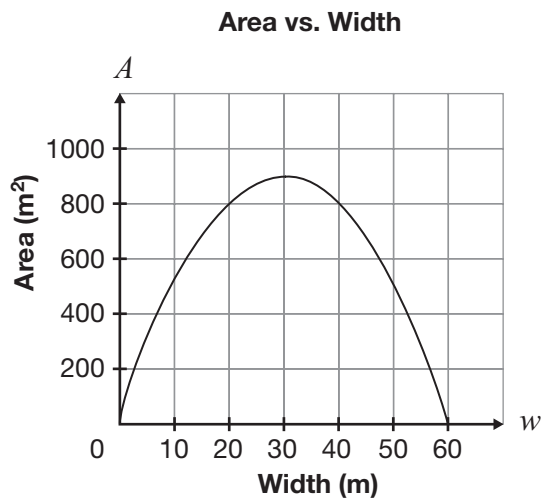


The total cost of bowling at Supreme Bowling is \$4 for shoe rental plus \$3 per game.

Complete the chart.

Ten Stripes Bowling	Supreme Bowling
The initial value is _____.	The initial value is _____.
Circle one: Direct variation Partial variation	Circle one: Direct variation Partial variation
Justification of choice of type of variation:	Justification of choice of type of variation:

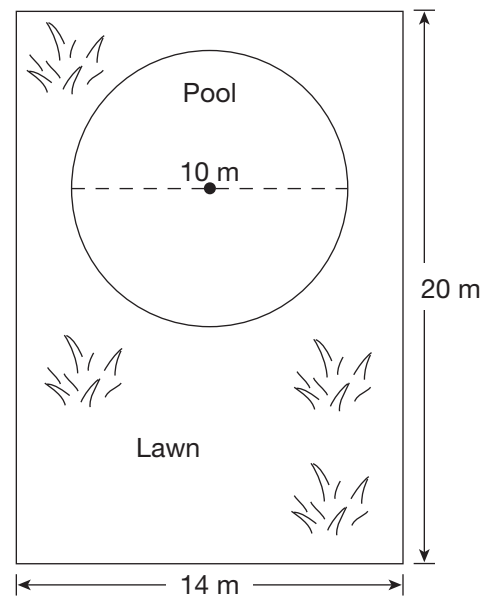
- 24** A rectangle is to have a perimeter of 120 m. The graph below shows the relationship between the area of the rectangle and its width.



What is the width of the rectangle with the largest area?

- a 30 m
- b 60 m
- c 120 m
- d 900 m

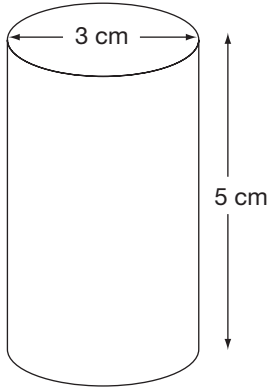
- 25** Gordon has a circular pool in his backyard, as shown below.



Which of the following is closest to the area of the lawn surrounding the pool?

- a 33.5 m^2
- b 34.2 m^2
- c 201.5 m^2
- d 248.6 m^2

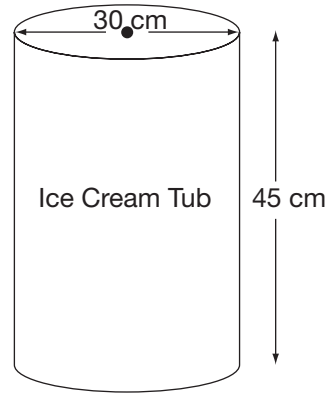
- 26** The water container below needs to be filled.



Which of the following represents the volume, in cm^3 , of water that fills the container?

- a $V = \pi(3^2)(5)$
- b $V = \pi(1.5)(5)$
- c $V = \pi(2 \times 3)(5)$
- d $V = \pi(1.5)^2(5)$

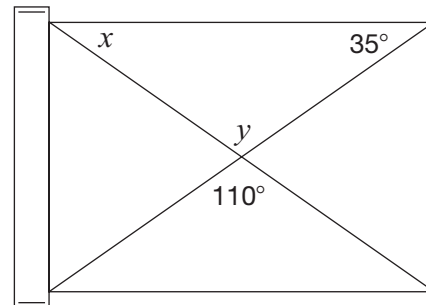
- 27** An ice cream shop sells ice cream cones that each contain an average of 525 cm^3 of ice cream. The ice cream is served from the following cylindrical tub.



About how many cones can be made from a full tub of ice cream with the dimensions shown?

- a 8
- b 16
- c 60
- d 242

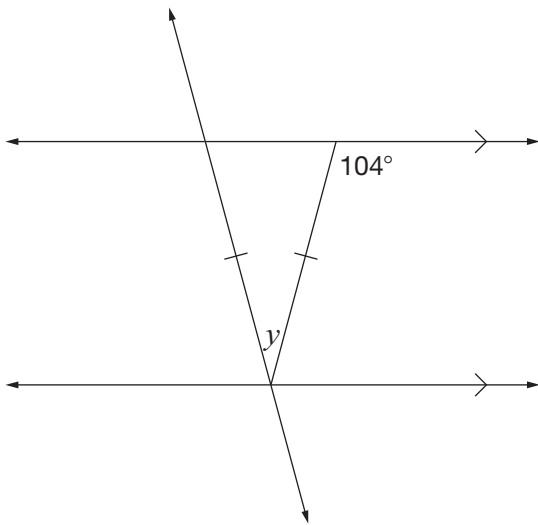
- 28** A carpenter is building a rectangular gate for a fence, as shown below.



What are the values of x and y ?

- a $x = 35^\circ, y = 110^\circ$
- b $x = 35^\circ, y = 145^\circ$
- c $x = 55^\circ, y = 110^\circ$
- d $x = 55^\circ, y = 145^\circ$

29 Consider the diagram below.



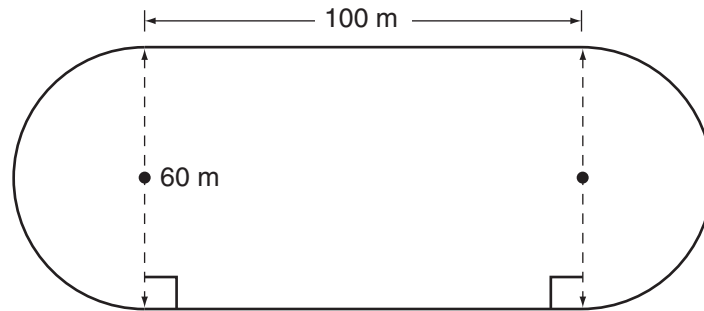
What is the value of y ?

- a 28°
- b 76°
- c 104°
- d 152°



30 Get Trackin'

Ashley runs around the following track.



How many times must she run around the track in order to run a total distance of 4 km?

Show your work.

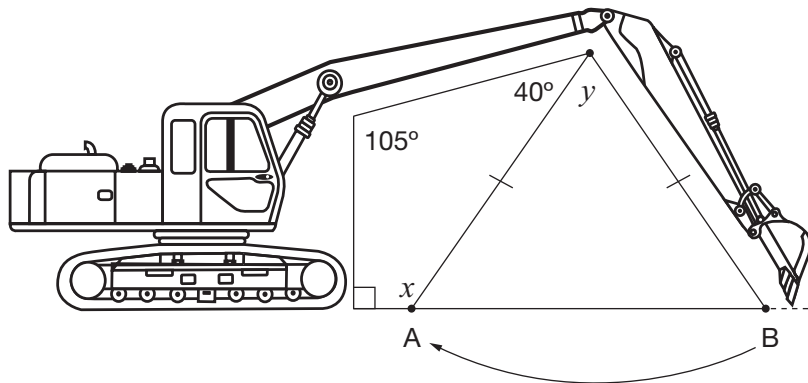
Hint:

$$1 \text{ km} = 1000 \text{ m}$$



31 Digging Around

A hydraulic arm swings from Point B to Point A, as shown in the diagram below.



Determine the values of x and y .

Justify your answers using geometric properties.

Value	Justification
$x =$ _____	
$y =$ _____	

Sample Assessment Questions: Applied

Answer Key

1. (a) (b) (c) (d)
2. (a) (b) (c) (d)
3. (a) (b) (c) (d)
4. (a) (b) (c) (d)
5. (a) (b) (c) (d)
6. (a) (b) (c) (d)
7. (a) (b) (c) (d)
8. Respond in booklet.

9. Respond in booklet.
10. (a) (b) (c) (d)
11. (a) (b) (c) (d)
12. (a) (b) (c) (d)
13. (a) (b) (c) (d)
14. (a) (b) (c) (d)
15. (a) (b) (c) (d)
16. (a) (b) (c) (d)

17. (a) (b) (c) (d)
18. (a) (b) (c) (d)
19. (a) (b) (c) (d)
20. (a) (b) (c) (d)
21. Respond in booklet.
22. Respond in booklet.
23. Respond in booklet.
24. (a) (b) (c) (d)

25. (a) (b) (c) (d)
26. (a) (b) (c) (d)
27. (a) (b) (c) (d)
28. (a) (b) (c) (d)
29. (a) (b) (c) (d)
30. Respond in booklet.
31. Respond in booklet.

End of Assessment