Academic

Grade 9 Assessment of Mathematics

2011

SAMPLE ASSESSMENT QUESTIONS

Record your answers to the multiple-choice questions on the Student Answer Sheet (2011, Academic).
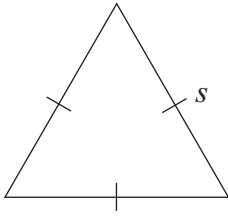
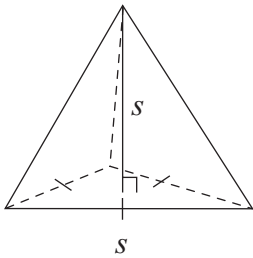**Education Quality and Accountability Office**

EQAO

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

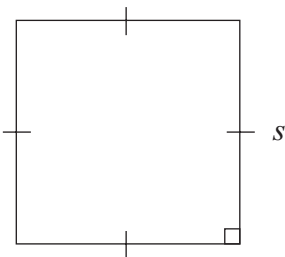**1** Which of the following has a volume that can be represented by s^3?
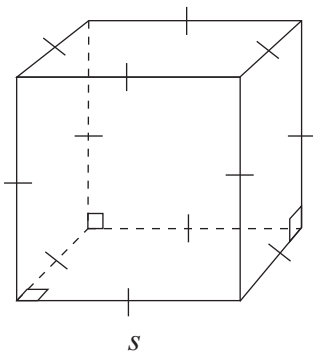
a

b

c

d

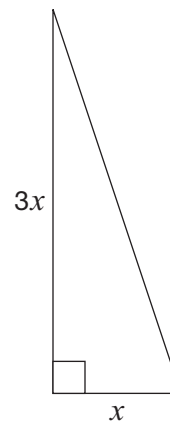**2** What value of m makes the equation $\frac{6a^m}{2a^3} = 3a^5$ true?

a 2

b 8

c 15

d 18

3 What is the value of the expression $\frac{5(-18 + 12)}{-4 + 1}$?

a 10

b 6

c −6

d −10

4 Luke designs a garden in the shape of a right triangle as shown below.
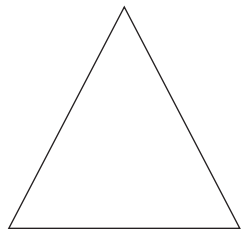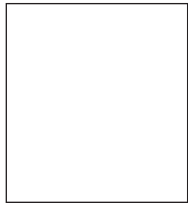

The total area of the garden is 96 m².

Hint:

$A = \frac{1}{2}bh$

Which is closest to the value of x in the diagram?

a 6 m

b 8 m

c 32 m

d 64 m

5 A square and an equilateral triangle are pictured below.

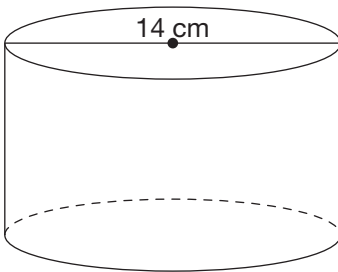$\longmapsto(5x + 3)\longmapsto$ $\longmapsto(7x - 1)\longmapsto$

If the square and the triangle have the same perimeter, what is the value of x?

a   2

b   4

c   9

d   15

6 How High Is It?

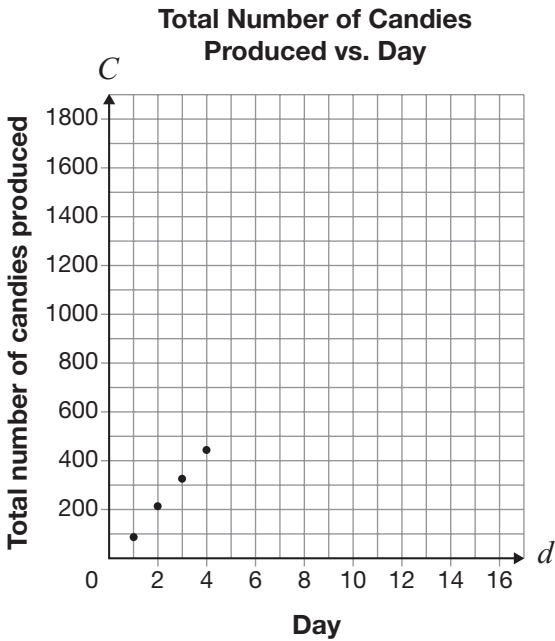The cylinder pictured below has a surface area of 660 cm^2.

14 cm

Use the following formula to determine the height of the cylinder:

Surface area $= 2\pi r^2 + 2\pi rh$

Show your work.

7 Dechen has a candy-making business. The graph below shows the total number of candies his business has produced by the end of each day for the first four days.

Total Number of Candies Produced vs. Day

If this trend continues, which of the following points represents a day with more candies produced than expected?

a   (5, 500)

b   (9, 850)

c   (10, 1300)

d   (14, 1400)

8 Karina has a job at a video store. The total she is paid each week is made up of an hourly rate plus $14 for transportation.

One week, she works 20 hours and is paid $215.

Which equation represents the relationship between Karina's total pay, P, in dollars, and the number of hours she works, n?

a $P = 10.75n + 14$

b $P = 14n + 10.75$

c $P = 10.05n + 14$

d $P = 14n + 10.05$

9 Which table of values shows a linear relation between C and n?

a

n	C
0	0
1	2
2	4
3	8

b

n	C
0	0
1	1
2	4
3	9

c

n	C
0	0
1	4
2	11
3	15

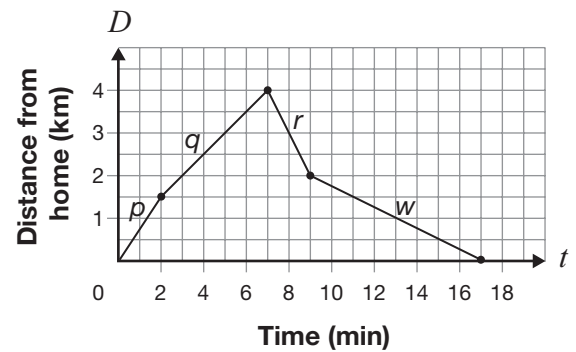**d**

n	C
0	0
1	3
2	6
3	9

10 Which relation does **not** have an initial value of 50?

a $y = 50$

b $y = 50 + 8x$

c $y = 50x$

d $y = 50 - x$

11 The graph below represents the relationship between Rena's distance from home and time.

During which section of the graph does Rena travel the fastest?

a p

b q

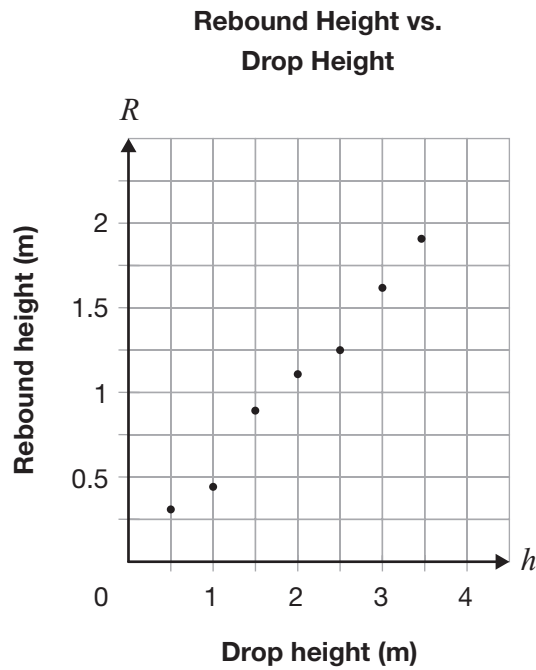c r

d w

12 The table below represents a linear relation.

Time, t	Distance, D
0	5
1	15
2	25
3	35
4	45

Which equation represents this relation?

a $D = 5t$

b $D = 10t$

c $D = 10t + 5$

d $D = 5t + 10$

⅓ **Follow the Bouncing Ball**

This scatter plot shows the relationship between the rebound height of a ball and the height from which the ball is dropped.

**Rebound Height vs.
Drop Height**

Drop height (m)

Draw a line of best fit for the data on the grid above.

Determine an equation for your line of best fit.

Show your work.

Equation of line of best fit: _____

14 Getting Paid

Hannah's total pay includes a base salary and a percent of her sales.

The following table shows her total pay for three different sales levels.

Sales ($)	Total pay ($)
15 000	1700
17 500	1825
28 000	2350

Determine Hannah's total pay when her sales are $47 000.

Show your work.

15 Which of the following **cannot** be an equation of a line?

a $x = 2$

b $y = 7$

c $y = 2x^2 + 7$

d $2x + y + 7 = 0$

16 Which of the following is the equation of the line $6x - 2y - 12 = 0$ in the form $y = mx + b$?

a $y = -3x + 6$

b $y = 3x - 6$

c $y = -\frac{1}{3}x + 12$

d $y = \frac{1}{3}x - 12$

17 Nevenka and Juan scuba dive. The graph below represents the relationship between the distance from the surface, in metres, and time, in minutes, for both divers as they swim down from the surface and then swim back up.

Distance from Surface vs. Time
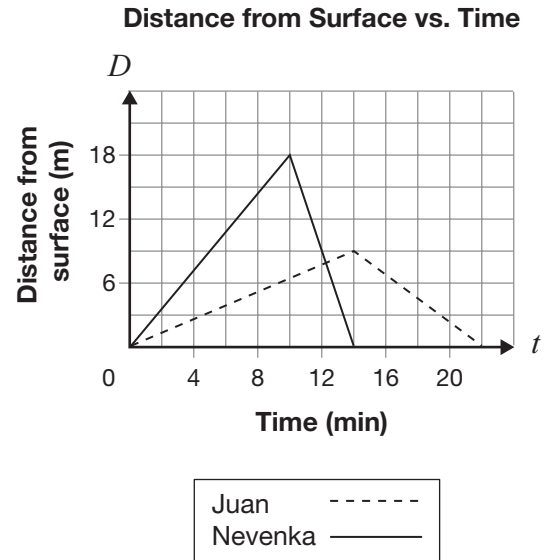
Which statement below is true?

a   Juan swims back up at a rate of 0.5 m/min.

b   Nevenka swims back up at a rate of 4.5 m/min.

c   Nevenka swims down faster than she swims back up.
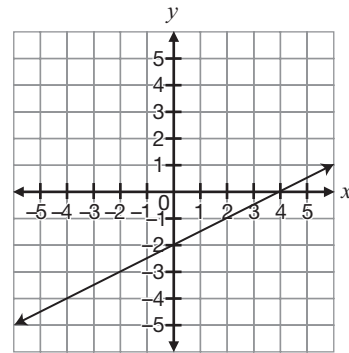
d   Juan swims down and back up at the same rate.

18 Alex has $150. She spends the same amount each week. After 6 weeks, she has $30 remaining.

The relationship between the amount of money Alex has and the number of weeks is represented by a line. What is the slope of this line?
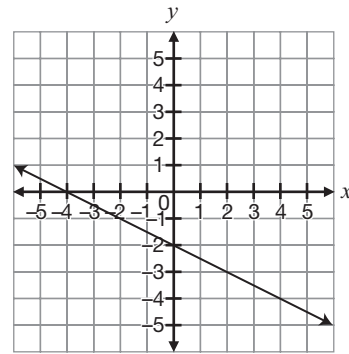
a   −25

b   −20

c   20

d   25

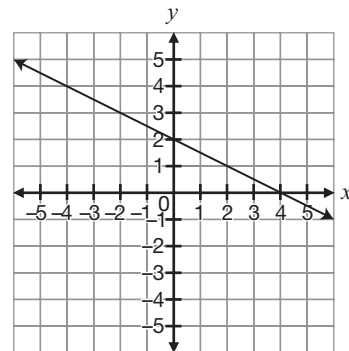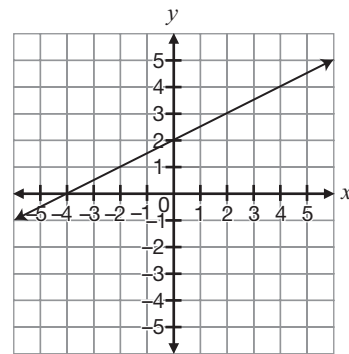**19** Which of the following represents the graph of the equation $2x - 4y = 8$?

a

b

c

d

20   Which equation represents a line that has
the same y-intercept as $2x + 3y - 6 = 0$?

a $y = \frac{1}{2}x + 2$

b $y = 2x - 2$

c $y = -\frac{1}{2}x + 6$

d $y = -2x - 6$

21   Nate buys a video-game system.

• The system costs $300.
• Games cost $60 each.
• He pays 13% tax on the system and on
  each game.
• He has $850 in total to spend.

After he pays for the system, how many
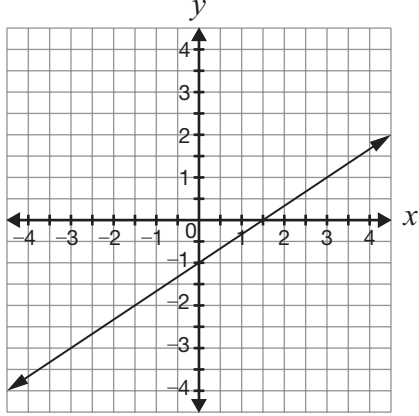games is Nate able to buy?

a   exactly 12

b   exactly 9

c   no more than 7

d   no more than 3

22   **Hit the Slopes**

Consider the two relations represented below.

Relation 1	Relation 2
$5x-2y=4$	

Determine the slope of the line representing each relation.

Show your work.

Slope of line representing Relation 1: _____

Slope of line representing Relation 2: _____

Which of these relations is represented by the steeper line?

_____

Justify your answer.

23 How Many Uniforms?

The equation $C = 20n + 35$ represents the relationship between the cost of school volleyball uniforms, C, in dollars, and the number of uniforms ordered, n.

- The uniform company requires that the school order a minimum of 15 uniforms.
- The school has a maximum of $600 to spend on the uniforms.

Determine the possible values for n and C in this situation.

Show your work.

The possible values for n are _____.

The possible values for C are _____.

24 Tom uses fencing to create a rectangular horse enclosure. He uses the side of a barn as one of the sides of the enclosure.

Barn
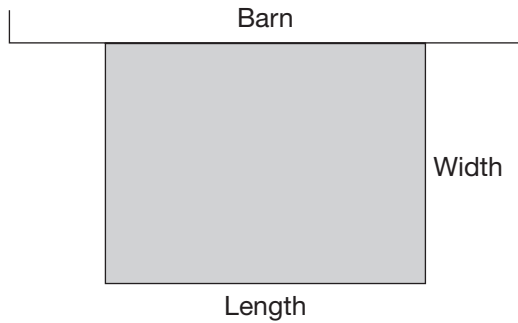
Width

Length

Tom has 48 metres of fencing to use for the three sides of the rectangular enclosure.

Which set of dimensions will use the entire 48 m of fencing?

a width is 8 m, length is 6 m

b width is 12 m, length is 12 m

c width is 24 m, length is 12 m

d width is 12 m, length is 24 m

25 Consider the following triangle.

16 cm

3.5 cm
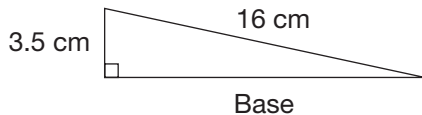
Base

Which expression can be used in the process of determining the length of the base?

a $16^2 - 3.5^2$

b $16^2 + 3.5^2$

c $\sqrt{16 + 3.5}$

d $\sqrt{16 - 3.5}$

26 Pablo is designing a rectangular flag that consists of three coloured triangles.

The picture below shows the colours of the triangles and the cost of each colour of material.

Red
$0.03/cm²

Green
$0.02/cm²

Blue
$0.01/cm²

50 cm

100 cm
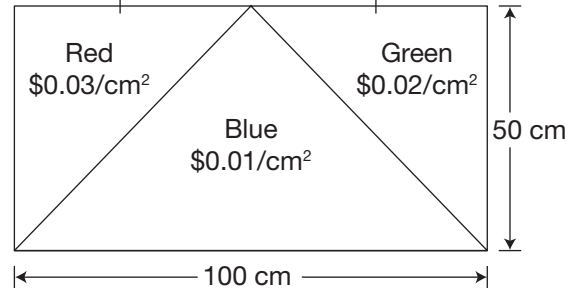
What is the total cost of the material?
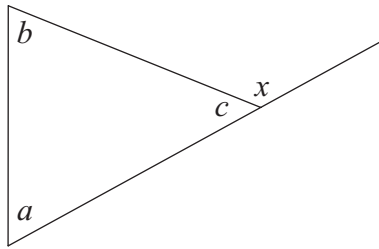
a $75.00

b $87.50

c $150.00

d $175.00

27 A cylinder has a volume of 400π cm^3 and a diameter of 20 cm.

Which of the following is closest to the height of the cylinder?

a 1 cm

b 4 cm

c 20 cm

d 40 cm

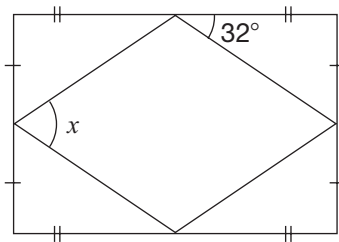**28** Consider the diagram below.

Which of the following equations is always true?

a $x = a + b$

b $x = b + c$

c $x = a - b$

d $x = b - c$

29 A rectangular sign is built as shown below. The four supports for the back of the sign form four congruent triangles.
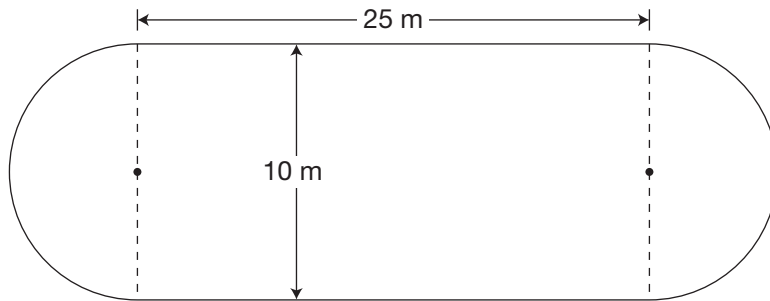

What is the value of x?

a 26°

b 32°

c 58°

d 64°

30 **Building an Ice Rink**

Jake builds an ice rink as shown below.

Determine the perimeter of the rink.

Show your work.

31　**Shazam**

Pravin designs a lightning bolt using two quadrilaterals and one triangle as shown below.
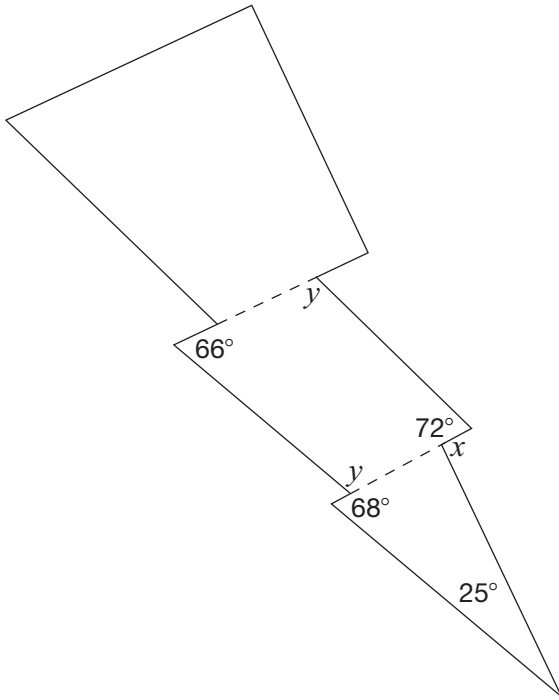
Complete the table below.

Justify your answers using geometric properties.

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

Grade 9 Assessment of Mathematics
2011

Sample Assessment Questions: Academic

Answer Key

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

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

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

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

End of Assessment

Applied

Grade 9 Assessment of Mathematics

2011

SAMPLE ASSESSMENT QUESTIONS

Record your answers to the multiple-choice questions on the Student Answer Sheet (2011, Applied).

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

1 The dimensions of a rectangle are in a 3:5 ratio. If the shorter side lengths are 30 cm, what are the lengths of the longer sides?

a   10 cm

b   15 cm

c   18 cm

d   50 cm

2 The table below shows information about renting movies from four different stores.

Name of store	Total cost ($)	Number of movies rented
Great Flix	6	2
Net Show	12	3
Movie Time	25	10
DVDs R Us	36	12

Which store offers the lowest cost per movie?

a   Great Flix

b   Net Show

c   Movie Time

d   DVDs R US

3 The table below shows the price per case of water at different stores.

Store	Price per case	Number of 500 mL bottles per case
Cheapies	$1.75	8
Foodsmart	$2.25	12
Variety Foods	$4.59	20
Super Grocers	$4.99	24

Evelyn is buying 120 bottles of water.

At which store should Evelyn buy her water to pay the least?

a   Cheapies

b   Foodsmart

c   Variety Foods

d   Super Grocers

4 The cost of an MP3 player is $299. A newer model costs 20% more.

Which of the following is closest to the sale price of the newer model after a 30% discount?

a $251.16

b $269.10

c $289.00

d $310.96

5 What is the value of the expression $\dfrac{-12}{-6+3}$?

a $\dfrac{1}{4}$

b $\dfrac{4}{3}$

c 4

d 5

6 Which value of x makes the equation $1 + \sqrt{x} = 10$ true?

a 3

b 9

c 18

d 81

7 The equation $d = 3.6 \times \sqrt{h}$ represents the relationship between the distance, d, that a person can see in an open field, in kilometres, and the person's height, h, in metres.

One afternoon, Amy can see a distance of 4.5 km.

Which of the following is closest to Amy's height?

a 1.1 m

b 1.6 m

c 2.1 m

d 2.5 m

8 A candle made of wax is in the shape of a cylinder.

6 cm

12 cm
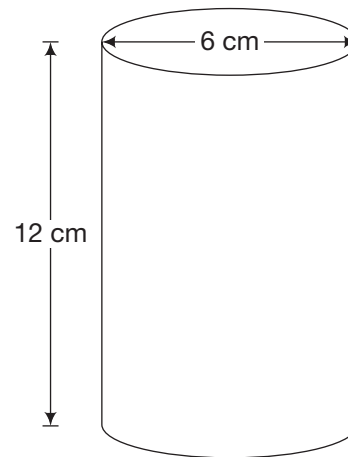
Hint:
$$V = \pi r^2 h$$

Which is closest to the total amount of wax to make the candle?

a 226 cm³

b 339 cm³

c 452 cm³

d 1357 cm³

9 Which expression is a simplified form of
$$-2x(-4x + 3)?$$

a $8x^2 - 6x$

b $8x^2 + 6x$

c $-8x^2 - 3$

d $-8x^2 + 3$

🔟 **Guzzling Gas**

David and Shaunese each take a 450 km trip.

• David drives a car and uses 7 L of gas per 100 km.

• Shaunese drives a truck and uses 12 L of gas per 100 km.

If gas costs $0.90/L, how much more will it cost Shaunese than David to drive 450 km?

Show your work.

⑪ Juggling Juice

Juice is sold in two different containers, a cone and a cube, as shown below.
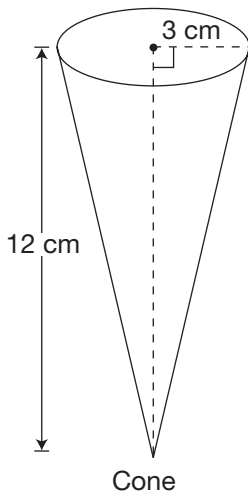
Cone

$$\text{Volume} = \frac{\pi r^2 h}{3}$$
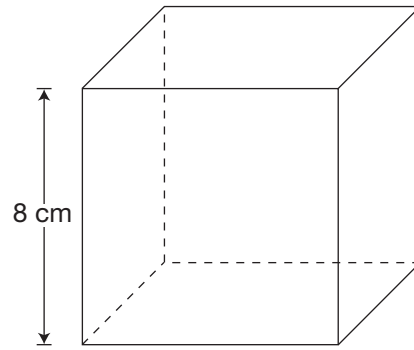
Cube

$$\text{Volume} = l^3$$

Which container holds more juice?

Circle one: Cone   Cube

Show your work.

12 The graph below represents the relationship between the number of calories and the volume for various drinks.

Number of Calories vs. Volume
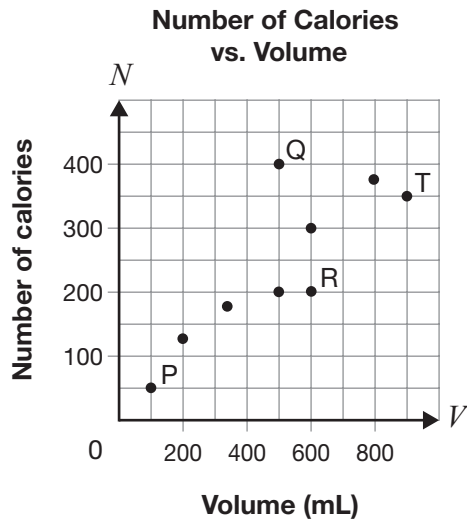
Which of the following points represents a drink with more calories than expected for its volume?

a P

b Q

c R

d T

13 A plumber charges an initial fee of $50, plus an additional $25 per hour.

Which graph represents this relationship?

a **Total Cost vs. Time**
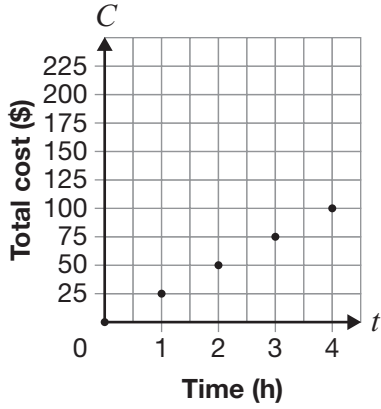
b **Total Cost vs. Time**
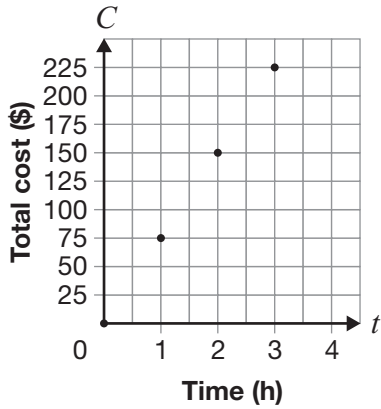
c **Total Cost vs. Time**
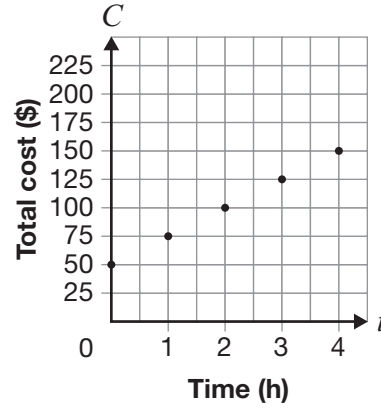
d **Total Cost vs. Time**
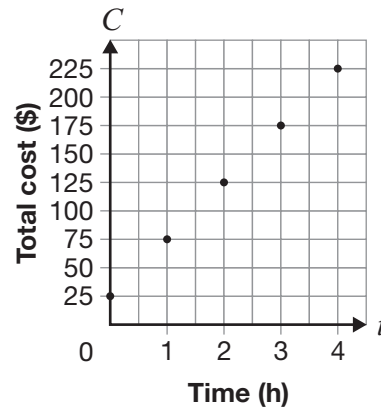
14 A snowstorm lasts for seven hours. Data is recorded for the depth of snow for the first five hours.

Time (h)	Depth of snow (cm)
0	5
1	8
2	11
3	14
4	17
5	20

Which graph below best models the depth of snow during the five hours?

a

b

c

d
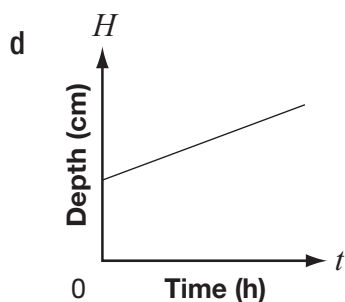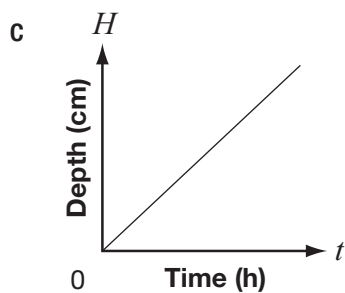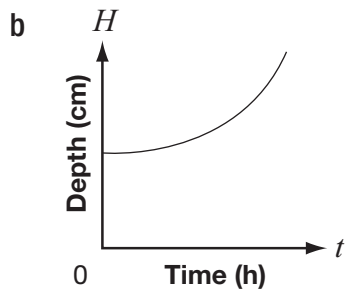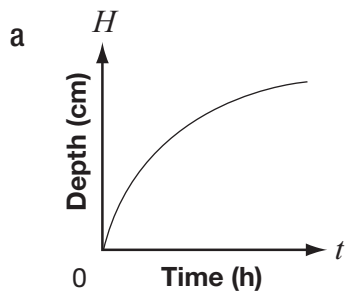
15 In which of the following patterns is there a linear relationship between the number of shaded squares and the term number?

a

Term 1   Term 2   Term 3   Term 4

b

Term 1   Term 2   Term 3   Term 4

c

Term 1   Term 2   Term 3   Term 4

d

Term 1   Term 2   Term 3   Term 4
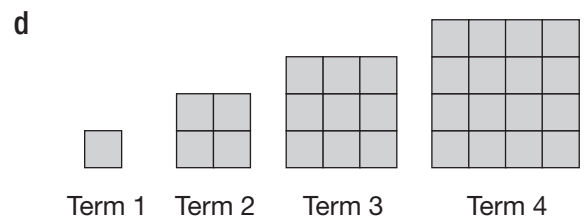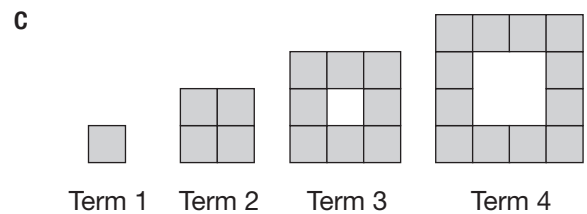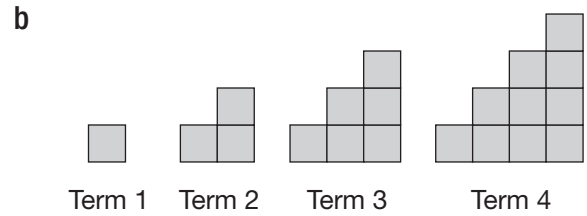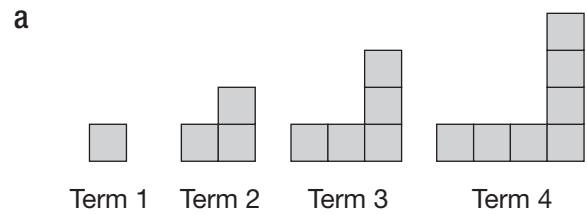
16 An online music store provides music that members can download. The store charges a membership fee and a cost per song.

The chart below represents the relationship between the total cost and the number of songs downloaded.

Number of songs	Total cost ($)
10	13
20	16
30	19

Which of the following is **not** true about this relationship?

a   It is non-linear.

b   It has an initial cost.

c   It has a constant rate of change.

d   It can be represented by a straight line.

17 At her fitness club, Joanne is charged $15 per month. The total cost for 12 months is $270.

Is the relationship between the total cost and the number of months a direct or a partial variation, and what is the initial fee?

a   direct variation, $0

b   direct variation, $180

c   partial variation, $15

d   partial variation, $90

18 The total cost for printing a classified advertisement in a local newspaper is made up of a $30 fee, plus $0.10 per word.

Which equation below models the relationship where C is the total cost to place the advertisement and w is the number of words?

a $C = 10 + 0.30w$

b $C = 10 + 30w$

c $C = 30 + 10w$

d $C = 30 + 0.10w$

19 Pablo has a cellphone. The relationship between his total monthly cost, C, in dollars, and the number of minutes he uses the phone, t, is represented by the equation $C = 20 + 0.25t$.

Which of the following is **not** true about this relationship?

a   The cost per minute is $0.25.

b   The value of the rate of change is 0.25.

c   The total monthly cost for 1 minute is $20.

d   The graph of the relationship has a C-intercept of 20.

20 The equation $C = 15n + 100$ represents the relationship between the total cost of a gym membership, C, in dollars, and the number of months of membership, n.

Which statement about this gym membership is true?

a   It has an initial cost of $15.

b   It costs $115 per month.

c   It has an initial cost of $15 and a fee of $100 per month.

d   It has an initial cost of $100 and a fee of $15 per month.

**21**   The following describes Ihab's drive from Windsor to Toronto:

- One hour after leaving Windsor, he stops for 15 minutes to have a snack.

- He then drives for two more hours and then stops to visit a friend for one hour.

- He then completes his drive to Toronto at a faster rate than any other segment of his trip.
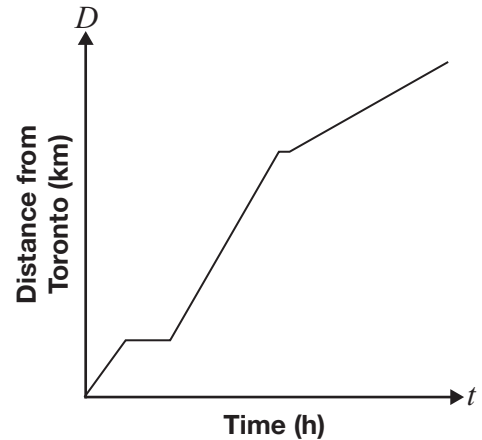
Which graph best describes his trip?
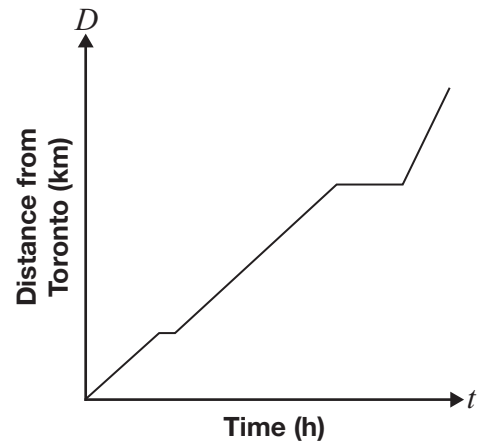
a   **Distance from Toronto vs. Time**
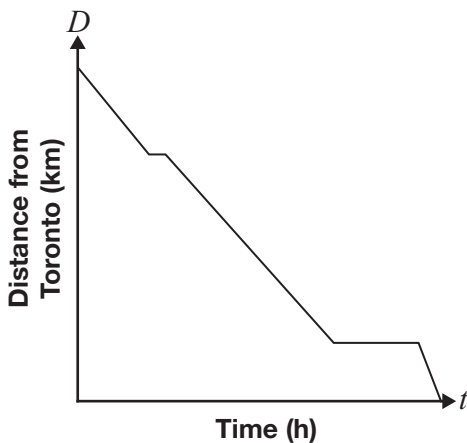
b   **Distance from Toronto vs. Time**
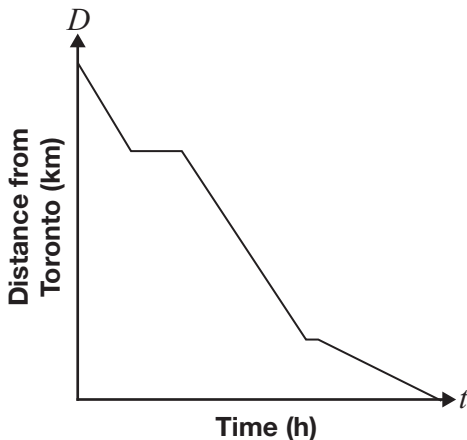
c   **Distance from Toronto vs. Time**

d   **Distance from Toronto vs. Time**

22   Dan needs to get his car fixed.

- Fast Freddie charges $440 for materials, plus $50 per hour for labour.

- Rapid Ron charges $360 for materials, plus $60 per hour for labour.

Which repair shop charges less for a 5-hour job, and how much less?

a   Rapid Ron charges $80 less.

b   Fast Freddie charges $30 less.

c   Rapid Ron charges $30 less.

d   Fast Freddie charges $10 less.

23 The current plan for downloading music is made up of a flat fee of $20 and a fee of $0.50 per download.

A new plan is made up of a flat fee of $10 and a fee of $0.50 per download.

Which graph represents both plans?

a

b

c

d
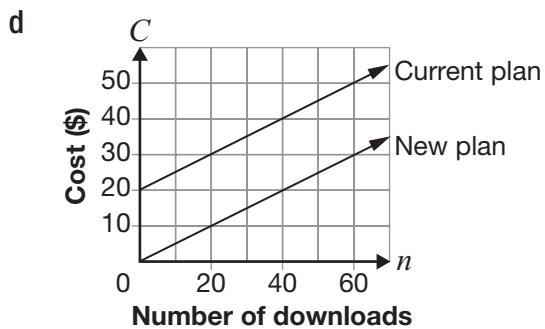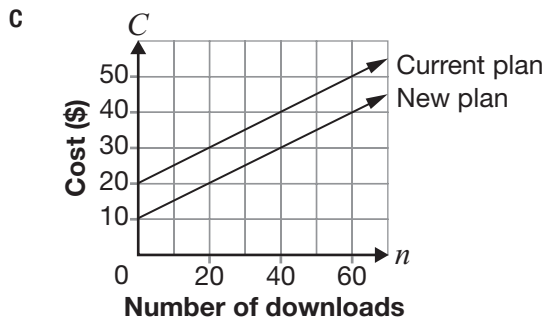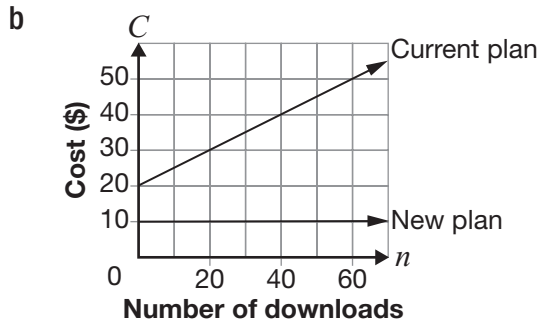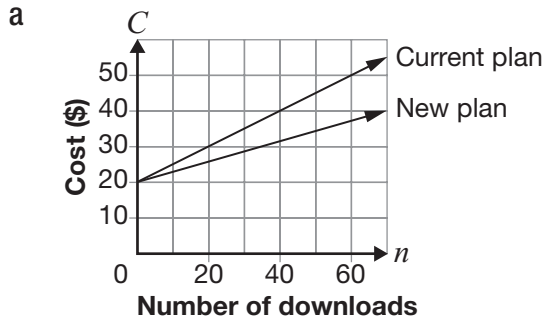
24 Two health clubs, Super Fit and Body Plus, offer monthly memberships. The total monthly cost for each club is represented by the graphs below.
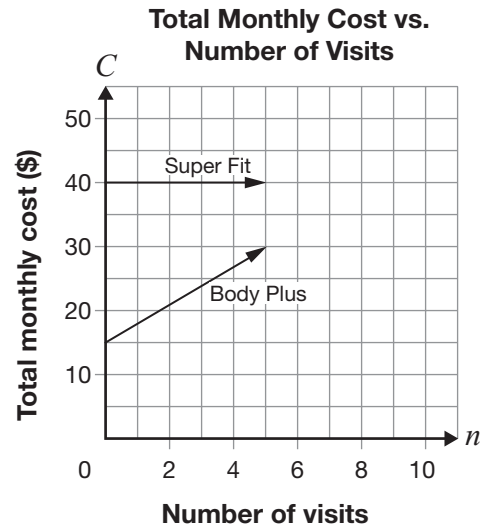
Which of the following is true?

a Body Plus is always cheaper.

b Super Fit is always more expensive.

c Super Fit is cheaper if the number of visits is fewer than 7.

d Body Plus is more expensive if the number of visits is greater than 9.

25 Corrina wants to rent a snowmobile for a day and considers two rental companies.

The relationship between the total cost of renting from Trails-R-Us and the number of kilometres travelled is represented by the graph below.

Total Cost vs. Number of Kilometres Travelled
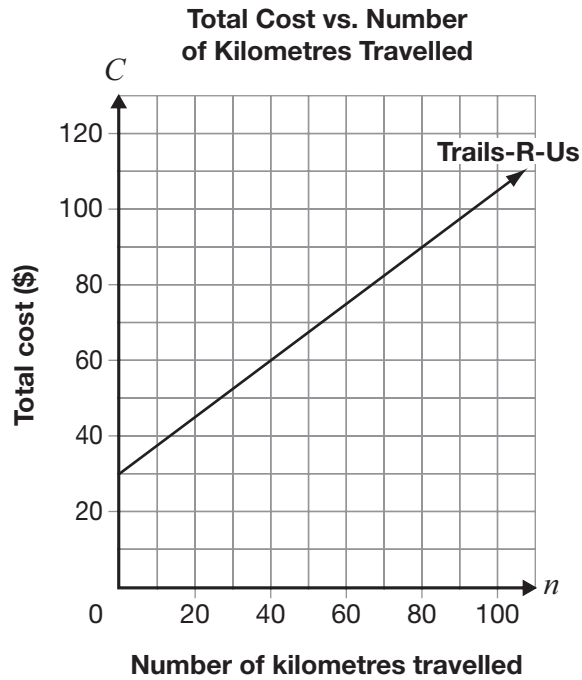
Off-Roads charges a flat rate of $90 for a day with unlimited kilometres.

At how many kilometres is the total cost the same at both rental companies?

a   70 km

b   80 km

c   90 km

d   100 km

26 Stack It

Juan draws the first three terms of a pattern as shown below.

Term 1   Term 2   Term 3
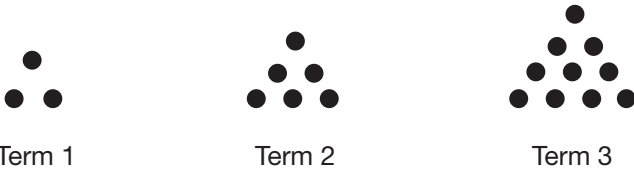
The pattern continues to grow in the same way. Complete the following table according to the pattern.

Term number, n	Number of dots, N
1	3
2	6
3	
4	
5	
6	

Number of Dots vs. Term Number
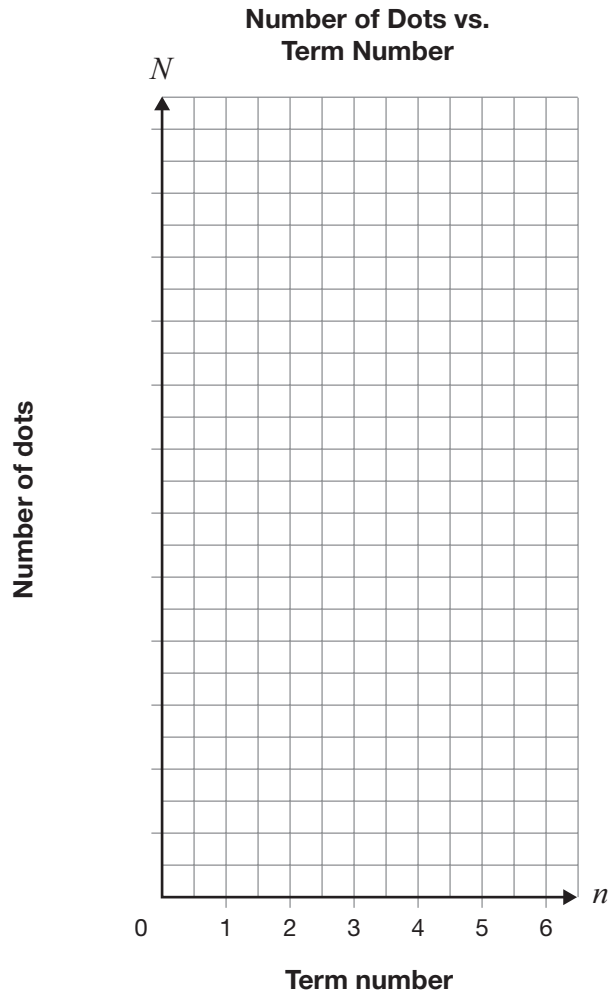
Graph the data from the table on the grid above. Add a scale for the N-axis.

Draw a line or curve of best fit for the data.

27   **Balloon Ride**

The relationship between the height of a hot-air balloon, H, in metres, and time, t, in minutes, is represented below.

Height of Balloon vs. Time
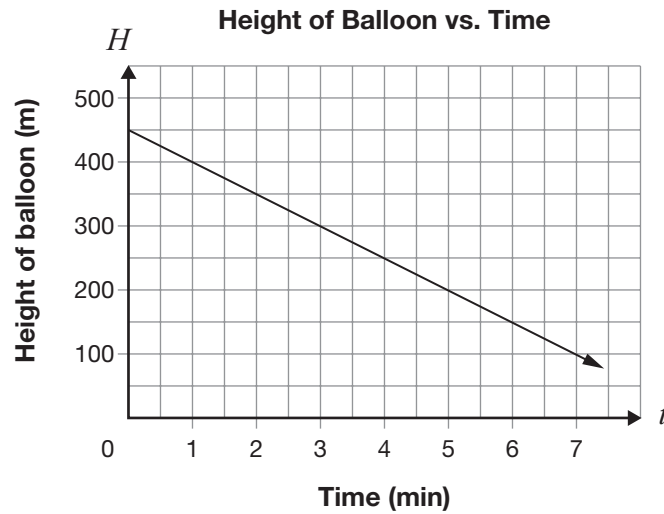
Determine an equation to represent the relationship between the height of the balloon and time.

$$H = \underline{\hspace{5cm}}$$

Show your work.

28 Walk This Way

Mauro takes a walk. The graph below shows the relationship between Mauro's distance from home and his walking time.

Distance from Home vs. Time
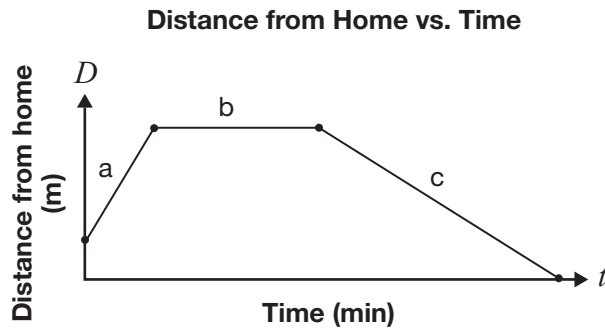
In the table below, compare Mauro's distance from home, his speed and the direction in which he is travelling in the various segments of his walk.

Segment of graph	Comparison to other segments
a	
b	
c	

29 Which dimensions produce the smallest perimeter for a rectangular area of 120 m²?

a   2 m × 60 m

b   3 m × 40 m

c   4 m × 30 m

d   6 m × 20 m

30 Two square gardens are shown below. A welcome banner extends from a corner of Garden A to a corner of Garden B.

Garden A
area = 42 m²

Banner

Garden B
area = 36 m²
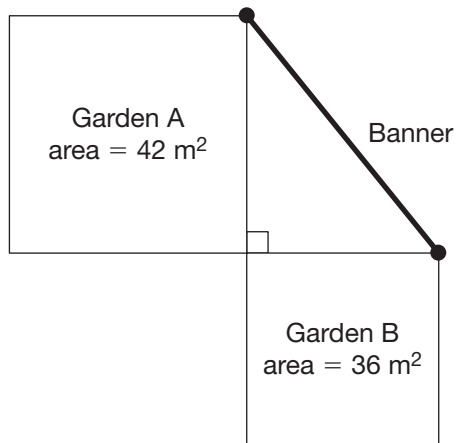
Which is closest to the length of the banner?

a   6 m

b   9 m

c   12 m

d   78 m

31 Use the Pythagorean theorem to find the length of the diagonal in the rectangle below.

80 cm

Diagonal

55 cm
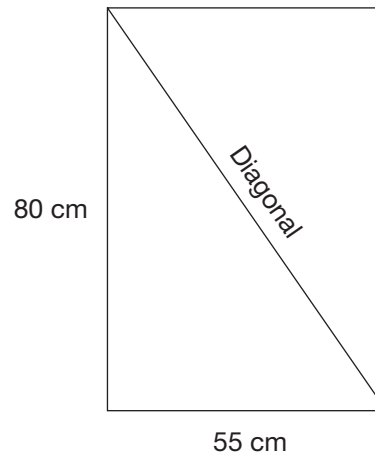
Which is closest to the length of the diagonal?

a   135 cm

b   97 cm

c   66 cm

d   58 cm

32   Hanna works painting sealant on driveways. She charges $7.50/m^2.

5 m

5 m

9 m

2.5 m
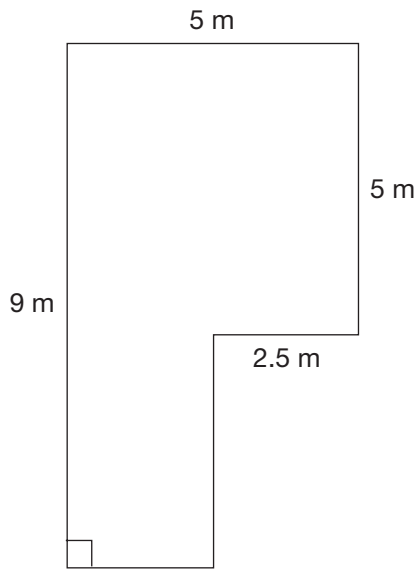
How much will she charge to paint the driveway shown above?

a $215.00

b $262.50

c $280.00

d $337.50

33   Consider the square below.

6 cm
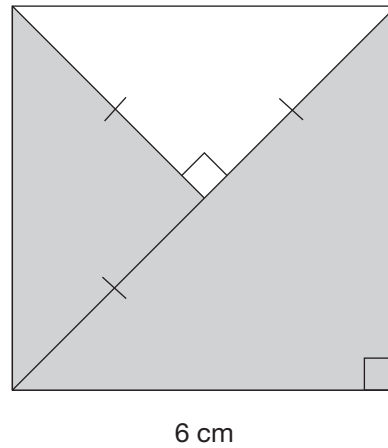
What is the area of the shaded part of the square?

a   36 cm^2

b   27 cm^2

c   18 cm^2

d   9 cm^2

34   Consider the diagram below.

23°

x

56°
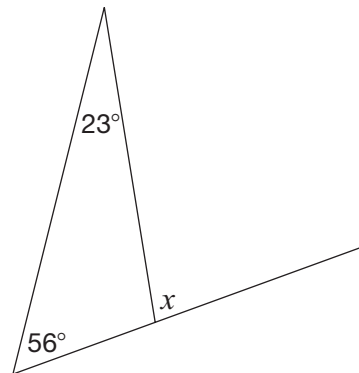
What is the value of x?

a   23°

b   56°

c   79°

d   101°

35 Consider the diagram below.
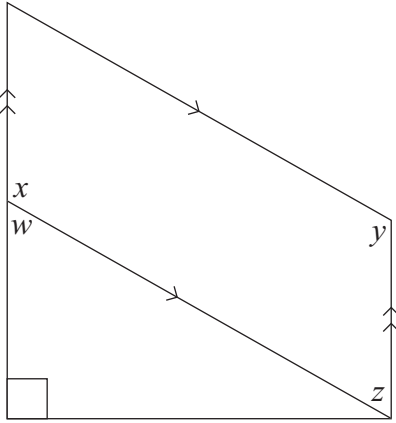
Which equation is true?

a $x = z$

b $w = y$

c $y + z = 180°$

d $w + z = 180°$

36 Wind in My Sails

A sail for a sailboat is represented below.
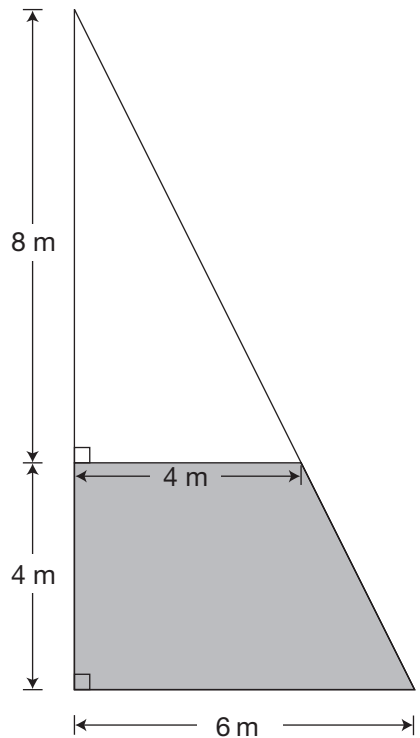
The unshaded part of the sail is made with material that costs $32/m^2$.
The shaded part of the sail is made with material that costs $125/m^2$.

Determine the total cost of the sail.

Show your work.

37 **Designing**

Consider the design below.
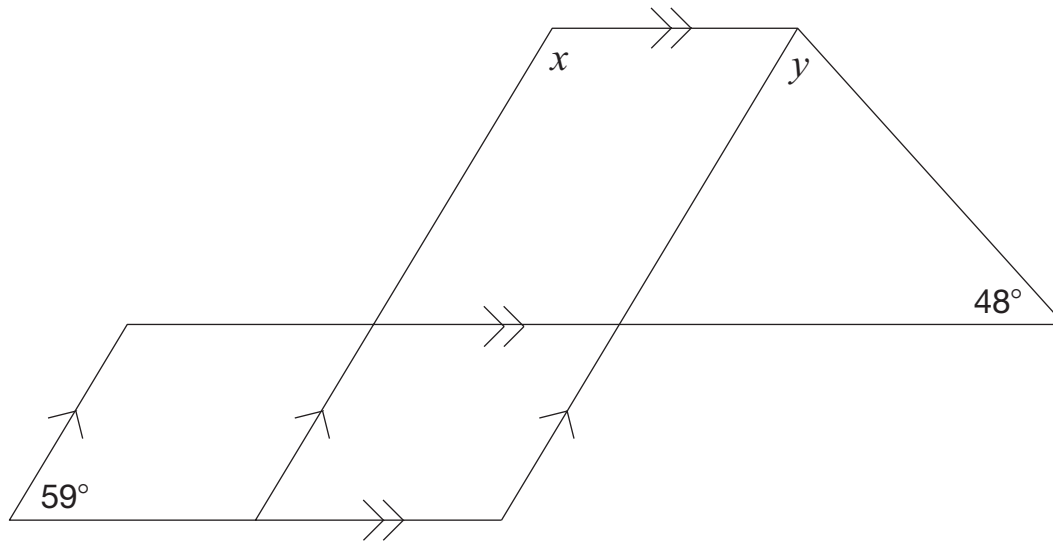
Complete the table below with the values of *x* and *y*.

Justify your answers using geometric properties.

Value	Justification using geometric properties
x = _____	
y = _____	

Grade 9 Assessment of Mathematics
2011

Sample Assessment Questions: Applied

Answer Key

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

11. Respond in booklet.
12. (a) ● (c) (d)
13. (a) (b) ● (d)
14. (a) (b) (c) ●
15. ● (b) (c) (d)
16. ● (b) (c) (d)
17. (a) (b) (c) ●
18. (a) (b) (c) ●
19. (a) (b) ● (d)
20. (a) (b) (c) ●

21. ● (b) (c) (d)
22. (a) (b) ● (d)
23. (a) (b) ● (d)
24. (a) (b) (c) ●
25. (a) ● (c) (d)
26. Respond in booklet.
27. Respond in booklet.
28. Respond in booklet.
29. (a) (b) (c) ●
30. (a) ● (c) (d)

31. (a) ● (c) (d)
32. (a) ● (c) (d)
33. (a) ● (c) (d)
34. (a) (b) ● (d)
35. (a) (b) ● (d)
36. Respond in booklet.
37. Respond in booklet.

End of Assessment