

Academic

Grade 9 Assessment of Mathematics

2012

RELEASED ASSESSMENT QUESTIONS

**Record your answers to the multiple-choice questions
on the Student Answer Sheet (2012, Academic).**

Education Quality and
Accountability Office



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

1 What is the value of the expression x^2 when $x = \frac{4}{5}$?

a $\frac{8}{5}$

b $\frac{8}{10}$

c $\frac{16}{5}$

d $\frac{16}{25}$

2 The volume of a rectangular prism is represented by $12x^3$. The height is represented by $3x$.

Which of the following represents the area of the base?

Hint:

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

a $4x^2$

b $4x^3$

c $9x^2$

d $9x^3$

3 A basketball player scores 28 points in a game. She scores 35% of the total team points.

How many points does her team score in total?

a 63

b 65

c 72

d 80

4 Which of the expressions below is equivalent to $3(4x - 5) - 7(9x - 2)$?

a $-51x - 1$

b $-51x - 3$

c $-51x - 7$

d $-51x - 29$

5 Liam sells sandwiches at an arena. He earns \$10.50 per hour plus \$0.40 for each sandwich he sells.

How many sandwiches does he need to sell during a 6-hour shift to earn \$125?

a 158

b 155

c 62

d 12

6 What a Bargain!

Susan buys a tennis racket from a store.

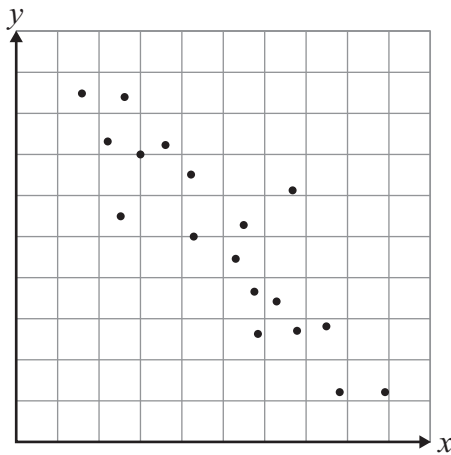
- The tennis racket's original price is \$75.
- All tennis rackets are on sale for 25% off the original price.
- The tennis racket has a scratch, so she receives an additional 10% off the sale price.

How much does Susan pay for her tennis racket, including 13% tax?

Show your work.



7 Consider the graph below.



Which relationship is most likely to be represented by this graph?

- a height vs. weight
- b pay vs. number of hours worked
- c gas remaining vs. distance travelled
- d volume of water in a bucket vs. its mass

8 The figures below are made with sticks of equal length. Figure 1 is made with 4 sticks.

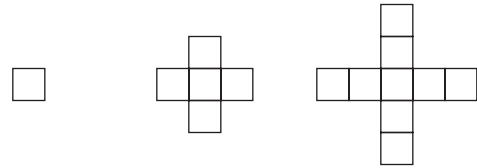


Figure 1 Figure 2 Figure 3

The pattern continues in the same way. Which table shows the relationship between the number of sticks, S , and the figure number, n ?

a

n	S
1	4
2	20
3	36

b

n	S
4	40
5	52
6	64

c

n	S
3	12
4	16
5	20

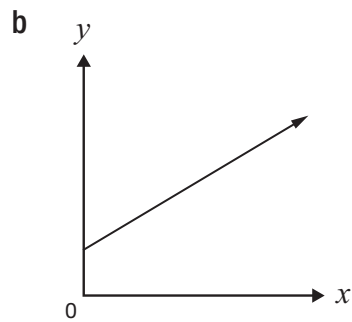
d

n	S
5	17
6	21
7	25

- 9** Which of the following represents a non-linear relation?

a

x	y
1	1
2	4
3	9
4	16



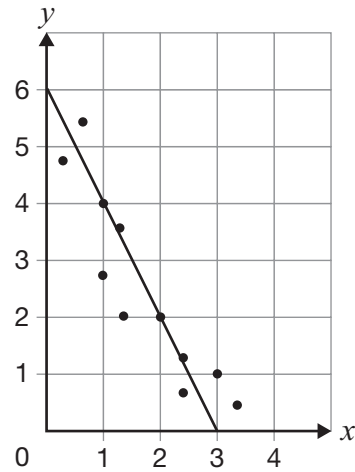
c

$y = 2x + 3$

d

x	y
4	8
3	5
2	2
1	-1

- 10** A line of best fit is drawn on the scatter plot below.



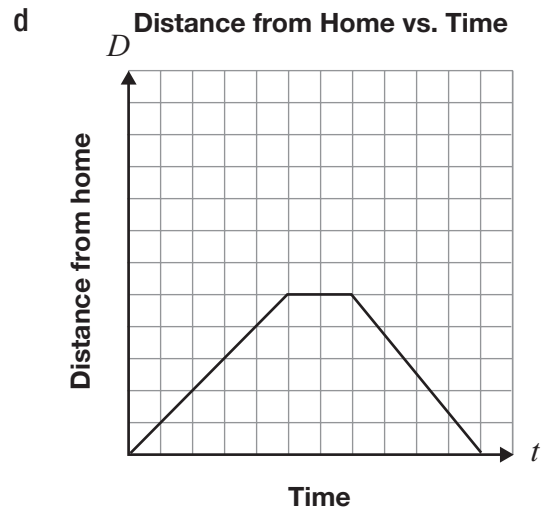
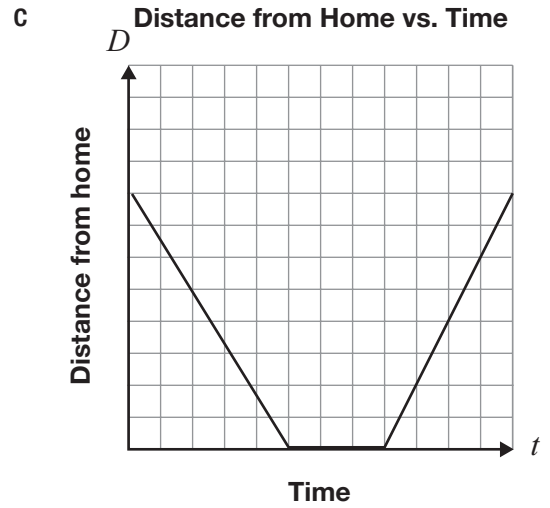
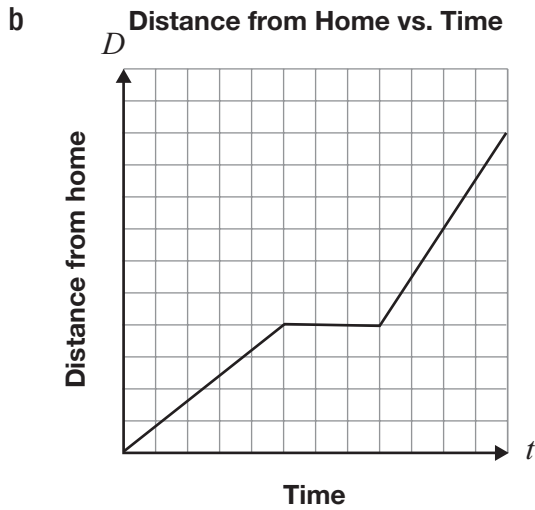
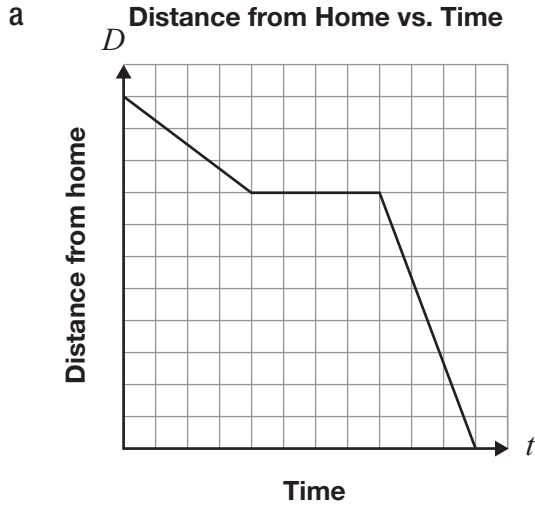
The slope of the line is -2 .

Which equation represents the line?

- a** $y = 6x - 2$
b $y = 3x - 2$
c $y = -2x + 3$
d $y = -2x + 6$

11 Bruno leaves home and goes for a run along a straight path. He runs to the park, stops for a rest and returns home.

Which graph best represents his run?



- 12** Abigail buys a prepaid card for her cellphone. When she talks on her phone, a fee per minute is deducted from the value of the prepaid card.

The table below shows information about the remaining value of the card.

Total number of minutes used, t	Remaining value, V (\$)
10	22.00
20	19.00

Which equation represents the relationship between the remaining value and total number of minutes used?

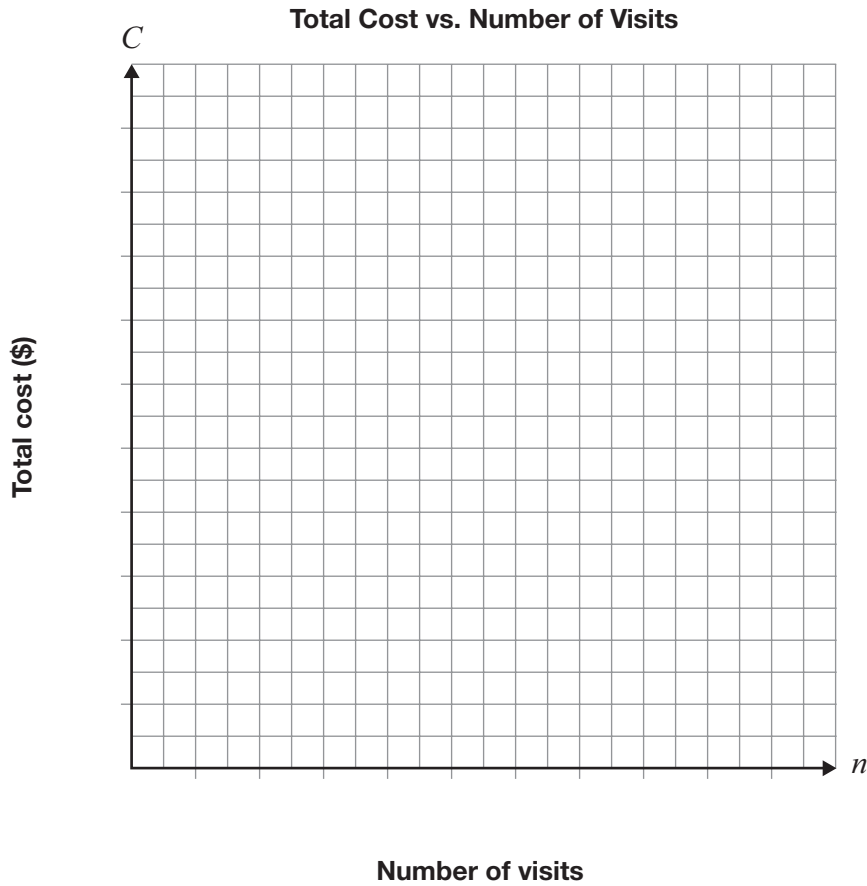
- a $V = 22 - 3t$
- b $V = 22 - 0.30t$
- c $V = 25 - 3t$
- d $V = 25 - 0.30t$



13 Which Is Which?

A relationship between the total cost to use a gym for a month, C , and the number of visits, n , is a partial variation. The total cost for 10 visits during one month is \$50.

Draw a graph that could represent this relationship. Label each axis with an appropriate scale.



Determine the equation for your graph.

$C =$ _____

Explain how you know your equation represents a partial variation.

14 Counting Pennies

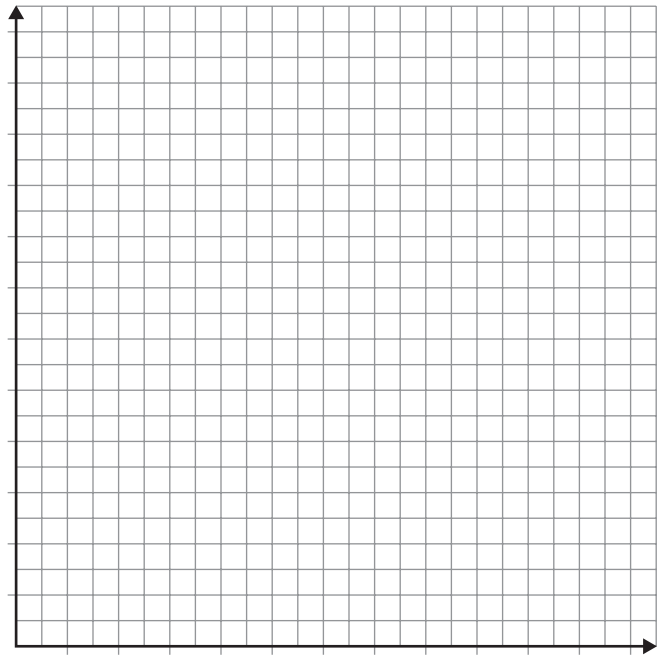
Identical pennies are placed in a container and the total mass is recorded.

The table below gives information about the total mass of different numbers of pennies in the container.

Number of pennies	Total mass (g)
4	60
6	65
10	75

Use the data to determine the number of pennies in the container when the total mass is 185 g.

Justify your answer. You may use the grid if you wish.



15 Which of the following equations does **not** represent a line?

- a $x = 5$
- b $y = 10$
- c $xy = 10$
- d $5x - y + 10 = 0$

16 Which of the following is the equation $4x - 5y + 12 = 0$ in the form $y = mx + b$?

- a $y = \frac{4}{5}x + \frac{12}{5}$
- b $y = \frac{5}{4}x - 3$
- c $y = 4x - 7$
- d $y = 5x + 16$

17 Consider the equation $y = mx + 5$.

If $(7, 3)$ is a point on the line represented by this equation, which of the following is true?

- a The rise is 8 when the run is 7.
- b The rise is 7 when the run is 8.
- c The rise is -2 when the run is 7.
- d The rise is 7 when the run is -2 .

18 Consider the relation $y = -3x + 5$.

Which of the following statements about the graph of this relation is **not** true?

- a The slope is 3.
- b The y -intercept is 5.
- c For a rise of 3, the run is -1 .
- d The graph crosses the y -axis at $(0, 5)$.

19 The total cost of swimming at a community swimming pool is made up of a membership fee and a cost per swim.

At this community centre, Jake pays a total of \$100 and swims 40 times. Paula pays a total of \$70 and swims 25 times.

Which of the following statements is true?

- a The membership fee is \$20.
- b The membership fee is \$30.
- c The cost per swim is \$2.50.
- d The cost per swim is \$2.80.

20 A local fair charges a \$15 entry fee and \$1.75 per ride. Dustin has \$35 to spend.

What is the maximum number of rides Dustin can go on?

- a 8
- b 11
- c 12
- d 20

21 In the relation $C = 60 + 15n$, C represents the total cost of holding an event at a hall, and n represents the number of guests.

The maximum number of guests allowed in the hall is 100.

What are the minimum and maximum possible values for C ?

- a \$0, \$1500
- b \$0, \$1560
- c \$60, \$1500
- d \$60, \$1560



22 Know Your Lines

Consider the equations of the two lines below.

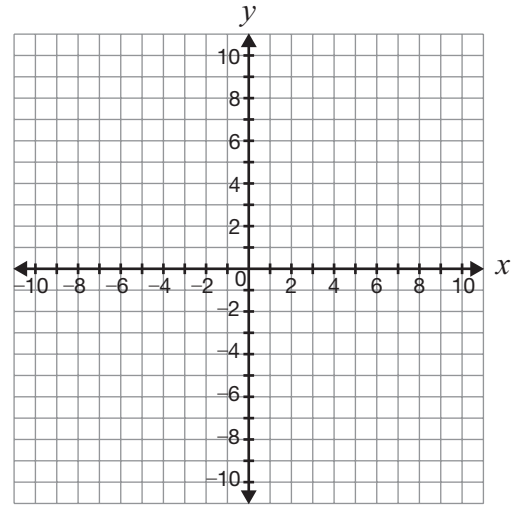
Line A: $y = -\frac{3}{2}x - 7$

Line B: $y = \frac{2}{3}x - 4$

Compare Line A and Line B. You may use the grid if you wish.

Justify your answers.

Complete the table below.



Characteristic	Comparison of Line A and Line B, with justification
Direction from left to right	
Steepness	
Parallel, perpendicular or neither	

23 Reduce, Reuse and Recycle

A high school is starting a recycling program.

The relationship between the total cost of the program, C , and the number of recycling bins, n , is represented by the equation $C = 48n + 75$.

The school must install a minimum of 12 recycling bins and has a maximum of \$1000 to spend on the program.

What are the possible values of C and n in this situation?

Justify your answer.

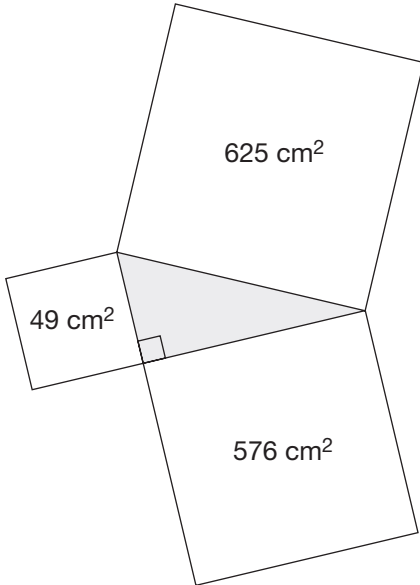
The possible values of n are _____.

The possible values of C are _____.

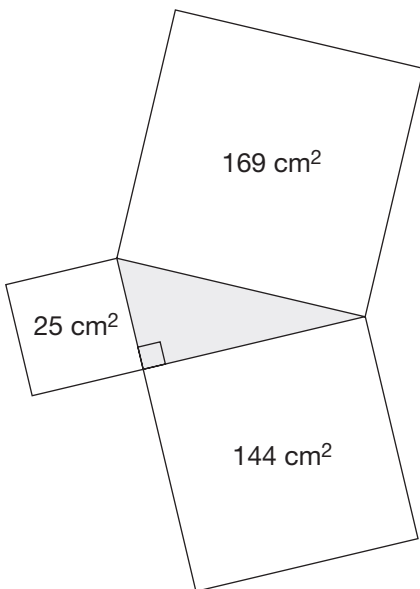
24 Each of the diagrams below shows a right triangle and a square constructed on each of its sides.

According to the Pythagorean theorem, which diagram is **not** correct?

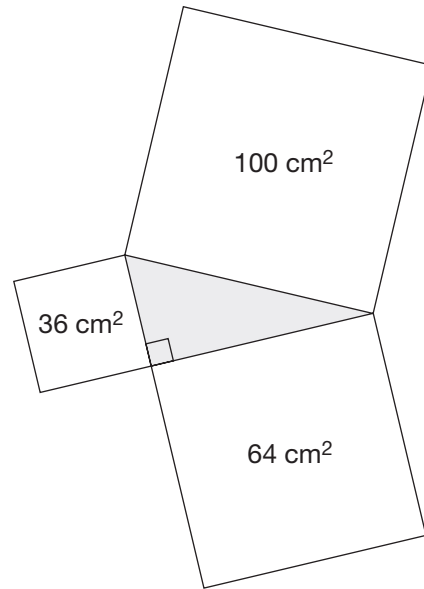
a



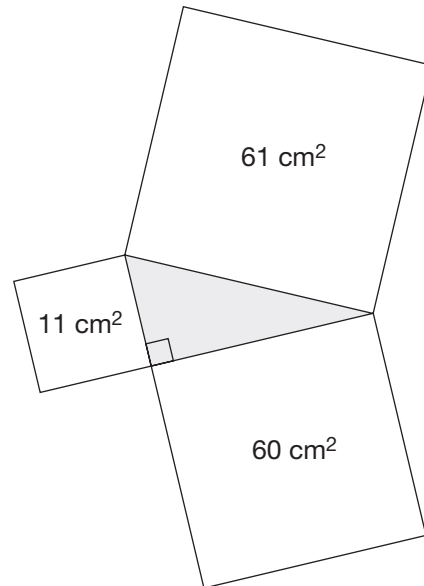
b



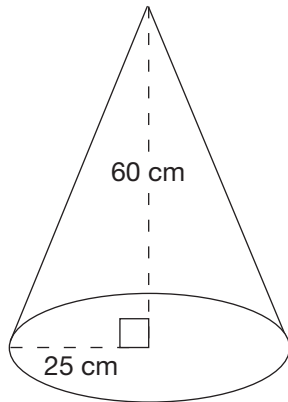
c



d



- 25** A pylon in the shape of a cone is shown below.

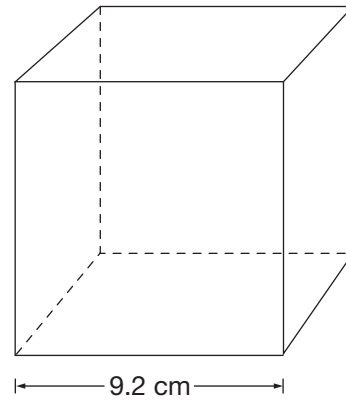


The outside surface of the cone is to be painted, but the bottom will not be painted.

Which of the following is closest to the total surface area to be painted?

- a 4284 cm^2
- b 4713 cm^2
- c 5105 cm^2
- d 5350 cm^2

- 26** A decoration is packed in a box shaped like a cube as shown below.



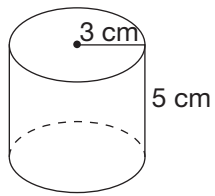
The decoration has a volume of 651 cm^3 .

Approximately how much empty space remains in the box?

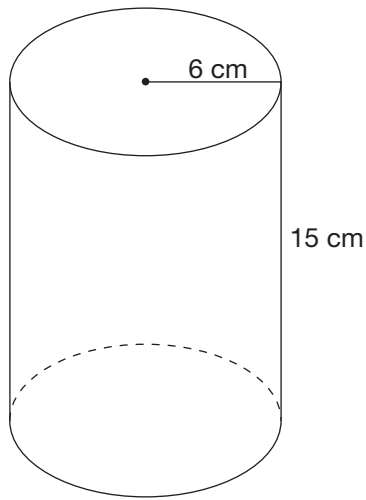
- a 128 cm^3
- b 143 cm^3
- c 623 cm^3
- d 779 cm^3

- 27** Two different cylindrical containers are shown below.

Container 1

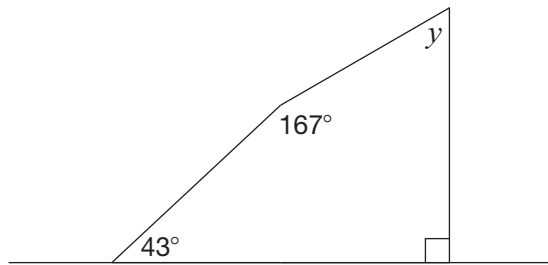


Container 2



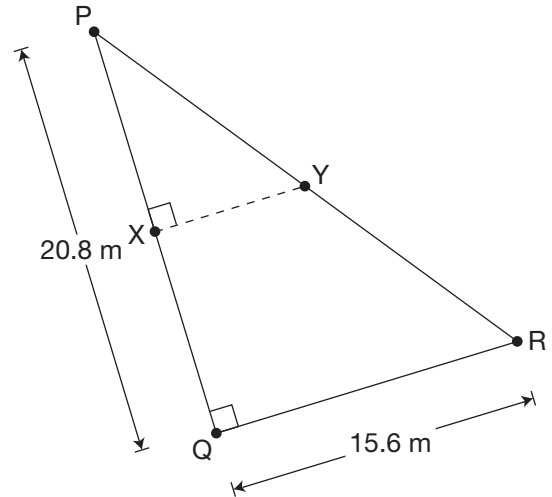
When the containers are full of milk, what is the ratio of the amount in Container 1 to the amount in Container 2?

- 28** Consider the diagram below.



What is the value of y ?

- 29** Consider the right triangle below.



Line segment XY connects the midpoint of PQ to the midpoint of PR .

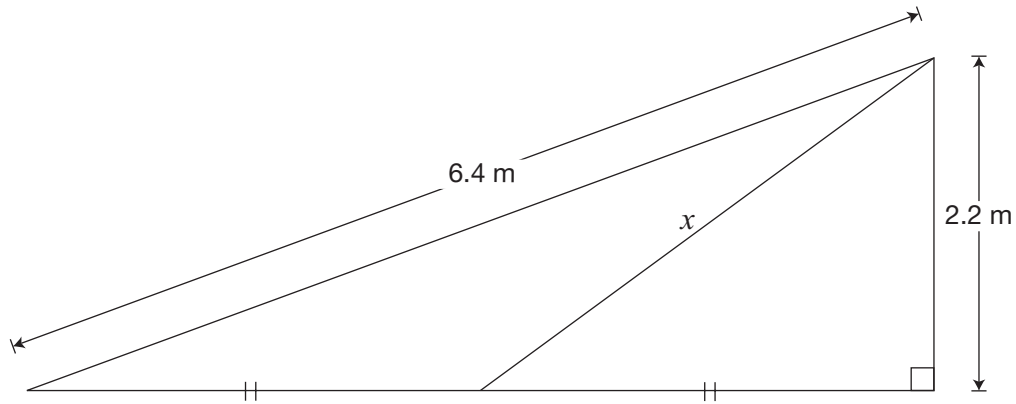
What is the length of XY ?

- a 43°
- b 60°
- c 137°
- d 150°

- a 5.2 m
- b 7.8 m
- c 10.4 m
- d 13.0 m

30 All the Right Stuff

The diagram below shows a small right triangle inside a large right triangle.



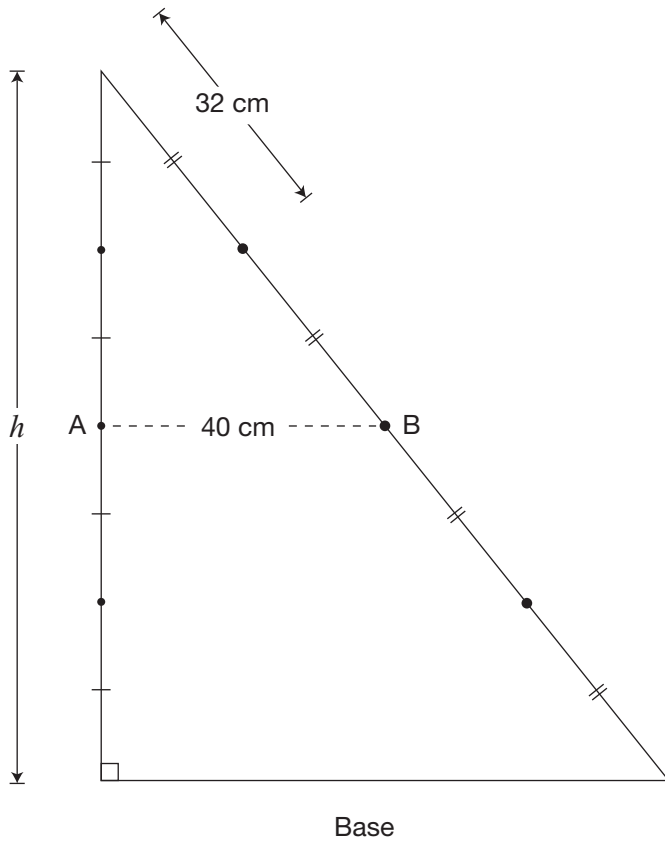
Determine the value of x .

Show your work.



31 Tricky Triangle

Line segment AB joins the midpoints of two sides of the triangle below. The length of AB is half the length of the base of the triangle.



Determine the value of h in the diagram.

Show your work.

Released Assessment Questions: Academic

Answer Key

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

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

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

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

End of Assessment

Print Student Name: _____

Student Signature: _____

Applied

Grade 9 Assessment of Mathematics

2012

RELEASED ASSESSMENT QUESTIONS

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on the Student Answer Sheet (2012, Applied).**

Education Quality and
Accountability Office



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The questions themselves
remain the same.

- 1** Consider the proportion below.

$$\frac{3}{4} = \frac{a}{24}$$

What is the value of a in the proportion?

- a 6
 - b 8
 - c 18
 - d 72
- 2** A small case of pop, with 12 cans, costs \$3.96. A large case has 18 cans. The cost per can in the large case is \$0.02 less than in the small case.
- What is the cost of a large case?
- a \$3.60
 - b \$3.72
 - c \$5.58
 - d \$5.94
- 3** In the first year of a fundraising campaign, donations are collected at a rate of \$700 each day for 8 days.
- In the second year, the daily rate doubles and the campaign is 3 days longer.
- How much money is raised in the second year?
- a \$4200
 - b \$7700
 - c \$11 200
 - d \$15 400

- 4** In an election for student council president, 480 students vote.

Jade receives 55% of the votes. Ericka receives the rest of the votes.

How many votes does Ericka receive?

- a 216
 - b 264
 - c 425
 - d 435
- 5** Consider the following equation:

$$c^2 = 6^2 + 10^2$$

Which is closest to the value of c ?

- a 4
 - b 6
 - c 12
 - d 16
- 6** Which expression is a simplified form of

$$3x^2 - 4x + 5 - x^2 + 2x - 1?$$

- a $2x^2 - 2x + 4$
- b $2x^2 + 2x + 6$
- c $4x^2 - 6x + 4$
- d $4x^2 + 6x + 6$

- 7** For which of the following is $x = -7$ **not** a solution?
- a** $4 = x + 11$
 - b** $3x = x - 28$
 - c** $5 = -2x - 9$
 - d** $5x = 2x - 21$



8 Road Trip!

Paul drives from home to his friend's house and then back home.

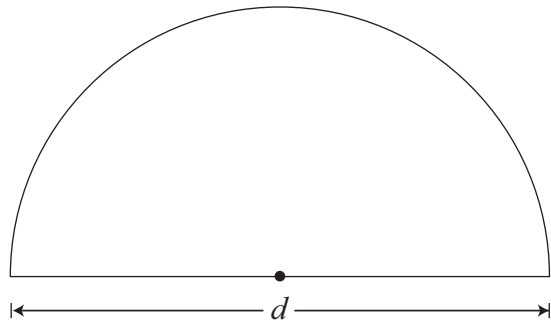
- The distance from Paul's home to his friend's house is about 720 km.
- On average Paul's car uses 6.8 L of gas for every 100 km.
- Gas costs 96.5 cents a litre.

How much does Paul pay in total for gas to his friend's house and back home?

Show your work.

9 Stage Show

A stage in the shape of a semicircle is shown below.



Hint:

$$\text{Area of semicircle} = \frac{\pi r^2}{2}$$

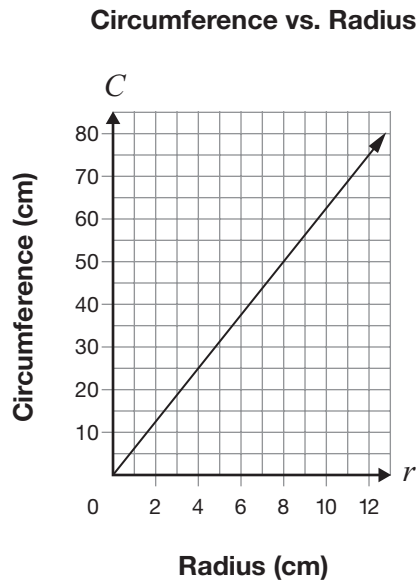
The area of the stage is 200 m^2 .

Determine the measure of the diameter.

Show your work.



- 10** The graph below represents the relationship between the circumference and the radius of a circle.



Which of the following is represented by this graph?

- a radius = 20 cm; circumference = 3.0 cm
- b radius = 10 cm; circumference = 1.6 cm
- c radius = 9 cm; circumference = 50 cm
- d radius = 7 cm; circumference = 44 cm

- 11** Sanjay makes \$20 per day plus \$8 for every magazine subscription he sells.

Which of the following tables shows data from the relationship between his total daily pay and the number of subscriptions he sells?

a

Number of subscriptions sold	Total daily pay (\$)
0	20
1	28
2	36
3	44
4	52

b

Number of subscriptions sold	Total daily pay (\$)
0	20
1	20
2	20
3	20
4	20

c

Number of subscriptions sold	Total daily pay (\$)
0	8
1	28
2	48
3	68
4	88

d

Number of subscriptions sold	Total daily pay (\$)
0	0
1	8
2	16
3	24
4	32

12 William belongs to a music downloading club. He pays \$8 a month plus \$0.50 per song downloaded.

Which of the following shows information about the relationship between the total monthly cost, in dollars, and the number of songs downloaded?

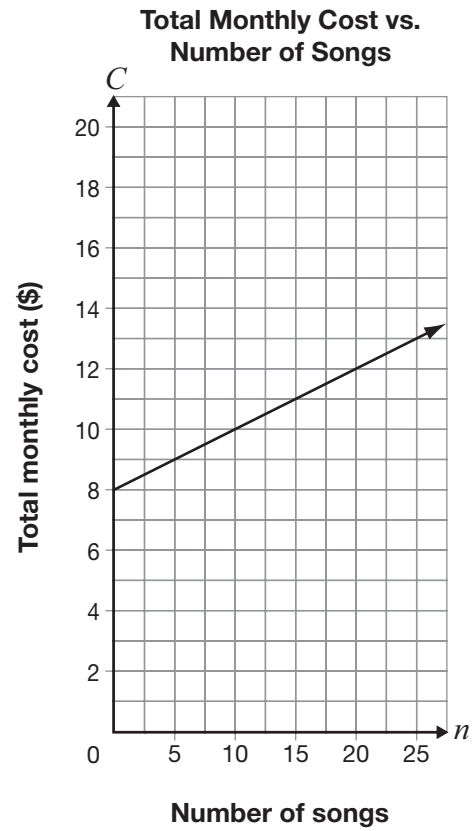
a

Number of songs	Total monthly cost (\$)
10	8.00
20	13.00
30	18.00
40	23.00

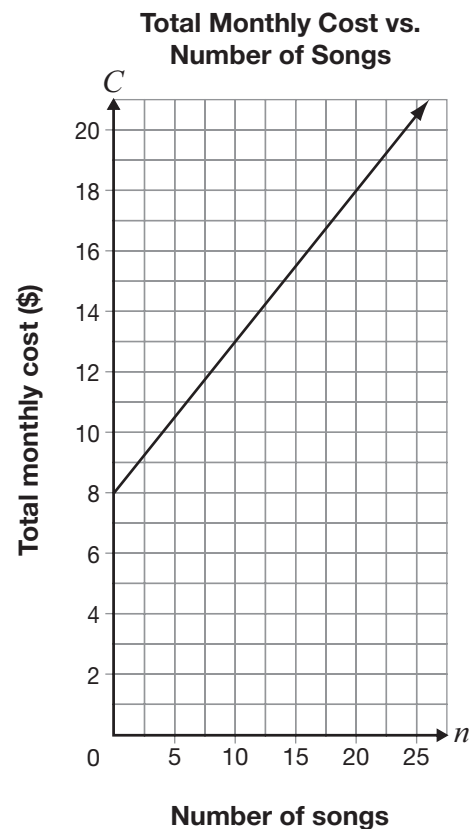
b

Number of songs	Total monthly cost (\$)
0	8.00
10	8.50
20	9.00
30	9.50

c



d

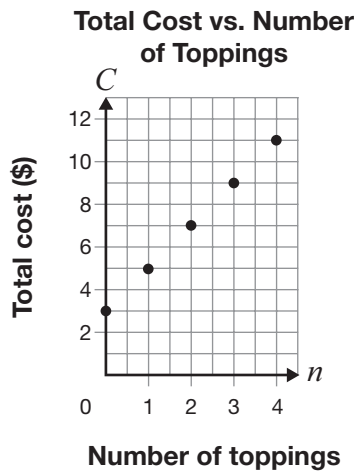


- 13** A restaurant charges \$3 for a cheese pizza plus \$2 per additional topping.

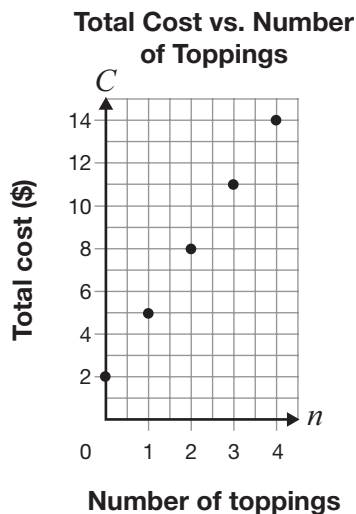
Which of the following shows two models that represent the relationship between the total cost of a pizza, C , and the number of additional toppings on it, n ?

a

Number of toppings, n	Total cost, C (\$)
0	3
2	7
4	11
6	15

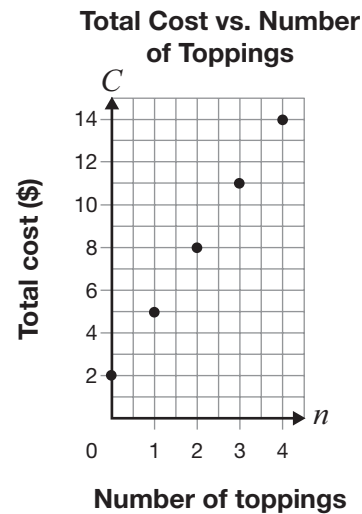


b $C = 3n + 2$



c

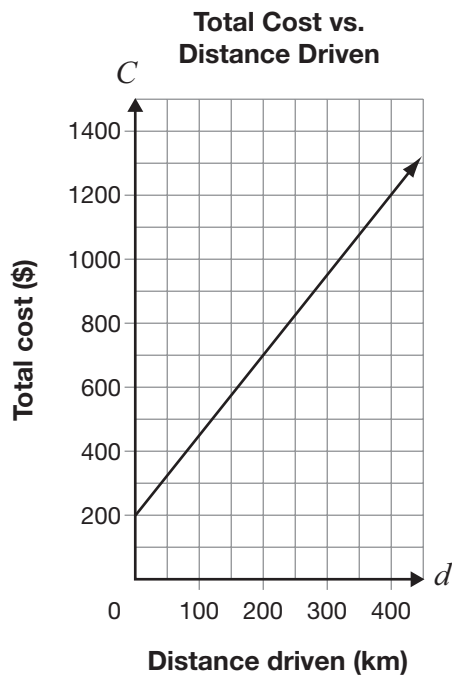
Number of toppings, n	Total cost, C (\$)
0	2
2	8
4	14
6	20



d $C = 2n + 3$

Number of toppings, n	Total cost, C (\$)
0	2
1	5
2	8
3	11

- 14** A limousine company charges customers according to the graph shown below.



What rate does the company charge per kilometre?

- a \$1.25
- b \$2.50
- c \$200.00
- d \$400.00

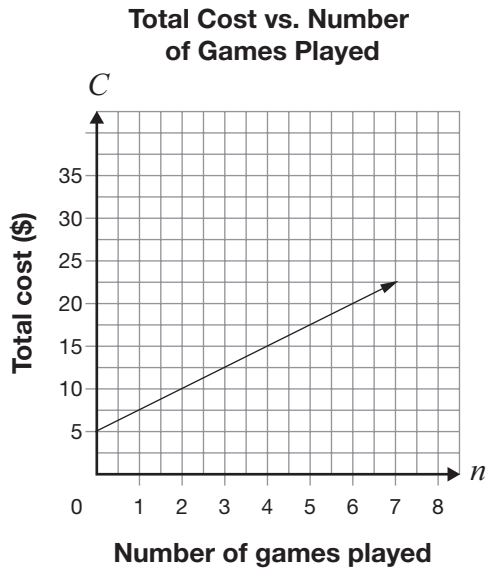
- 15** A basketball club offers two types of memberships.

- Membership Y: No registration fee and \$15 per hour for court time.
- Membership Z: \$40 registration fee and \$5 per hour for court time.

Which of these relationships is a partial variation, and what is its initial cost?

- a Membership Y; \$0
- b Membership Y; \$15
- c Membership Z; \$5
- d Membership Z; \$40

- 16** An arcade charges each customer an admission fee plus a cost to play each game. The relationship between the total cost, C , and the number of games played, n , is shown on the grid below.



Which equation below represents this relationship?

- a $C = 0.5n + 5$
 b $C = 0.5n + 7.5$
 c $C = 2.5n + 5$
 d $C = 2.5n + 7.5$

- 17** The table below shows information about the linear relationship between the total cost per month of Sylvie's cellphone plan and the number of text messages she sends.

Month	Number of text messages	Total cost (\$)
January	60	28
February	20	24
March	30	?

According to this relationship, what is Sylvie's total cost for March?

- a \$14
 b \$20
 c \$25
 d \$26

- 18** The table below shows the relationship between the cost to rent a bicycle, C , and the number of hours, n .

Number of hours, n	Rental cost, C (\$)
0	10
1	13
2	16
3	19

Which equation represents this relationship?

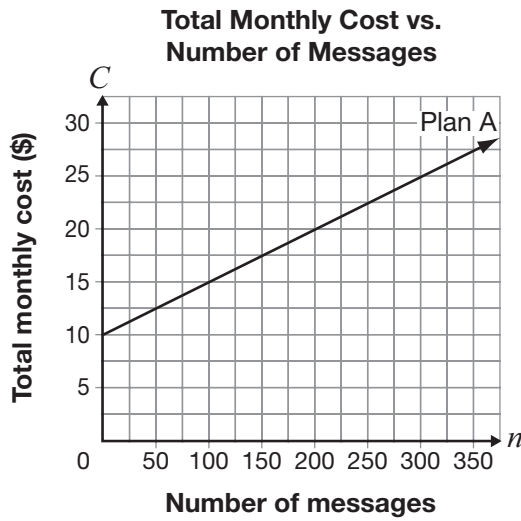
- a $C = 3n$
 b $C = 10n$
 c $C = 3 + 10n$
 d $C = 10 + 3n$

- 19** A taxi charges a flat fee of \$3.75, plus \$1.50 per kilometre driven.

What is the total cost of a 10 km trip?

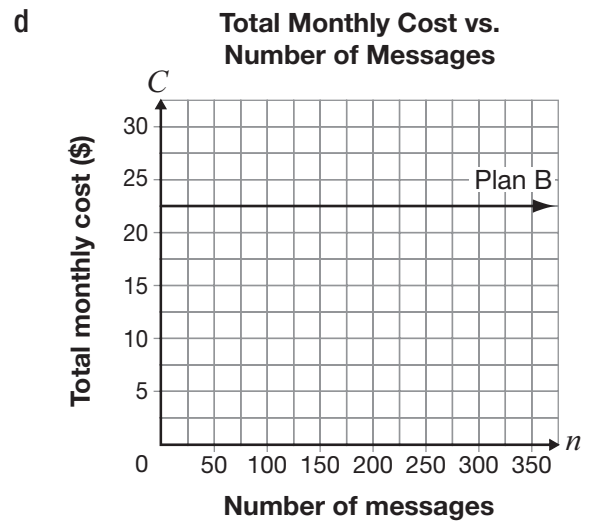
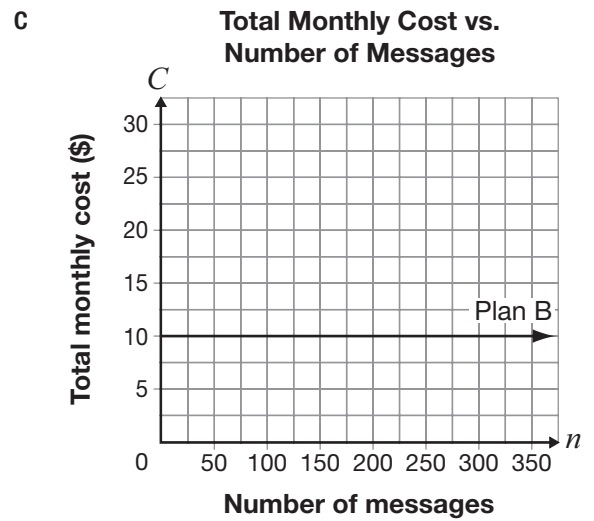
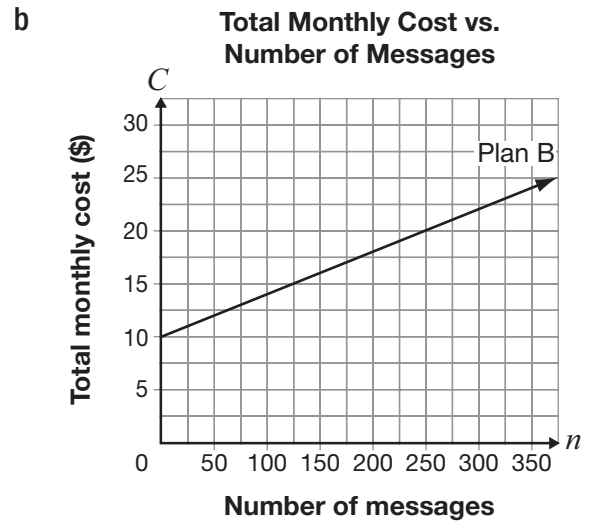
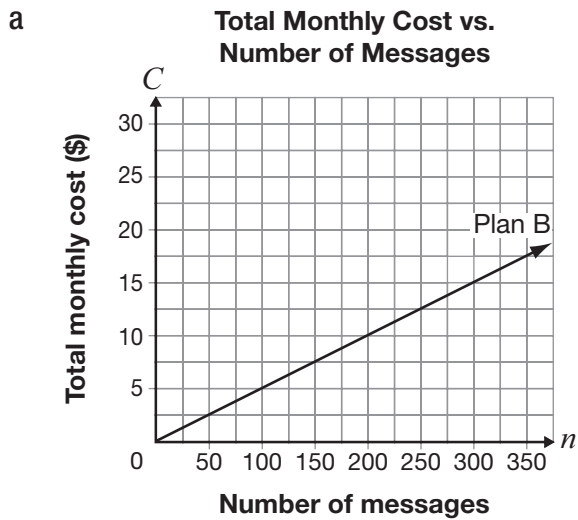
- a \$15.00
- b \$18.75
- c \$39.00
- d \$52.50

- 20** Kris is considering a new text message plan. The graph below shows information about Plan A.



Plan B has the same total monthly cost for 250 messages.

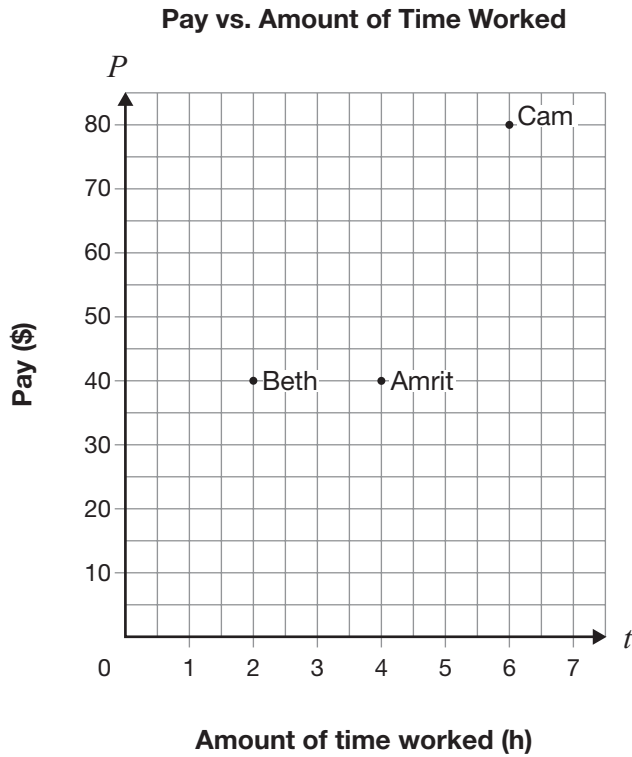
Which of the following graphs could represent Plan B?



21 Student Work

Cam, Beth and Amrit are paid at an hourly rate for their time worked.

The graph below shows the amount paid and the time worked for these three students.



Determine which student is paid the highest hourly rate.

Justify your answer.

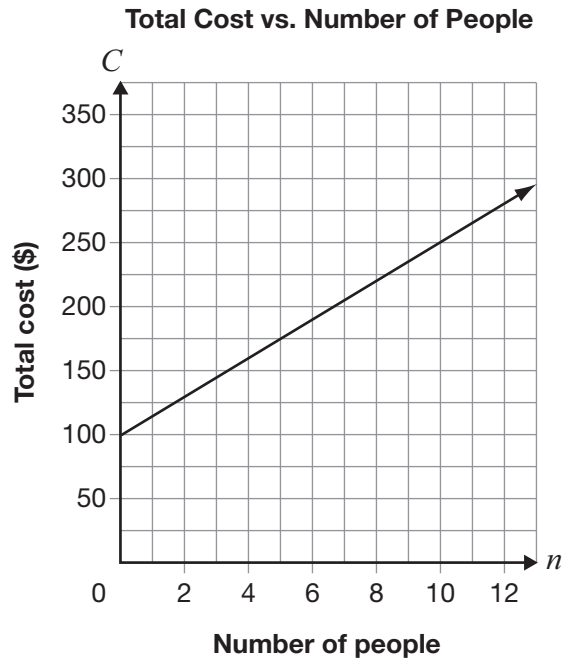
The student who is paid the highest hourly rate is _____ .

22 Rental Rates

The total cost of a banquet includes a fixed fee to rent the hall and a cost per person. Information about the total cost at two different halls is shown below.

Hall A

Number of people, n	Total cost, C (\$)
10	275
20	450
30	625

Hall B

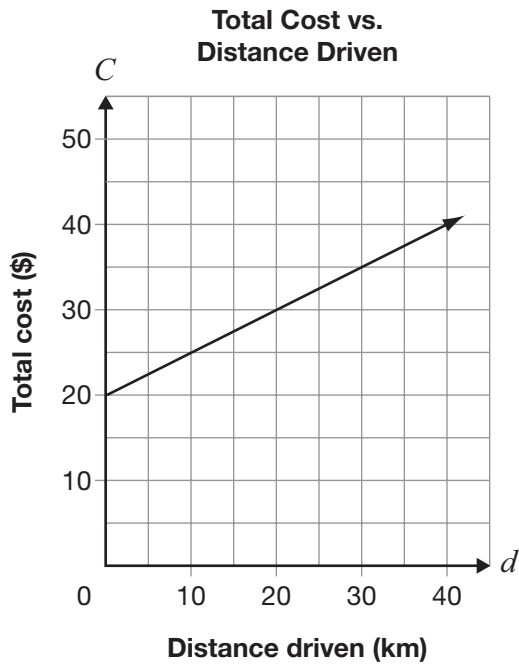
Which hall's total cost includes a lower cost per person?

Circle one: Hall A Hall B

Justify your answer.

23 Requesting All Rentals!

Erin rents a car. The relationship between the total cost of the rental and the distance driven is shown by the graph below.



Use the graph to estimate the total cost of the rental if Erin drives 27 km. Show your work on the graph.

The estimated cost for 27 km is _____.

Using the equation $C = 20 + 0.5d$, where C represents the total cost, in dollars, and d represents the distance Erin drives, in kilometres, determine the total cost of driving 27 km.

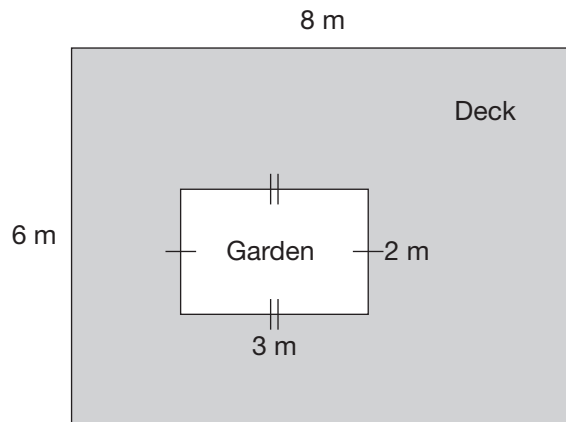
Show your work.

The actual cost for 27 km is _____.

There could be a difference in the total cost of driving 27 km when you use the graph rather than the equation.

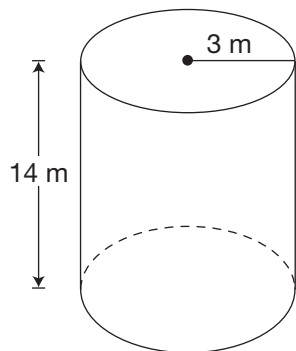
Explain why there could be a difference.

- 24** Ollie constructs a rectangular deck. He builds the deck around a garden in his yard as shown below.



What is the area of the deck?

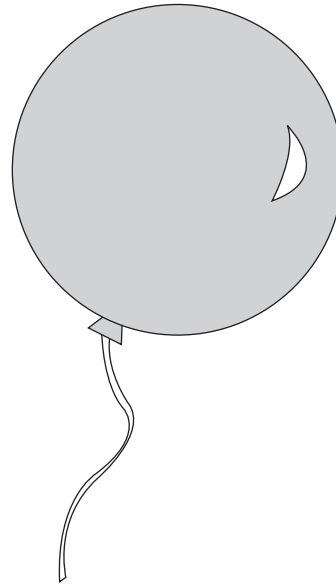
- a 48 m^2
 - b 42 m^2
 - c 20 m^2
 - d 18 m^2
- 25** Consider the cylinder below.



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

- a 126 m^3
- b 132 m^3
- c 264 m^3
- d 396 m^3

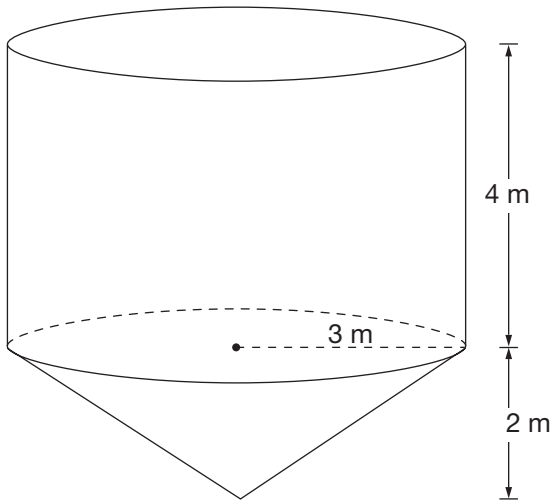
- 26** Air is pumped to fill a spherical balloon. Each time air is pumped, 300 cm^3 of air enters the balloon.



Which of the following is closest to the number of times air must be pumped to fill an empty spherical balloon to a radius of 10 cm ?

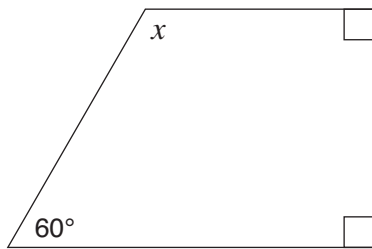
- a 4
- b 14
- c 30
- d 42

- 27** A container that stores grain is in the shape of a cylinder and cone as shown below.



Which is closest to the volume of the container?

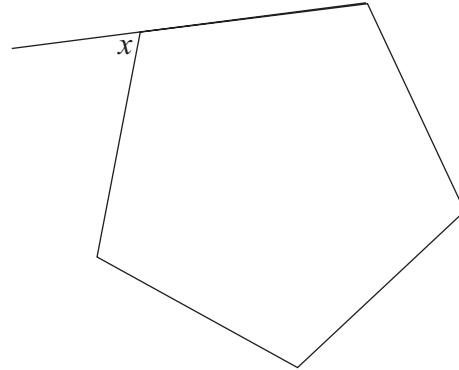
- a 88 m^3
 - b 113 m^3
 - c 132 m^3
 - d 170 m^3
- 28** Consider the diagram below.



What is the value of x ?

- a 30°
- b 60°
- c 120°
- d 150°

- 29** A regular pentagon is shown below.

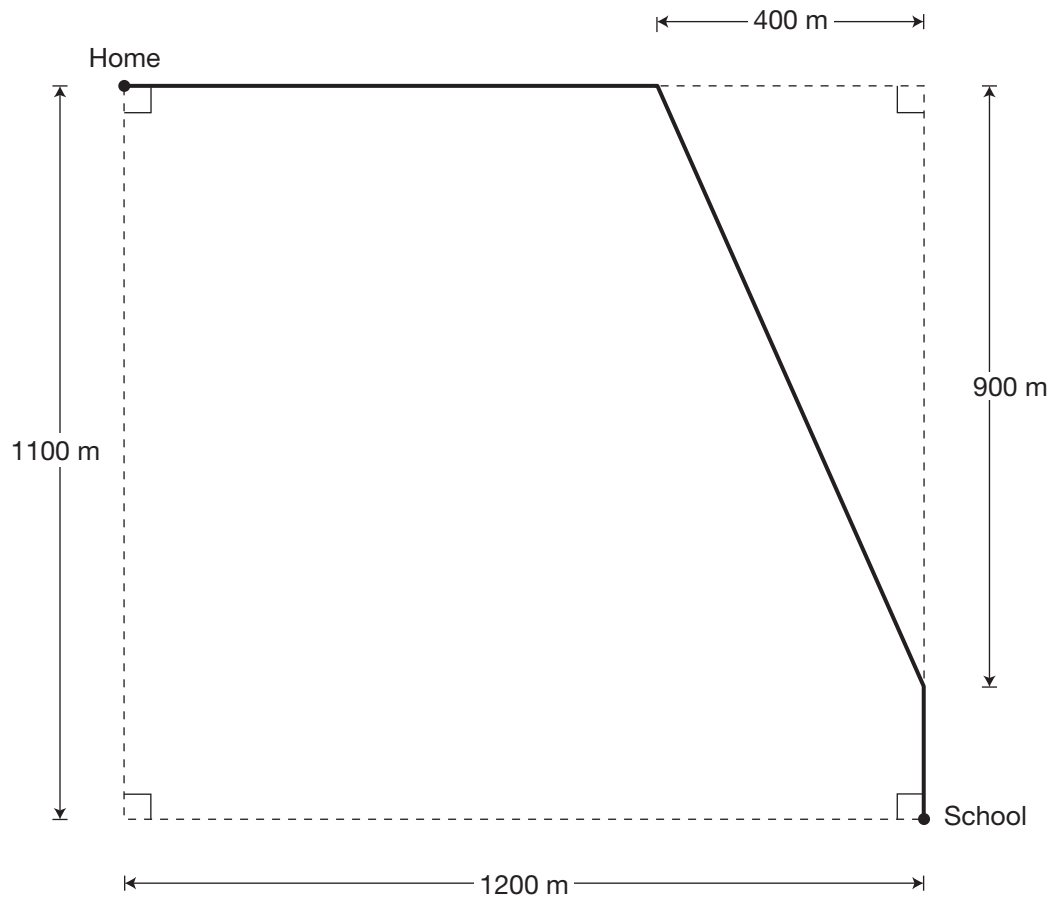


What is the value of x ?

- a 60°
- b 72°
- c 108°
- d 180°

30 School's In

Chandra uses the map below to determine the distance from home to school.

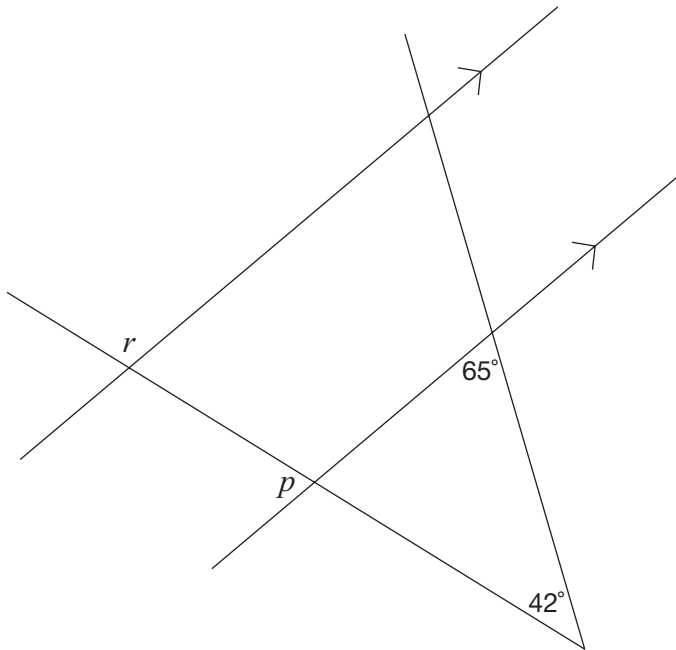


Determine the total distance she will travel from home to school if she walks along the dark, solid lines shown on the map.

Show your work.

31 Angle, Angle

Consider the diagram below.



Complete the chart below with the values for p and r . Justify your answers using geometric properties.

Value	Justification using geometric properties
$p =$ _____	
$r =$ _____	

Released Assessment Questions: Applied

Answer Key

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

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

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

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

End of Assessment

Print Student Name: _____

Student Signature: _____