

Applied

Grade 9 Assessment of Mathematics

2014

RELEASED ASSESSMENT QUESTIONS

**Record your answers to the multiple-choice questions
on the Student Answer Sheet (2014, Applied).**

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.

Directions

Make sure you have the following materials:

- Student Answer Sheet
- the Formula Sheet
- a pencil and an eraser
- a ruler
- a scientific or graphing calculator
- some paper for rough work for multiple-choice questions only

The diagrams in this booklet are **not** all drawn to scale.

Answering Multiple-Choice Questions

When answering the multiple-choice questions, be sure you use the Student Answer Sheet. The circles you will be filling in are lettered a, b, c, d.

1. Try to answer all of the multiple-choice questions. Be sure to read each question and its four answer choices carefully. Do not spend too much time on any one question.
2. To indicate your answer, **use a pencil to fill in the circle completely** on the Student Answer Sheet.
Like this: ● **Not like this:** ⊗ ✓ ◐ ◑
3. If you fill in more than one answer to a question, the question will be scored zero.
4. If you leave a question blank, the question will be scored zero.
5. Cleanly erase any answer you wish to change and fill in the circle for your new answer.

Answering Open-Response Questions

1. Do all of your work for each question (even your rough work) in the space provided for the question. Work on additional pages will **not** be scored.
2. Present a complete and well-organized solution to each question. Give as much information as you can.
3. Write your solutions so that they can be understood by someone who does not know your work.
4. Make sure you follow the directions on the Key Words page.
For example, a question might ask you to “Show your work.” Read the Key Words page. It says to record all calculations and steps. So, if you sketch a graph in the process of getting to your answer, show the sketch and label it.
5. When using a calculator, write down the numbers you use and the operations you carry out.
For example, a question might ask you to “Find the area of a circle with a radius of 7 cm.” You need to write $A = \pi(7)^2$ as well as the answer you get on your calculator.

Key Words

Throughout the assessment, key words are used to identify the type of response required from you. The key words are explained below. Refer to this sheet to make sure you are responding fully to each question.

Compare:

Tell what is the same and what is different.

Describe:

Use words to create a mental picture for the reader.

Determine:

Use mathematics to find a solution to the problem.

List:

Use point form.

Explain:

Use words and symbols to make your solution clear.

Justify:

Give reasons and evidence to show your answer is correct.

Show your work:

Record all calculations and all the steps you went through to get your answer. You may use words, numbers, graphs, diagrams, symbols and/or charts.

- 1** Billy has 3 apples and 4 oranges.

Which of the following has a ratio of apples to oranges equivalent to Billy's?

- a 3 apples and 8 oranges
- b 4 apples and 3 oranges
- c 8 apples and 6 oranges
- d 9 apples and 12 oranges

- 2** The ratio of the width to the height of a television screen is 16:9.

If the height of the screen is 52 cm, which is closest to the width?

- a 92 cm
- b 87 cm
- c 59 cm
- d 29 cm

- 3** A store gives reward points for every dollar spent. The number of reward points varies directly with the total amount spent.

Sofia spends \$300 and receives 15 reward points.

Juan spends \$900. He receives reward points at the same rate as Sofia.

How many **more** reward points will Juan receive than Sofia?

- a 20
- b 30
- c 60
- d 90

- 4** Each year, a school sends 50 students to a conference.

Last year, the cost was \$12.50 per student. This year, the cost per student has increased by 16%.

What is the total cost to send 50 students to the conference this year?

- a \$625
- b \$633
- c \$725
- d \$841

- 5** What is the value of x in the equation

$$25 - \sqrt{x} = 9?$$

- a 4
- b 16
- c 225
- d 256

- 6** The formula for the volume of a cylinder is $V = \pi r^2 h$, where r is the radius and h is the height.

A cylinder has a radius of 3 cm and a height of 10 cm.

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

- a 188 cm^3
- b 283 cm^3
- c 888 cm^3
- d 8882 cm^3

- 7** A formula for the relationship between a person's maximum heart rate, H , and the person's age, a , is shown below.

$$H = 217 - 0.85a$$

According to the formula, which of the following is closest to Jasmin's maximum heart rate if she is 14 years old?

- a 203
- b 205
- c 229
- d 239

8 Orange-Gi

Gina is buying 24 oranges. Two stores offer the following deals:

Store A: 12 oranges for \$6.48

Store B: 5 oranges for \$2.65

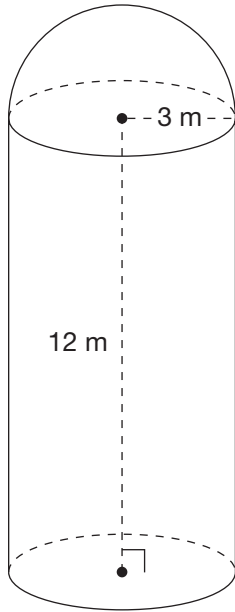
Gina can buy oranges individually.

How much will Gina save if she buys 24 oranges at Store B?

Show your work.

9 Volumizer

The figure pictured below is made of a cylinder and a hemisphere.



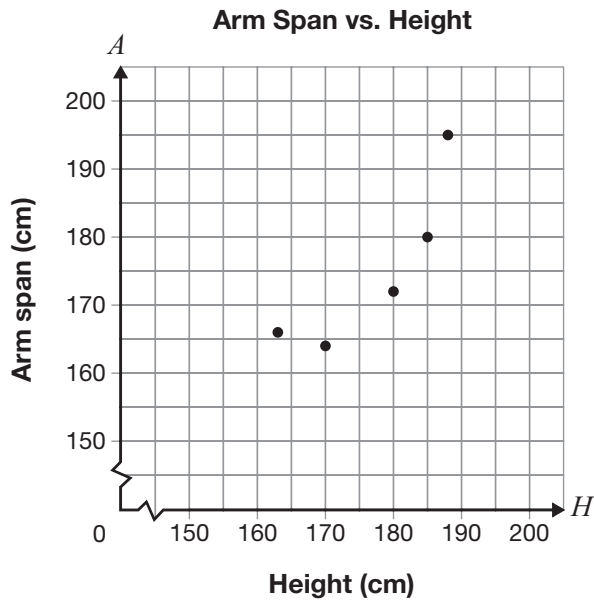
Its volume can be determined using the following formula, in which r is the radius and h is the height of the cylinder.

$$V = \frac{2}{3}\pi r^3 + \pi r^2 h$$

Determine the volume of the figure.

Show your work.

- 10** Five students plot their arm span and height on the graph below.

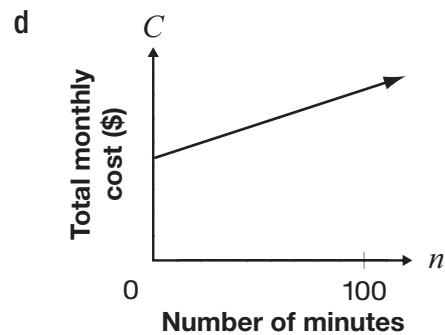
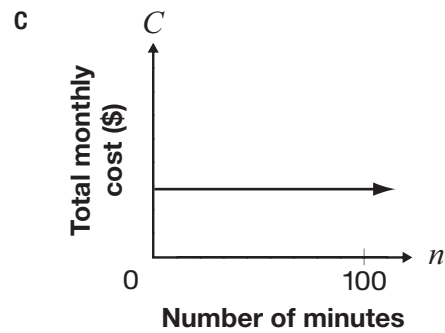
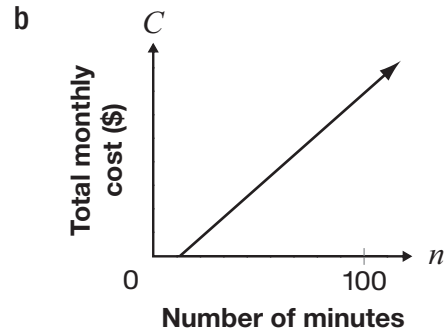
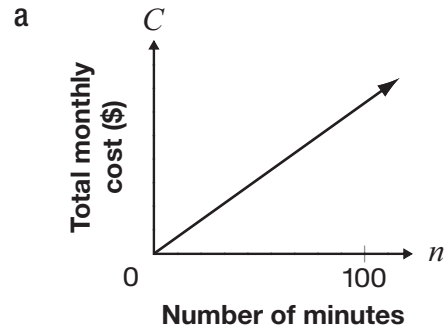


Which of the following describes one of these 5 students?

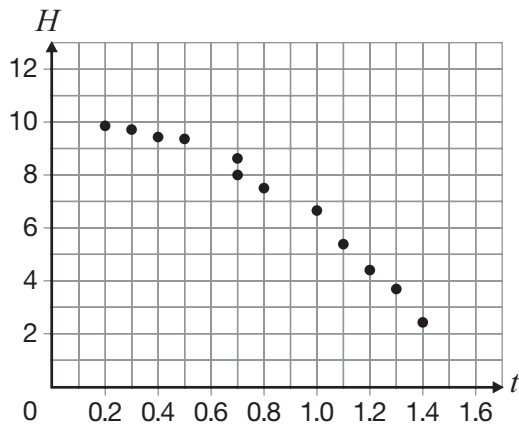
- a height: 166 cm; arm span: 162 cm
- b height: 170 cm; arm span: 164 cm
- c height: 180 cm; arm span: 165 cm
- d height: 195 cm; arm span: 188 cm

- 11** Each month, Alex’s cellphone plan costs \$15, plus \$0.10 per minute of use.

Which graph could represent Alex’s total monthly cost?



- 12** The scatter plot below shows data from an experiment.



Which of the following best represents the trend in this data?

- a a line that starts at (0, 10) and ends at (1.5, 0)
- b a line that starts at (0, 0) and ends at (1.6, 12)
- c a curve that starts at (0, 10) and ends at (1.5, 0)
- d a curve that starts at (0, 0) and ends at (1.6, 12)

- 13** Patterns are made using the square \square .

For which of the following patterns is there a linear relationship between the number of squares in the term and the term number?

- a

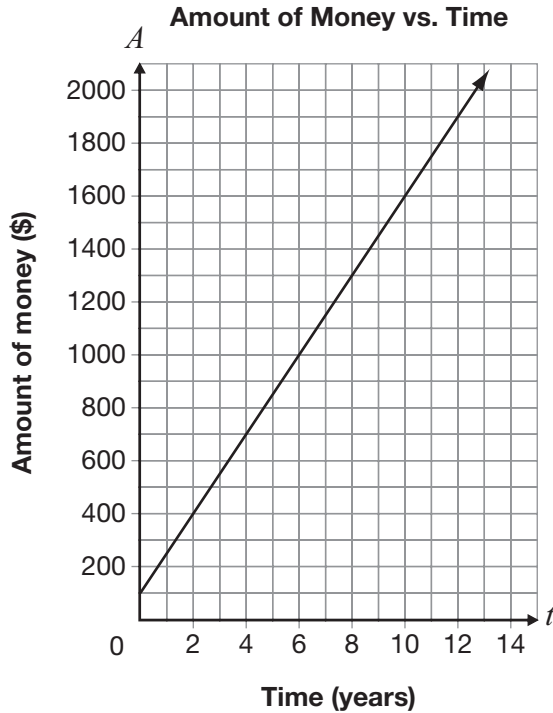
\square	$\square\square\square$	$\square\square\square\square$	$\square\square\square\square\square$
Term 1	Term 2	Term 3	Term 4
- b

\square	$\square\square$	$\square\square\square$	$\square\square\square\square$
Term 1	Term 2	Term 3	Term 4
- c

\square	$\begin{array}{c} \square \\ \square \end{array}$	$\begin{array}{cc} \square & \square \\ \square & \square \end{array}$	$\begin{array}{ccc} \square & \square & \square \\ \square & \square & \square \end{array}$
Term 1	Term 2	Term 3	Term 4
- d

\square	$\begin{array}{cc} \square & \square \\ \square & \square \end{array}$	$\begin{array}{ccc} \square & \square & \square \\ \square & \square & \square \\ \square & \square & \square \end{array}$	$\begin{array}{cccc} \square & \square & \square & \square \\ \square & \square & \square & \square \\ \square & \square & \square & \square \\ \square & \square & \square & \square \end{array}$
Term 1	Term 2	Term 3	Term 4

- 14** A graph representing the relationship between the amount of money in a bank account and time, in years, is shown below.



What is the rate of change for this relationship?

- a \$200 per year
- b \$160 per year
- c \$150 per year
- d \$100 per year

- 15** Halyna starts with \$50 in her bank account, and she spends \$3 per day from it.

Compared to Halyna, Manny starts with \$5 more in his account and spends \$1 more each day.

Which of the following equations represents the amount of money remaining in Manny's account, A , at the end of each day, d ?

- a $A = 51d$
- b $A = 59d$
- c $A = 55 - 9d$
- d $A = 55 - 4d$

- 16** The cost, C , in dollars, of a pizza with n toppings is represented by the equation $C = 2n + 5$.

Which of the following statements is true?

- a The base cost of the pizza is \$2, and the cost per topping is \$5.
- b The base cost of the pizza is \$5, and the cost per topping is \$2.
- c The base cost of the pizza is \$7, and the cost per topping is \$2.
- d The base cost of the pizza is \$7, and the cost per topping is \$5.

- 17** Data in the table below is from a linear relationship.

n	C
2	10
4	16
6	22
8	
10	
12	

What is the value of C when $n = 10$?

- a 24
 - b 28
 - c 34
 - d 40
- 18** A movie-rental club charges a membership fee and a cost for each movie rented.

The table of values shows total costs for renting movies.

Number of movies, n	Total cost, C (\$)
1	12
2	14
3	16
4	18

Which of the following equations correctly represents this relationship?

- a $C = 4n + 8$
- b $C = 4n + 12$
- c $C = 2n + 10$
- d $C = 2n + 12$

- 19** One night at 11 p.m., the temperature is 3.5°C . Throughout the night, the temperature drops at a constant rate of 2°C per hour.

At this rate, when will the temperature reach -7.5°C ?

- a 4:30 a.m.
- b 5:00 a.m.
- c 5:30 a.m.
- d 6:00 a.m.

- 20** Carla belongs to a movie subscription service. Her total monthly cost consists of a \$16 fee and \$1.50 per movie viewed.

Susan's total monthly cost for a different movie subscription service has a fee that is \$4 less than Carla's, but the cost per movie viewed is the same.

Which of the following represents Susan's total monthly cost, C , in dollars, where n is the number of movies viewed?

- a $C = 20 + 1.5n$
- b $C = 12 + 1.5n$
- c $C = 13.5n$
- d $C = 12n$

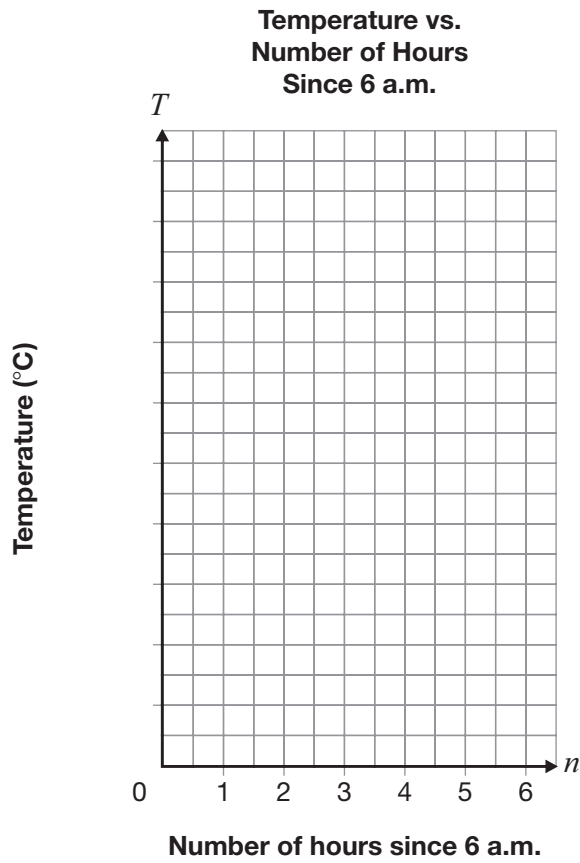
21 Warming Up

The temperature outside at 6 a.m. is 4°C . The temperature rises by 1.5°C every hour.

Complete the table of values for this relationship.

Number of hours since 6 a.m.	Temperature ($^{\circ}\text{C}$)
0	4
1	
4	
6	

Graph the data on the grid below. Choose and label an appropriate scale for the T -axis.



22 Hot Air Balloons

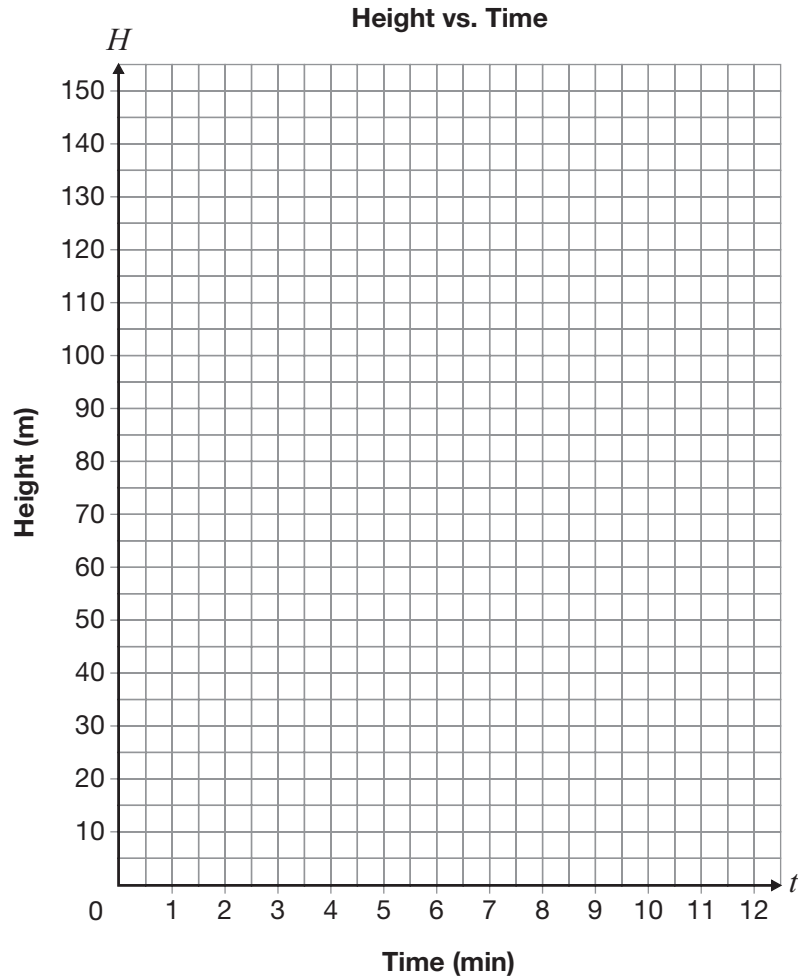
A green hot air balloon is rising at a constant rate.

- After 2 minutes, it is at a height of 30 m.
- After 6 minutes, it is at a height of 75 m.

A blue hot air balloon is rising at twice the rate of the green balloon.

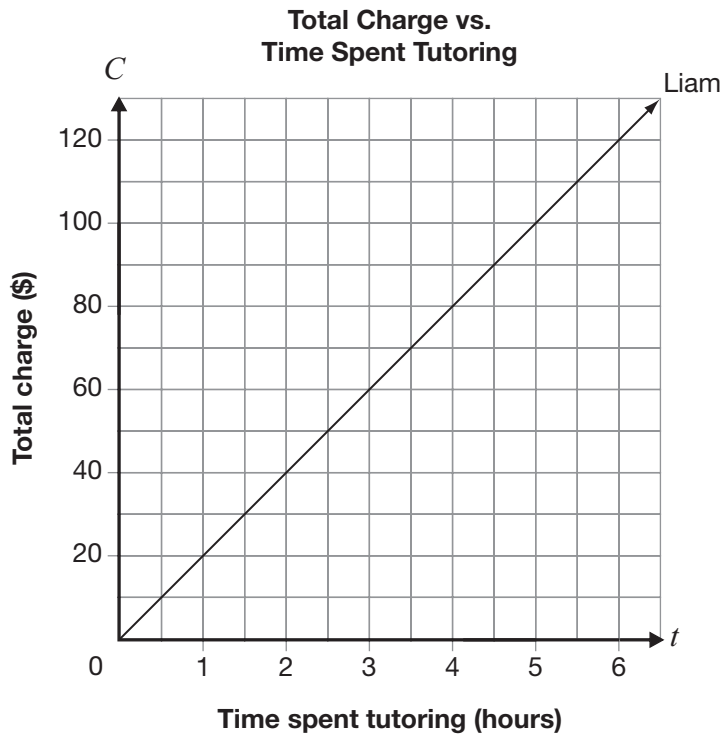
Determine the rate in metres per minute at which the blue balloon is rising.

Show your work. You may use the grid if you wish.



23 Two Tutors

Tianna and Liam both charge for tutoring. Information about Liam’s total charge for tutoring is shown on the grid below.



Tianna’s total charge is made up of a base fee of \$40, and \$10 per hour of tutoring.

They both start a tutoring session at the same time one day, and they both spend the same amount of time tutoring.

If Tianna’s and Liam’s charges were the same, how many hours did they each spend tutoring?

Justify your answer.

Tianna and Liam each spent _____ hours tutoring.

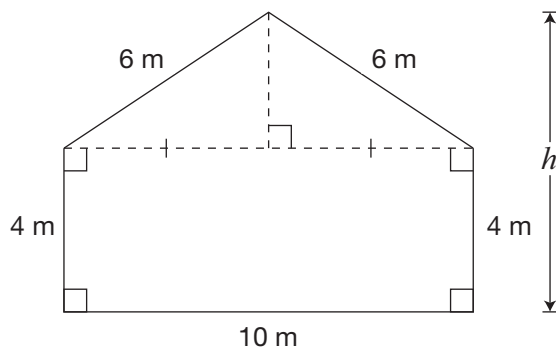
- 24** A rectangular area will be enclosed on all 4 sides.

Four options are shown below.

Option	Area (m ²)	Width (m)	Length (m)
1	256	2	128
2	256	4	64
3	256	16	16
4	256	32	8

Which option has the smallest perimeter?

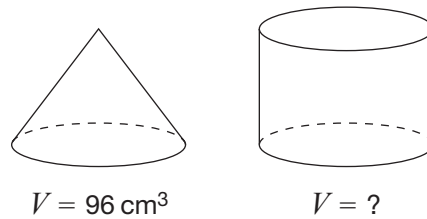
- a Option 1
 - b Option 2
 - c Option 3
 - d Option 4
- 25** The diagram below represents the front view of a house.



Which is closest to the height, h , of the house?

- a 3 m
- b 7 m
- c 10 m
- d 12 m

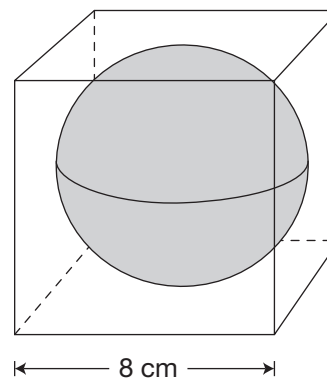
- 26** The cone and cylinder pictured below have the same height and radius.



The volume of the cone is 96 cm^3 .

What is the volume of the cylinder?

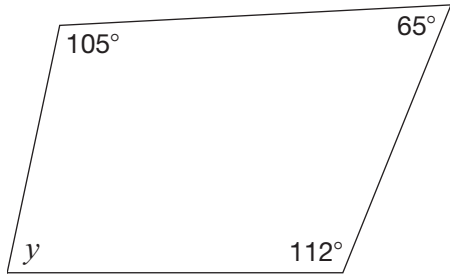
- a 32 cm^3
 - b 96 cm^3
 - c 192 cm^3
 - d 288 cm^3
- 27** The diagram below shows a spherical globe in a cube-shaped box. The globe fits tightly in the box.



Which is closest to the volume of empty space in the box?

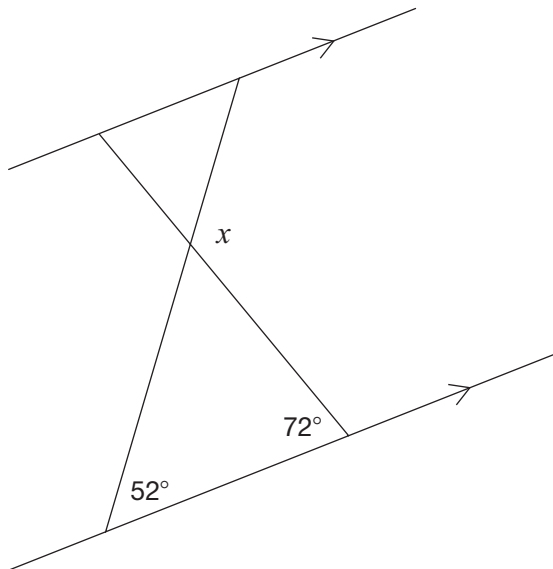
- a 244 cm^3
- b 268 cm^3
- c 512 cm^3
- d 780 cm^3

28 What is the value of y in the diagram below?



- a 65°
- b 75°
- c 78°
- d 102°

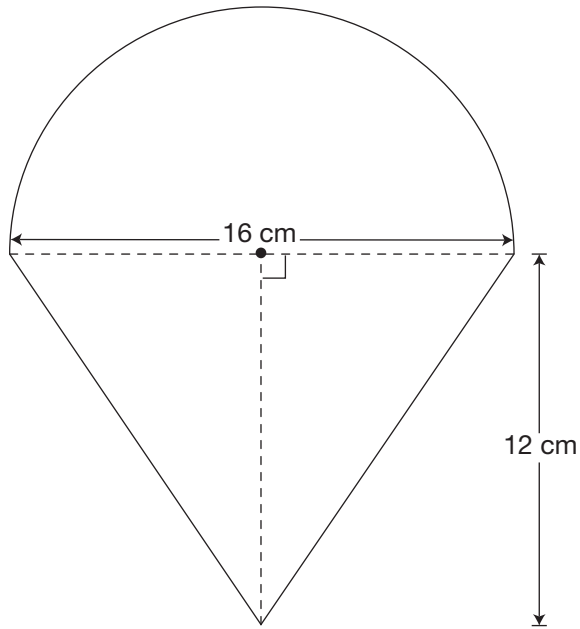
29 What is the value of x in the diagram below?



- a 56°
- b 72°
- c 108°
- d 124°

30 Flat Shape

The shape below is made of a semicircle and a triangle.

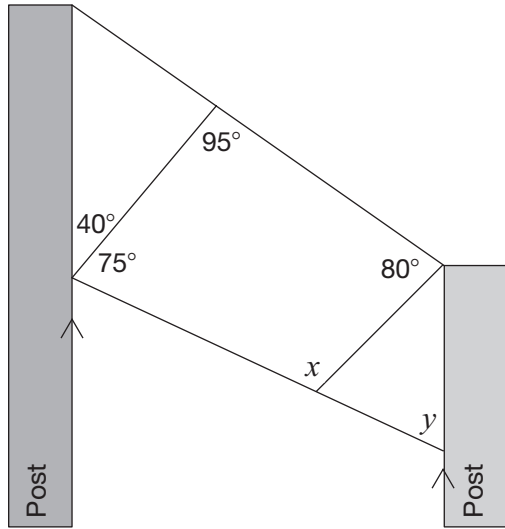


Determine the area of this shape.

Show your work.

31 Sign Design

A sign is strung between two posts as shown below.



Complete the table below with the values of x and y .

Justify your answers using geometric properties.

Value	Justification using geometric properties
$x = \underline{\hspace{2cm}}$	
$y = \underline{\hspace{2cm}}$	

**Education Quality and
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