Released Assessment Questions, 2018

Grade 9 Assessment of Mathematics • Academic

For Use with Assistive Technology

Listen as your teacher reads the instructions. Some key points are listed below.

Make sure you have the Formula Sheet for reference.

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

Answering Multiple-Choice Questions

Answer all multiple-choice questions. If you fill in more than one answer to a question, or leave a question blank, the question will be scored zero. Incorrect answers will also be scored zero.

Answering Open-Response Questions

Do all of your work for each question in the space provided for the question **only.**

Write your solutions, including all calculations, clearly and completely.

ATTENTION:

The format of this document differs from that of the actual assessment booklets, as the questions are sorted by strand.

There are more multiple-choice and open-response questions in this document than in a regular booklet.

You are now ready to start.

Multiple-Choice

1. A ball is dropped from a cliff that is 135 m high. The relationship between the height of the ball, h, in metres, and time, t, in seconds, can be represented by the equation $h = -4.9t^2 + 135$.

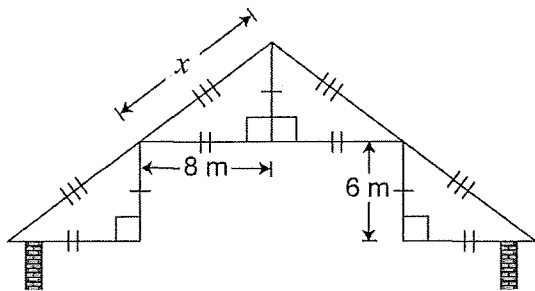   Which is closest to the height of the ball after 2.1 seconds? $t = 2.1$

   a. 22 m

   Sub $t = 2.1$

   b. 29 m

   c. 113 m

   $h = -4.9(2.1)^2 + 135$

   $= 113$

   d. 125 m

2. A roof can be modelled by four congruent triangles, as pictured.

   The length of x, in metres, can be determined using the formula $x^2 = 8^2 + 6^2$.

   Which is closest to the total length of **both** sides of the roof, $4x$? $x^2 = 64 + 36$

   a. 56 m

   $x^2 = 100$

   b. 40 m

   $x = \sqrt{100}$

   c. 21 m

   $= 10$

   d. 15 m

3. Which is a simplified form of $3x(7x - 2)$?

$= 21x^2 - 6x$
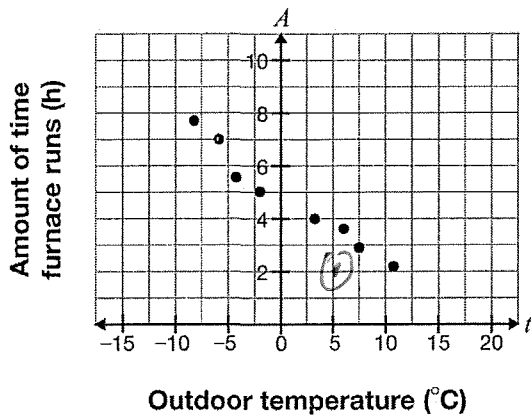
a. $21x^2 - 2x$

b. $21x^2 - 2$

c. $21x^2 - 6$

d. $21x^2 - 6x$

4. One winter, Cassy records the total amount of time, A, in hours, that her furnace runs in a day versus the outdoor temperature, t, in degrees Celsius. She produces this scatter plot.

**Amount of Time Furnace Runs
vs. Outdoor Temperature**

Outdoor temperature (°C)

Cassy then decides to improve the insulation in her home, which will save energy and reduce the amount of time her furnace runs.

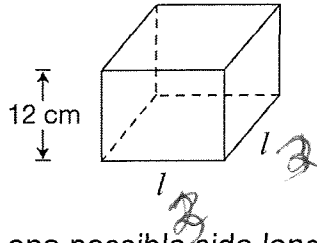Which point could Cassy expect to record **after** improving the insulation in her home?

a.   (−5, 10)

b.   (0, 5)

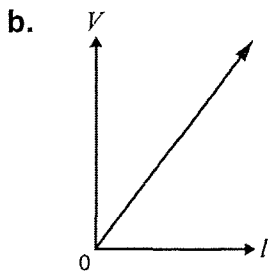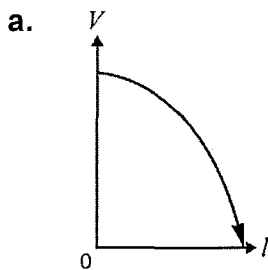c.   (5, 2)

d.   (10, 5)

5. The side lengths, l, of this square-based prism can change. The height is 12 cm and **cannot** change.

12 cm

l

l

The volume of the prism for one possible side length is given in this chart.

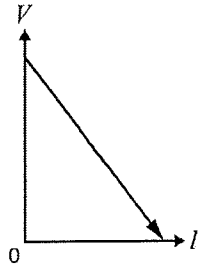| l	V
1	12
2	48
3	108

Which graph could represent the relationship between the volume, V, in cm^3, of this square-based prism and the length of a side of its square base, l, in cm?

a. V

l

0

b. V

l

0

c.
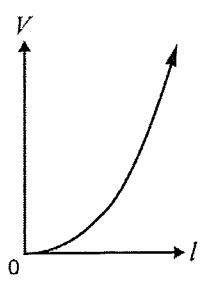
d.

6. An amusement park charges an entrance fee and a cost per ride as shown in the table.

Number of rides	Total cost ($)
3	15
9	27

(handwritten table: 0 | 9; 3 | 15; 6 | 21 (new fee); 9 | 27; (4) circled)

(handwritten: (3, 15) (9, 27))

The park decides to reduce its entrance fee by $5.

What type of variation is this **new** relationship, and what is its initial value?

a. a partial variation with an initial value of $4

b. a direct variation with an initial value of $2

c. a partial variation with an initial value of $9

d. a direct variation with an initial value of $0

7. A class measures the diameter of a snowball as it melts. Information about the diameter at two different times is shown on the grid below.
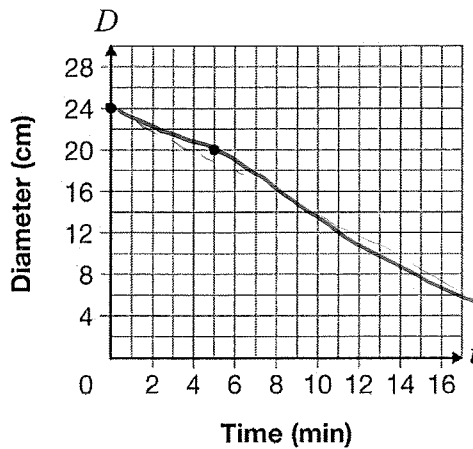
(handwritten:
$$y = -\frac{4}{5}t + 24$$
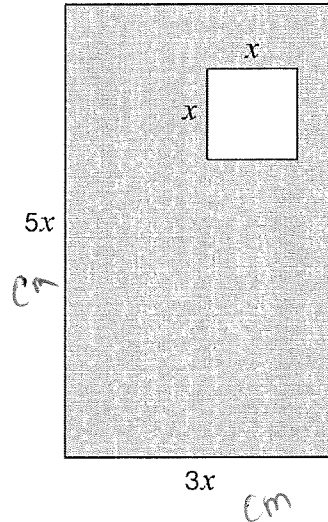$$0 = -\frac{4}{5}t + 24$$
$$-24 = -0.8t$$
)

If this situation is modelled as a linear relationship using the two points, what is the **total time** it will take the snowball to melt completely?

a. 30 minutes

b. 24 minutes

c. 20 minutes

d. 16 minutes

Open-Response

8. Square Removed

This rectangle has a square removed. There are algebraic expressions for the sides, in centimetres.

The area of the rectangle without the square is 126 cm^2.

Determine the side length of the square, x, in centimetres.

Show your work.

$$A_{\square} = (5x)(3x) = 15x^2$$

$$A_{\square} = x^2$$

$$A_{shaded} = 15x^2 - x^2 = 14x^2$$

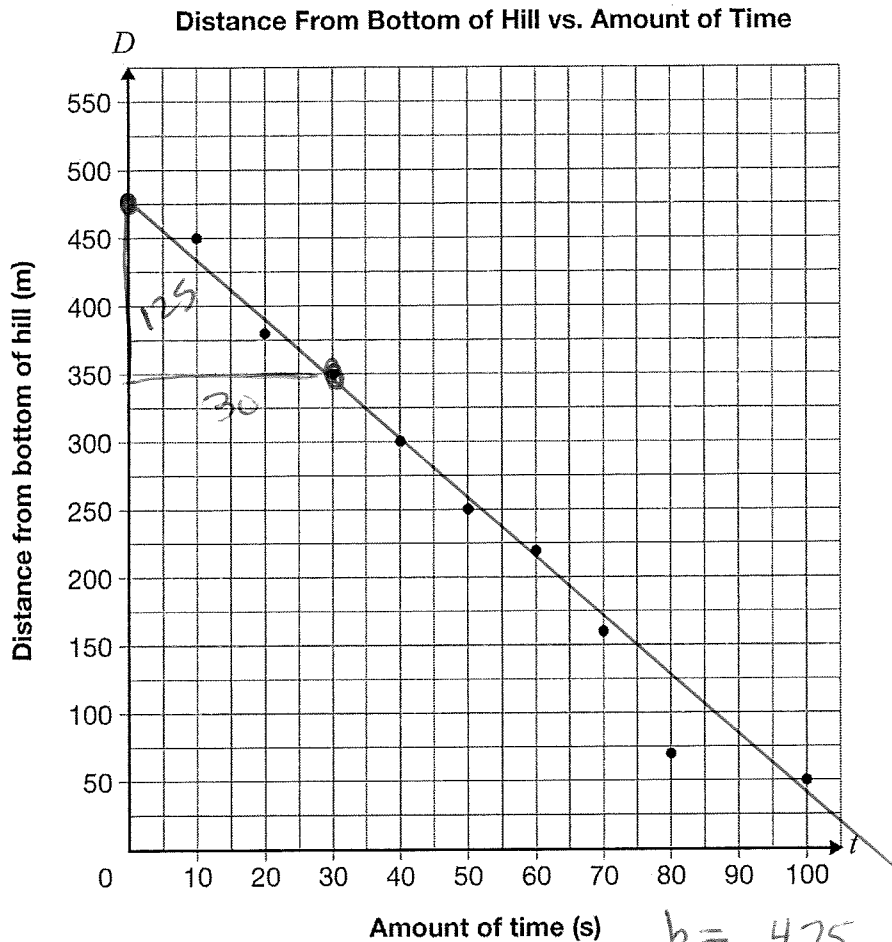$$\frac{14x^2}{14} = \frac{126}{14}$$

$$x^2 = 9$$

$$x = \sqrt{9}$$

$$= 3$$

The side length of the square, x, is _____3_____ cm.

9. How Fast Can You Ski?

This scatter plot shows the relationship between the distance a downhill skier is from the bottom of a ski hill and the amount of time the skier has been on the hill.

Distance From Bottom of Hill vs. Amount of Time

Draw an appropriate line of best fit for the data.

$b = 475$

$m = -4.17$

Determine an equation for your line of best fit.

Show your work. If using technology, provide support to show why your answer is correct.

going down from left to right

$$D = \underline{-4.17s + 475}$$

or $D = -\dfrac{25}{6}s + 475$

10. Tree Planting

A high school's environmental club is selling trees to raise money. The club starts with a donation from the principal and then collects money for each tree it sells.

Information about the linear relationship between the total amount raised and the number of trees sold is given.

Graph all the data from the table on the grid. Include an appropriate scale on the vertical axis.

Number of trees sold, n	Total amount raised, A ($)
3	240
9	420
11	480

Total Amount Raised vs. Number of Trees Sold

A

Total amount raised ($)

2   4   6   8   10   12
Number of trees sold
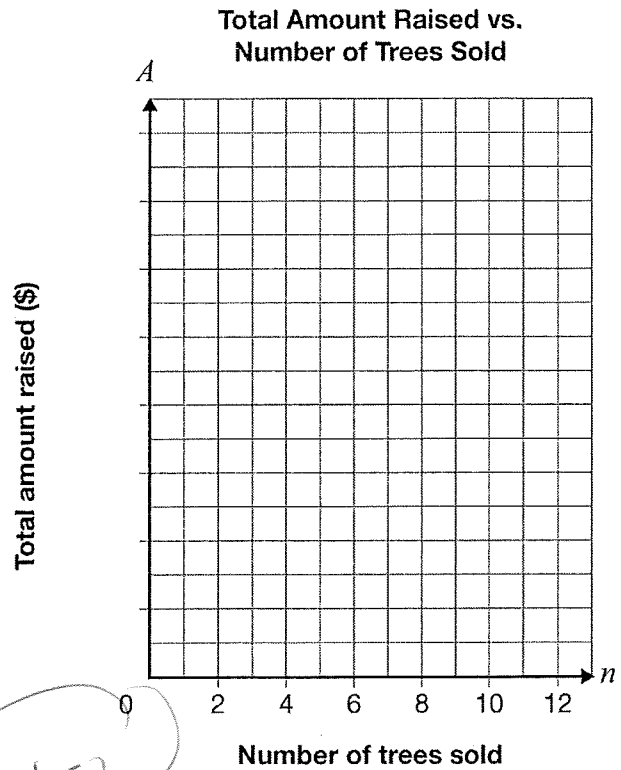
$$m = \frac{480 - 420}{11 - 9}$$

$$= \frac{60}{2} = 30$$

$$y = mx + b$$
$$240 = 30(3) + b$$
$$b = 150$$

Determine an equation to represent the relationship between the total amount raised, A, and the number of trees sold, n.
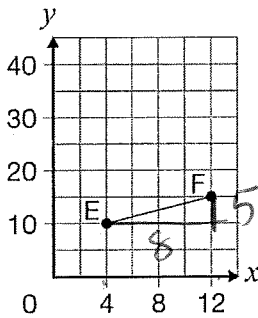
Show your work.

$A =$ $30t + 150$

11. Comparisons

Line segment AB has a slope of $\frac{5}{8}$.
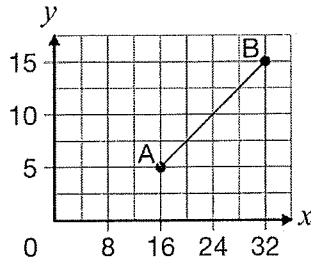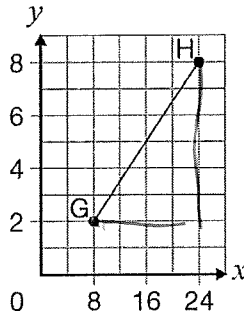

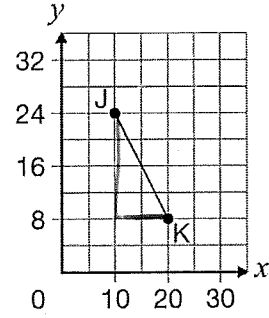Slope of $\overline{AB} = \frac{5}{8}$

Determine the slope of line segments EF, GH and JK below.

Slope of $\overline{EF} = \dfrac{5}{8}$

Slope of $\overline{GH} = \dfrac{6}{16} = \dfrac{3}{8}$

Slope of $\overline{JK} = \dfrac{-16}{10} = -\dfrac{8}{5}$

Complete the chart by comparing the slope of each of line segments EF, GH and JK to the slope of line segment AB if all the line segments were graphed on the same grid.

|	Line segment EF $\frac{5}{8}$	Line segment GH $\frac{3}{8}$	Line segment JK $-\frac{8}{5}$
Comparison to line segment AB $m = \frac{5}{8}$	Circle one: (parallel) perpendicular neither	Circle one: (less steep) more steep same steepness	Circle one: parallel (perpendicular) neither

12. The Better Choice

Shane has a choice between two jobs helping people around his neighbourhood.

• **Job A:** Shane's total pay is shown on the grid below.

• **Job B:** Shane will receive base pay of $30, plus $12.50 per hour.

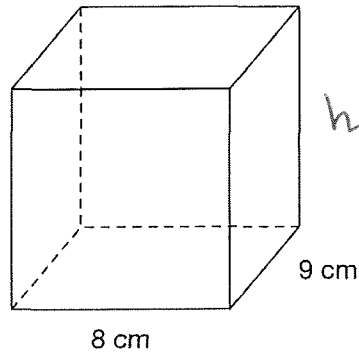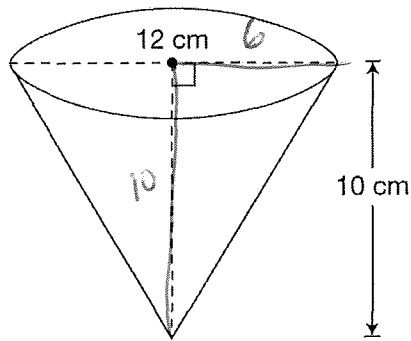Determine the conditions under which Shane should select Job A and the conditions under which he should select Job B.

Justify your answer.

Total Pay vs. Number of Hours Worked

Number of hours worked
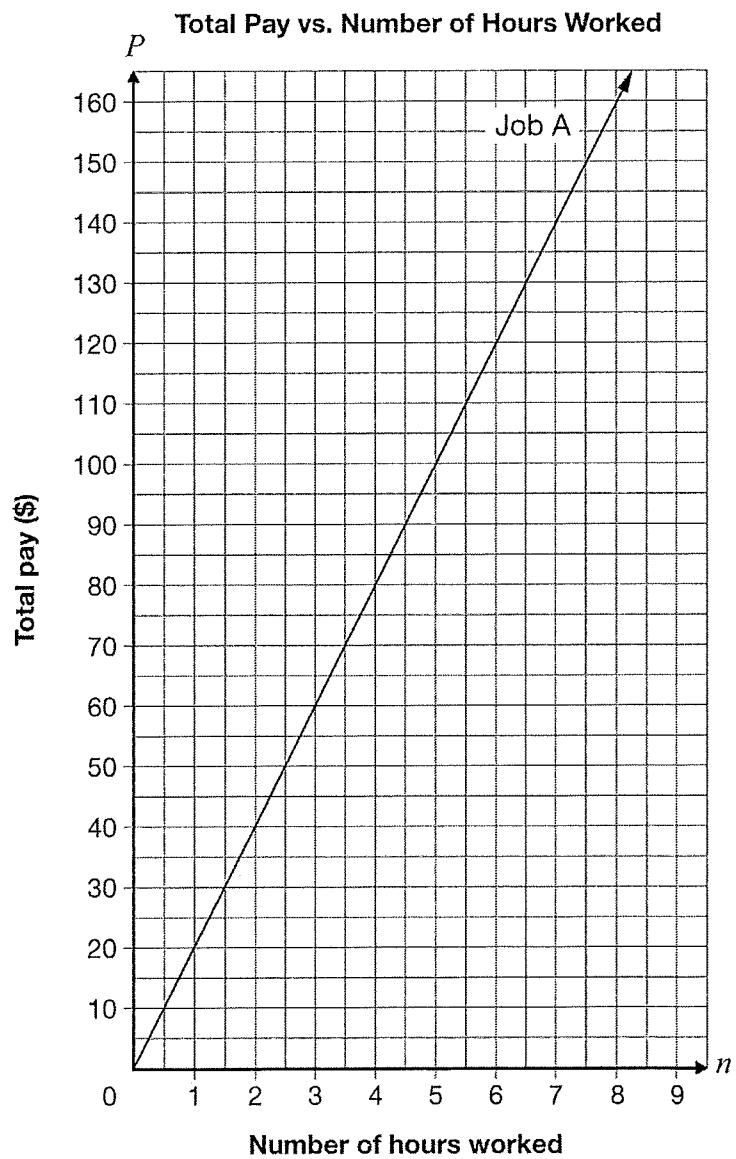
13. What Height?

Two containers are pictured below. One container is a cone, and the other is a rectangular-based prism.

The cone is completely filled with water, and then the water is poured into the empty prism, without spilling.

Determine the height of the water in the prism.

Show your work.

Handwritten work:

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

$$= \frac{(3.14)(6)^2(10)}{3}$$

$$= 376.8 \text{ cm}^3$$

Cone diagram labels: 12 cm, 6, 10, 10 cm

Prism diagram labels: h, 9 cm, 8 cm

$$(8)(9)(h) = 376.8$$

$$\frac{72h}{72} = \frac{376.8}{72}$$

$$h \doteq 5.23 \text{ cm}$$

Multiple-Choice

14. Which of the following does **not** represent a straight line?
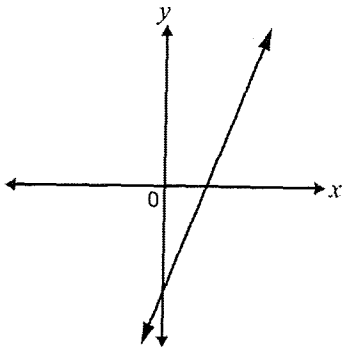
a. $y = 2$
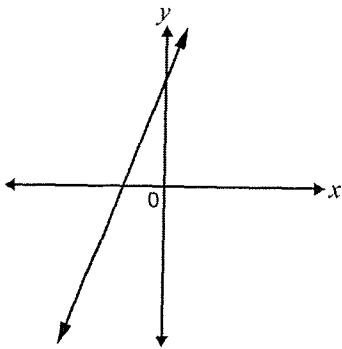
b. $x = 2$

c. $x = 2y$

d. $y = x^2$

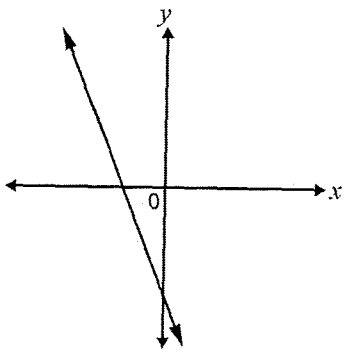**15.** Which of these graphs could represent $y = 5 - 2x$?
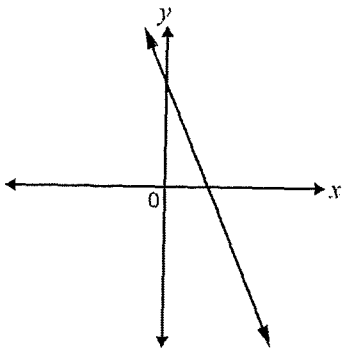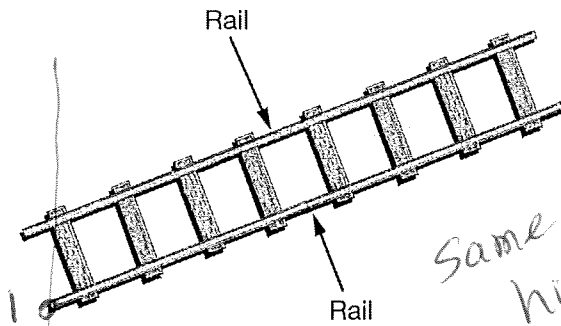
a.

$m = -2$

$b = 5$

b.

c.

d.

16. The path of one of the rails of a train track can be represented by the equation $y = \frac{2}{3}x + 1$.

Rail

Rail

Same slope
higher y-int.

Which equation could represent the path of the second rail?
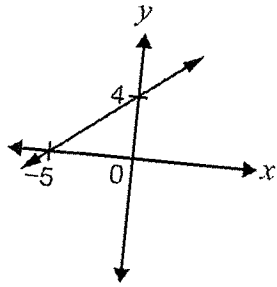
a. $y = -\frac{3}{2}x + 3$

b. $y = -\frac{2}{3}x + 3$

c. $y = \frac{2}{3}x + 3$

d. $y = \frac{3}{2}x + 3$

17. Using the x- and y-intercepts, select the graph that represents $4x - 5y = -20$.
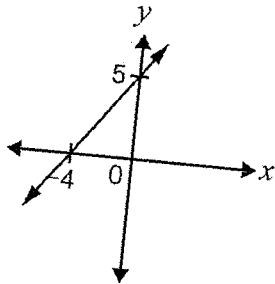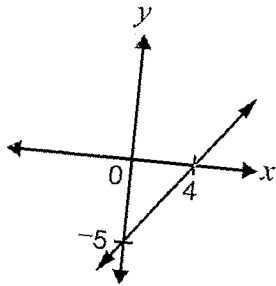
a. (circled)

b.

c.

d.

$$-5y = -4x - 20$$
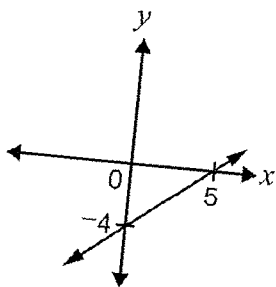$$\frac{-5y}{-5} = \frac{-4x}{-5} - \frac{20}{-5}$$

$$y = \frac{4}{5}x + 4$$

18. Fresh Springs Water Company delivers bottled water.

The total cost of the water, C, in dollars, is represented by $C = 8 + 1.5n$, where n is the number of litres.

Which of the following statements could be true?

Customers who order more than 1 L of water will pay

fee = $8.

→ fixed fee

a. $1 for every 9.5 L of water.

b. $9.50 for each litre of water.

c.   an $8 delivery charge and $1.50 per litre of water.
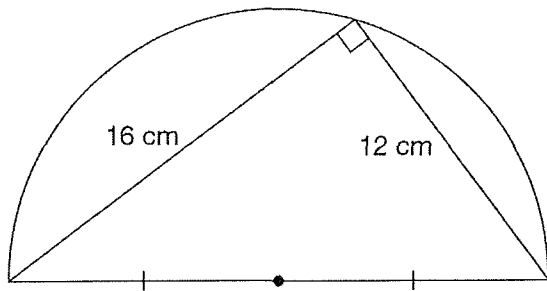
d.   a $1.50 delivery charge and $8.00 per litre of water.

19. Which of the following dimensions produces a rectangle with the smallest perimeter?

a.   10 m × 120 m

b.   30 m × 40 m   *close to square !!*

c.   50 m × 24 m

d.   60 m × 20 m

20. A semicircle with a right triangle in it is shown.

What is the radius of the semicircle?

Hint:
Use the Pythagorean
theorem.

a. 28 cm

b. 20 cm

c. 14 cm

d. 10 cm

$$a^2 + b^2 = c^2$$

$$16^2 + 12^2 = x^2$$

$$x^2 = 400$$
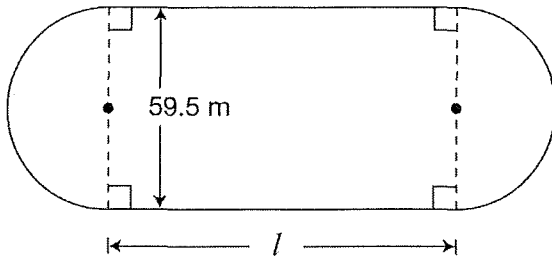
$$x = \sqrt{400}$$

$$x = 20$$

$$r = 10$$

since diameter = 20

21. A diagram of a track with a perimeter of 475 m is shown below.

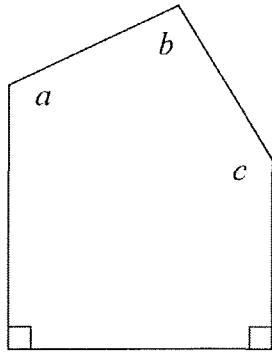59.5 m

l

$$P = C + 2l$$

$$475 = 2\pi (29.7) + 2l$$

$$475 = 186.83 + 2l$$

$$l = 144.085$$

Which of the following is closest to the length of a side of the rectangular part of the track, *l*?

a.   51 m

b.   144 m

c.   288 m

d.   356 m

22. Which of the following is true for this diagram?

b

a

c

5 sides = 3 triangles

(3) (180) = 540

a. $a + b + c + 90° + 90° = 180°$

b. $a + b + c + 90° + 90° = 360°$

c. $a + b + c + 90° + 90° = 540°$

d. $a + b + c + 90° + 90° = 720°$