



ANSWERS

Name: _____

Year 8 Level
Department of Mathematics 2015
Parade College

TEST: Ch 10 Measurement

Section	Marks	Your mark
A: Vocabulary knowledge	4	
B: Multiple Choice	10	
C: Short Answer	26	
D: Analysis Question	10	
Total Marks = 50		

Section A: Vocabulary Knowledge (1 × 4 = 4 marks)

1. The perimeter of a shape is the distance around the outside boundaries of the shape.
2. The ratio of the circumference to the diameter of a circle has the value of π .
3. The area of a shape is the amount of flat surface enclosed by the shape.
4. Volume is a measure of the amount of space inside a 3-dimensional object

WORD LIST

Perimeter volume area length space
ratio cross-section highest common factor

Section B

Multiple Choice Section

Question 1

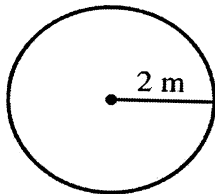
What is the conversion of 83 600 m to km?

- A 836 km
- B 0.836 km
- C 83.6 km
- D 8.36 km
- E 8360 km

$$83,600 \div 1000 = 83.6 \text{ km}$$

Question 2

What is the **diameter** of the circle shown below?

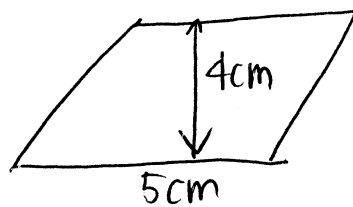


- A $\pi \times 2 \text{ m}$
- B 4 m
- C 1 m
- D $\pi \times 4 \text{ m}$
- E 2 m

Question 3

The area of a parallelogram with base 5 cm and height 4 cm is:

- A 10 cm^2
- B 50 cm^2
- C 5 cm^2
- D 20 cm^2
- E 25 cm^2



$$A = bh$$
$$\therefore A = 5 \times 4 = 20 \text{ cm}^2$$

Question 4

5,000 cm² is equal to:

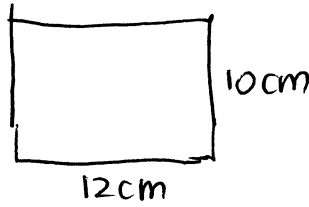
- A. 0.5 m²
- B. 5 m²
- C. 50 m²
- D. 5000 m²
- E. 500000 m²

$$\begin{aligned} 5000 \text{ cm}^2 \\ &= 5000 \div 100^2 \text{ m}^2 \\ &= 0.5 \text{ m}^2 \end{aligned}$$

Question 5

A rectangle has a length of 12 cm and a width of 10 cm. Its **perimeter** would be:

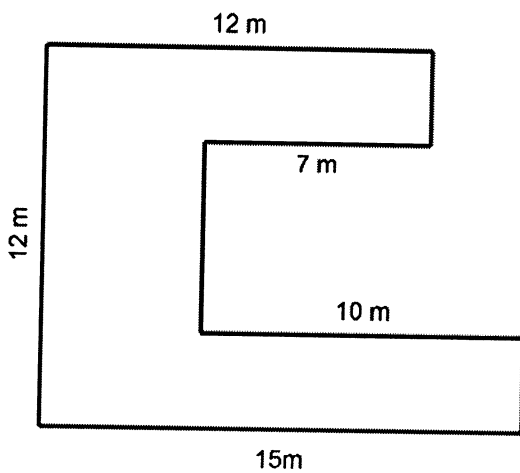
- A. 22 cm
- B. 44 cm
- C. 32 cm
- D. 34 cm
- E. 120 cm



$$\begin{aligned} P &= 2 \times 12 + 2 \times 10 \\ &= 24 + 20 \\ &= 44 \text{ cm} \end{aligned}$$

Question 6

In the shape below, all sides are either horizontal or vertical.

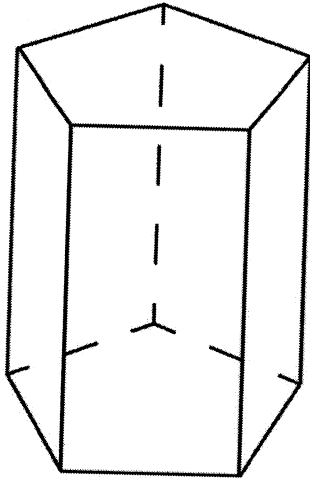


$$\begin{aligned} P &= 12 + 15 + 10 + 7 + 12 \\ &= 56 \text{ m} \end{aligned}$$

If we calculate the perimeter of this shape we would get:

- A. 56 m
- B. 62 m
- C. 66 m
- D. 68 m
- E. Cannot be calculated as there is not enough information

Question 7

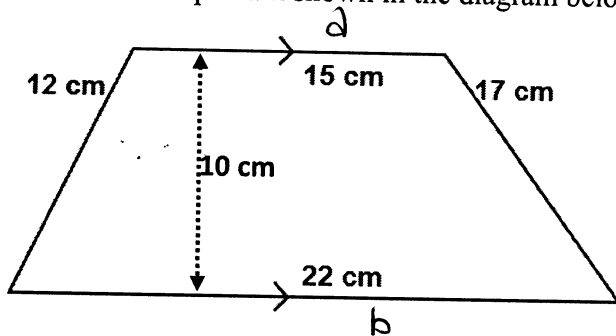


Can the shape above be referred to as a prism? Select the accurate answer.

- A. Yes, because all sides are straight lines
- B. Yes, because it has a uniform cross-section
- C. Yes, because it has a pentagon as its base
- D. Yes, because it could also be laid flat on one of its rectangular faces.
- E. Yes, because the base has a regular shape.

Question 8

Consider the trapezium shown in the diagram below:



A calculation which would correctly give its area in square centimetres would be:

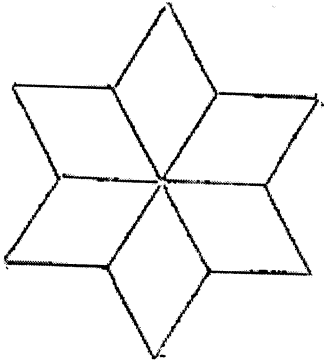
- A. $\frac{10(12+17)}{2}$
- B. $\frac{12(15+22)}{2}$
- C. $\frac{17(15+22)}{2}$
- D. $\frac{10(12+15)}{2}$
- E. $\frac{10(15+22)}{2}$

$$A = \frac{h(a+b)}{2}$$

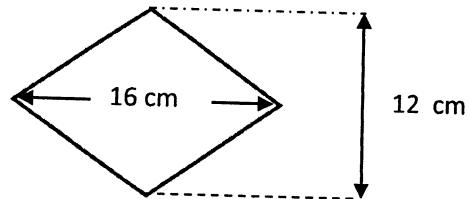
$$\therefore A = \frac{10(22+15)}{2}$$

Question 9

Evan has been asked to design an emblem for his basketball club. He has come up with a star made up entirely of rhombuses, as shown below.



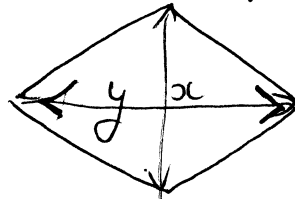
Each rhombus has the following measurements:



The total area of Evan's star is:

- A. 96cm^2
- B. 192cm^2
- C. 288cm^2
- D. 576cm^2
- E. 1152cm^2

Each rhombus:



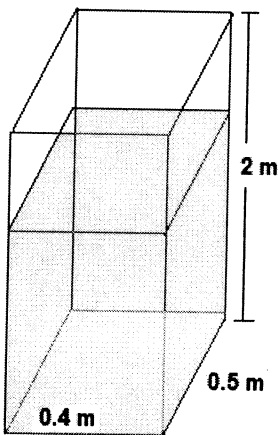
$$A = \frac{xy}{2}$$

$$\therefore A = \frac{12 \times 16}{2} = 96\text{cm}^2$$

Total area
 $= 6 \times 96\text{cm}^2$
 $= 576\text{cm}^2$

Question 10

The water tank shown in the diagram below is in the shape of a rectangular prism:



The volume of the tank is:

- A. 0.4m^3
- B. 0.8m^3
- C. 1m^3
- D. 2.9m^3
- E. 5.8m^3

$$V = Ah$$

$$A = 0.4 \times 0.5 = 0.2\text{m}^2$$

$$V = 2 \times 0.2$$

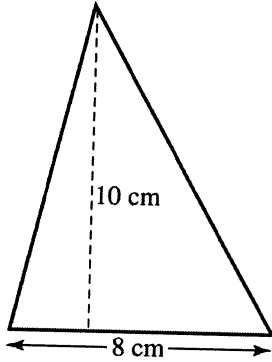
$$0.4\text{m}^3$$

Section C: Short Answer

Full working must be shown in order to gain full marks.

Question 1

Calculate the area of the triangle shown below:



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

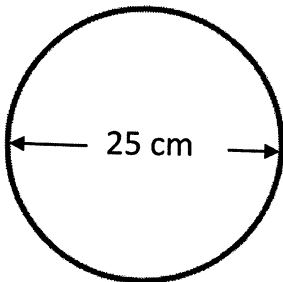
$$A = \frac{8 \times 10}{2}$$

$$A = 40 \text{ cm}^2$$

2 marks

Question 2

The diameter of a circle is 25 cm, as shown below. Calculate the circumference of this circle, correct to one decimal place.



$$C = 2\pi r \quad \text{or} \quad C = \pi d$$

$$d = 25$$

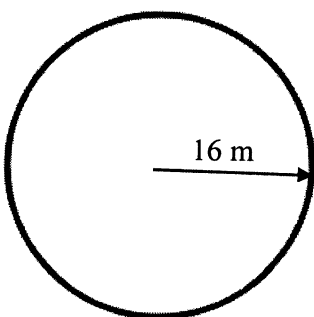
$$\therefore C = \pi \times 25$$

$$C = 78.5 \text{ cm}$$

2 marks

Question 3

The radius of a circle is 16 m. Calculate the area of the circle, correct to the nearest whole number.



$$A = \pi r^2$$

$$r = 16$$

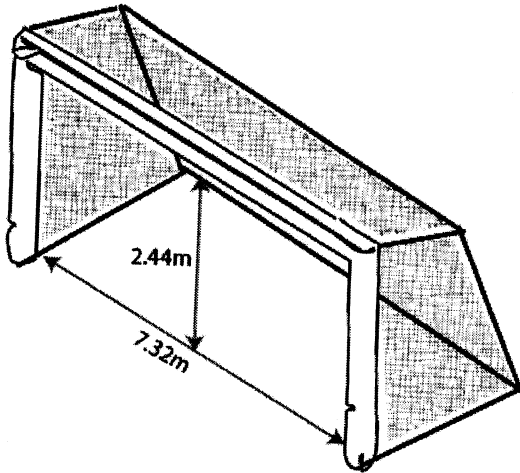
$$\therefore A = \pi \times 16^2$$

$$A = 804 \text{ m}^2$$

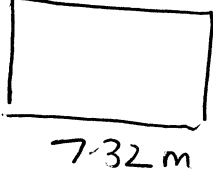
2 marks

Question 4

The diagram below shows the dimensions of a soccer goal:



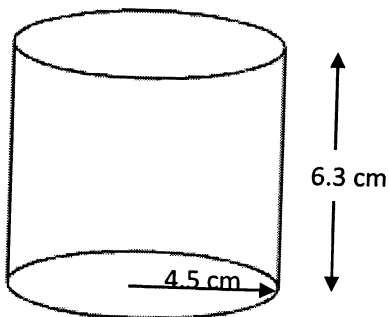
What is the area of the rectangular goal face? Give your answer correct to two decimal places.

$$A = lw$$
$$\therefore A = 7.32 \times 2.44$$
$$A = 17.86 \text{ m}^2$$


2 marks

Question 5

The pistons in a certain model of car are cylinders with a radius of 4.5 cm and a height of 6.3 cm. The car's engine has 4 of these pistons.



- a. Calculate the volume of a single piston in cubic centimetres. Give your answer correct to two decimal places.

$$V = \pi r^2 h$$
$$\therefore V = \pi \times 4.5^2 \times 6.3$$
$$V = \pi \times 4.5 \times 4.5 \times 6.3 \approx 400.79 \text{ cm}^3$$

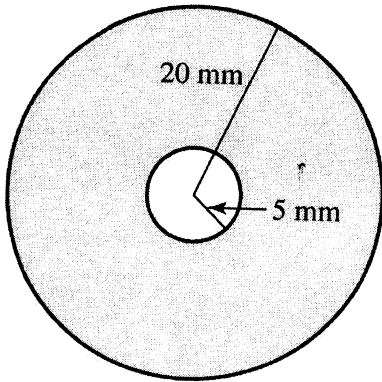
- b. Calculate the engine capacity (the total volume of all the pistons). Give your answer correct to one decimal place.

$$\text{Total volume} = 400.79 \times 4$$
$$= 1274.5 \text{ cm}^3$$

3 marks

Question 6

Calculate, the area of this annulus, in square millimetres, correct to two decimal places:



$$A = \text{Big circle} - \text{Small circle}$$

$$A = \pi R^2 - \pi r^2$$

$$A = \pi \times 20^2 - \pi \times 5^2$$

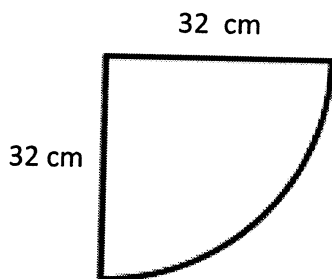
$$A = \pi \times 20 \times 20 - \pi \times 5 \times 5$$

$$A = 1178.10 \text{ mm}^2$$

3 marks

Question 7

Calculate, correct to one decimal place, the **perimeter** of the shape shown below

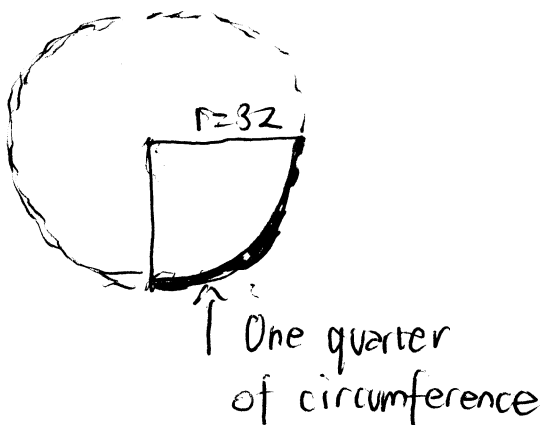


$$P = 32 + 32 + \text{Length of arc}$$

$$\therefore P = 64 + \frac{1}{4} \times \text{Circumference}$$

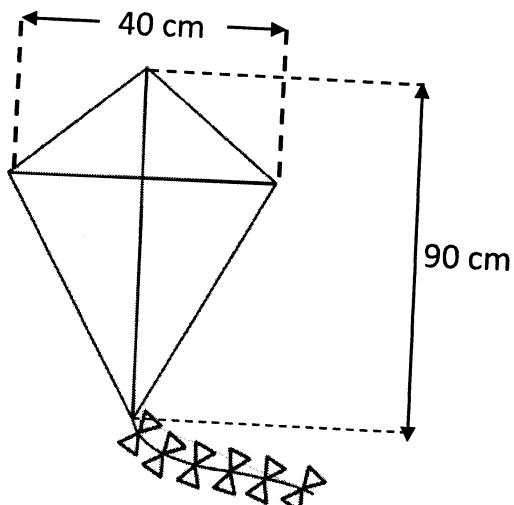
$$P = 64 + \frac{2\pi \times 32}{4} = 114.3 \text{ cm}$$

3 marks



Question 8

Jordan is going to make a kite out of a special light weight fabric. His kite will have aluminium diagonals with dimensions as shown:



- a. Calculate the area of fabric that will be required for this kite.

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

$$A = \frac{1}{2} \times 40 \times 90$$
$$= 1800 \text{ cm}^2$$



- b. The cost of the fabric is \$0.10 per square centimetre, and the cost of the aluminium tubing for the diagonals is \$0.30 per centimetre. Calculate the total cost of materials for Jordan's kite

$$\text{Cost of fabric} = 1800 \times 0.1$$
$$= \$180$$

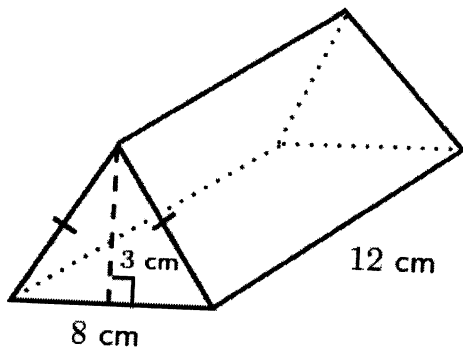
3 marks.

$$\text{Cost of tubing} = (90 + 40) \times 0.3$$
$$= 130 \times 0.3$$
$$= \$39$$

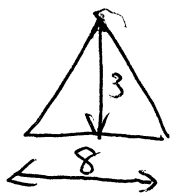
$$\therefore \text{Total cost} = \$219$$

Question 9

For the triangular prism shown below:



- a. Calculate the area of the triangular cross-section.



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

$$A = 0.5 \times 8 \times 3 = 12 \text{ cm}^2$$

- b. Hence, find the volume of the prism.

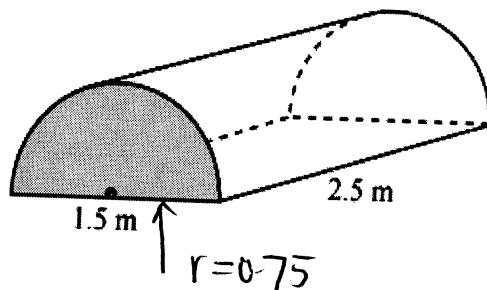
$$V = A \cdot h$$

$$\therefore V = 12 \times 12 = 144 \text{ cm}^3$$

3 marks

Question 10

A tent with semicircular ends is in the shape of a prism. The diameter of the ends is 1.5 m. The tent is 2.5 m long.



Calculate the volume of this tent. Give your answer in cubic metres. to the nearest whole number.

$$V = A h$$

$$A = \frac{\pi r^2}{2}$$

$$A = \frac{\pi \times 0.75^2}{2} = 0.8836 \text{ m}^2$$

$$\therefore V = 0.8836 \times 2.5 = 2.2 \approx 2 \text{ m}^3$$

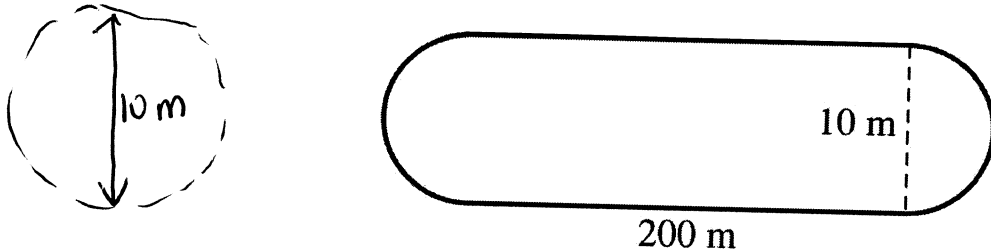
3 marks

Section D: Analysis Section

Full working must be shown in order to gain full marks.

Question

Phil and Stefan are training for the next football season. They are jogging together around the athletics track shown in the diagram below:



- a What distance would they cover, if they jog two laps of the track?

$$P = \text{Circumference of circle} + 2 \times 200$$

$$C = \pi d$$
$$= \pi \times 10$$

$$= 31.416 \text{ m}$$

$$\therefore P = 31.416 + 2 \times 200$$

$$= 431.416 \text{ m}$$

$$\therefore \text{Two laps} = 2 \times 431.416 \approx 862.8 \text{ m}$$

- b They jog at a speed of 140 metres per minute. How long will it take them to jog three laps of the track? Give your answer in minutes, correct to two decimal places.

$$\text{Total distance} = 431.416 \times 3 = 1294.248 \text{ m}$$

$$\text{Time} = \frac{1294.248}{140} = 9.24 \text{ minutes}$$

2 marks

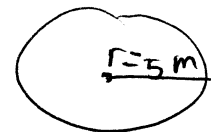
- c The track surrounds a lawn. Calculate the area of this lawn, correct to the nearest square metre.

$$A = A_{\text{circle}} + A_{\text{rectangle}}$$

$$A = \pi r^2 + lw$$

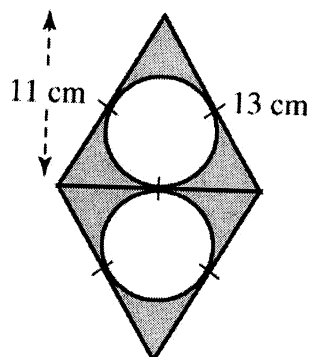
$$= \pi \times 5^2 + 200 \times 10$$

$$= 2079 \text{ m}^2$$

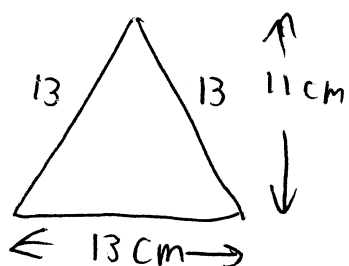


3 marks

- d. Phil and Stefan's football club has the following logo on all its uniforms:
Two identical equilateral triangles make up the design



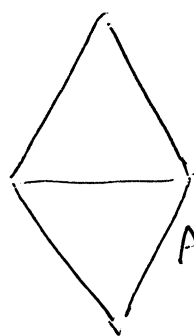
If each circle takes up an area of 20 cm^2 , find the area of the shaded part.



$$\begin{aligned}
 A &= \frac{bh}{2} \\
 &= \frac{13 \times 11}{2} \\
 &= 71.5 \text{ cm}^2
 \end{aligned}$$

2 marks

$$\begin{aligned}
 \therefore \text{Area of rhombus} &= 71.5 \times 2 \\
 &= 143 \text{ cm}^2
 \end{aligned}$$



$$A = 2 \times \text{Area of triangle}$$

$$\begin{aligned}
 \therefore \text{Shaded part} &= 143 - 2 \times 20 \text{ cm}^2 \\
 &= 103 \text{ cm}^2
 \end{aligned}$$