

Y8 Maths

Unit 3 Test

2D Shapes and 3D Solids

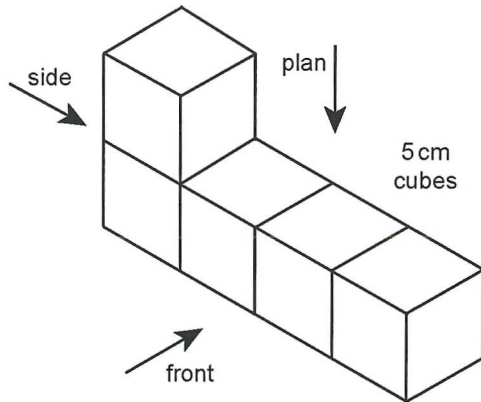
Name: _____

markscheme

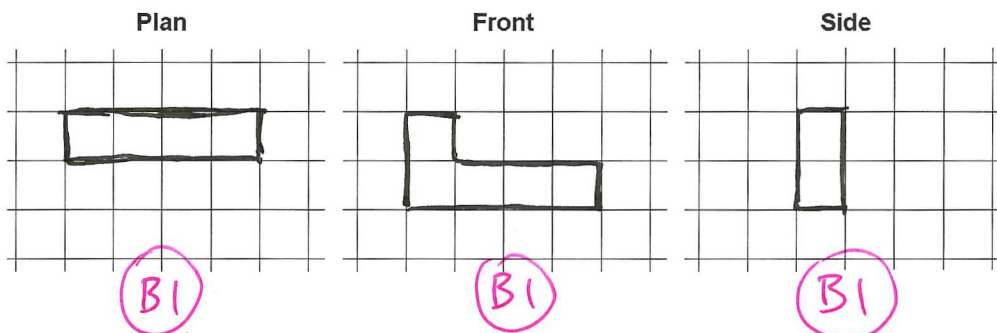
CALCULATOR ALLOWED

total 43

- 1 This model is made from 5 centimetre cubes.



Draw the plan, the front elevation and the side elevation of the model.



Allow the plan view
to be a 90° rotation
of the answer drawn above

(Total 3 marks)

- 2 Aysha's new bike has 26 inch diameter wheels.

What is the circumference of her new wheel?

Give your answer correct to 1 decimal place.

$$C = \pi \times 26 \quad \text{M1}$$

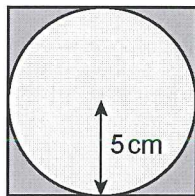
$$\text{A1 } 81.7 \text{ inches}$$

(Total 2 marks)

allow 81.6 if they
have used 3.14 for π

3 a

Find the area of the shaded region in this diagram, giving your answer correct to 1 decimal place.



$$\text{Area of square} = 10 \times 10 \quad (M1)$$

$$\text{Area of circle} = \pi \times 5^2 \quad (M1)$$

$$\text{Shaded area} = (10 \times 10) - (\pi \times 5^2) \quad (M1) \text{ for subtracting their circle area from their square area}$$

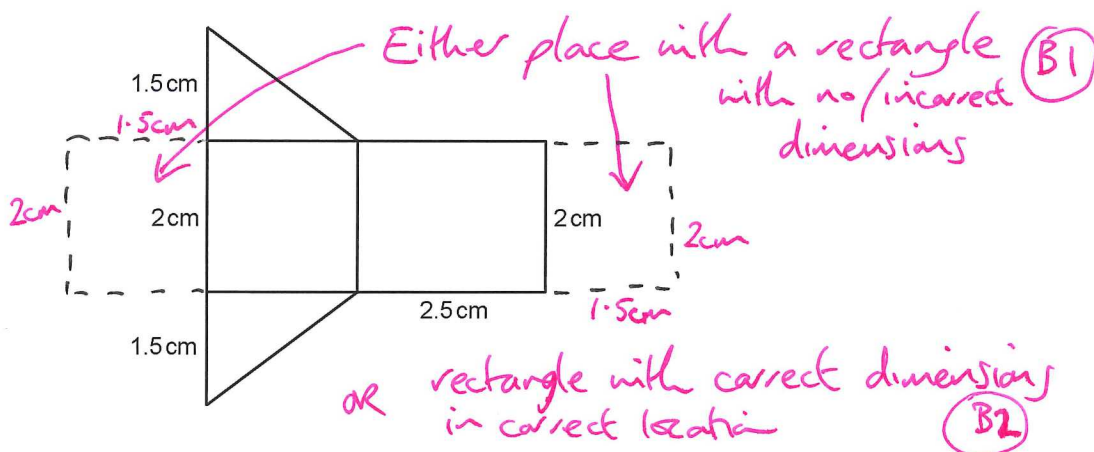
$$(A1) \quad 21.5 \quad \text{cm}^2 \quad [4]$$

b Convert your answer to part a into mm²

$$(A1)(ft) \quad 2150 \quad \text{mm}^2 \quad [1]$$

(Total 5 marks)

4 The diagram shows an incomplete net of a solid shape.



a Add a face to complete the net, showing the dimensions.

[2]

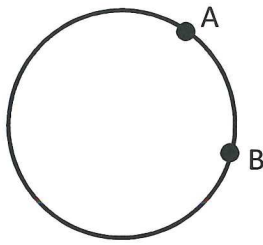
b What is the name of this solid?

(B1) triangular prism

[1]

(Total 3 marks)

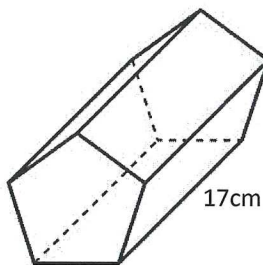
5 What is the name given to the distance AB below, which is part of the circumference of a circle?



(B1) arc
.....
(Total 1 mark)

6 Find the volume of these prisms.

a

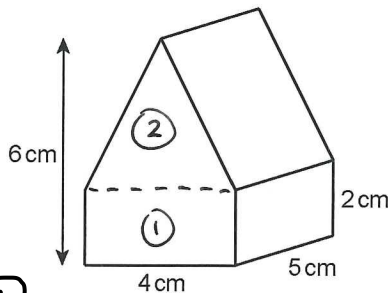


Area of pentagon = 25cm^2

$$\text{Vol} = 25 \times 17 \quad (\text{M1})$$

(A1) 425 cm^3
[2]

b



OPTION 2

$$\text{Vol cuboid} = 4 \times 5 \times 2 = 40\text{cm}^3 \quad (\text{M1})$$

$$\text{Vol tri prism} = \frac{1}{2} \times 4 \times 4 \times 5 = 40\text{cm}^3 \quad (\text{M1})$$

$$\text{Total volume} = 40 + 40 = 80\text{cm}^3 \quad (\text{A1})$$

(M1) for adding
their 2 volumes

OPTION 1

$$\begin{aligned} \text{Area } (1) &= 4 \times 2 \\ &= 8 \end{aligned}$$

$$\begin{aligned} \text{Area } (2) &= \frac{1}{2} \times 4 \times 4 \\ &= 8 \end{aligned}$$

$$\text{Area cross-section} = 16$$

$$\text{Vol} = 16 \times 5 \quad (\text{M1}) \text{ for their '16' } \times 5$$

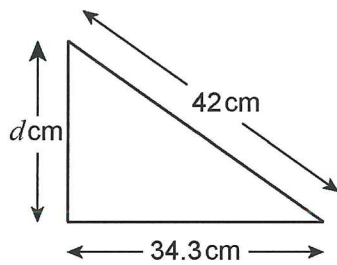
(M1) for splitting
front shape and
trying to find
its area using
correct formulae

(A1)

(A1) 80 cm^3
[4]

(Total 6 marks)

- 7 Find the length of the side marked d in this right-angled triangle. Give your answer correct to 3 significant figures.



$$d^2 = 42^2 - 34.3^2$$

$$d^2 = 587.51$$

$$d = \sqrt{587.51}$$

(B1) for a correct Pythag statement using numbers/letter of the question

(M1) for $\sqrt{587.51}$

(A1)

~~24.2~~

C.A.O. (Total 3 marks)

- 8 The area of a circular cake plate is 1520 cm^2 . Find the diameter of the plate to the nearest cm.

$$\pi r^2 = 1520 \quad (M1)$$

$$r^2 = \frac{1520}{\pi}$$

$$r = \sqrt{\frac{1520}{\pi}} = 21.996... \quad (M1) \text{ for } \sqrt{\frac{1520}{\pi}}$$

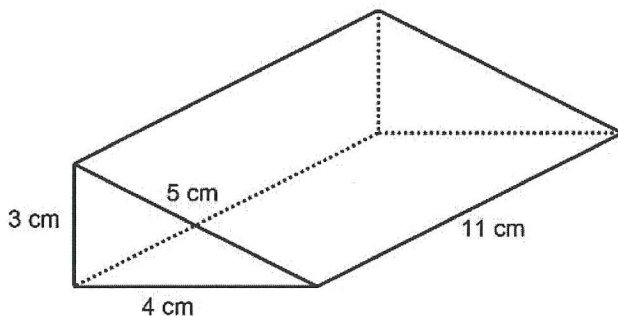
$$d = 2 \times 21.996...$$

(A1)

44

(Total 3 marks)

- 9 Find the total surface area of this triangular prism.



(M1) for correct method to find area of one (or two) triangles

$$\begin{aligned} \text{Area of one triangle} &= \frac{1}{2} \times 4 \times 3 \\ &= 6 \end{aligned}$$

(M1) for correct method to find area of one rectangle

$$\text{Area of base rect} = 4 \times 11 = 44$$

$$\text{Area of left rect} = 3 \times 11 = 33$$

$$\text{Area of sloping rect} = 5 \times 11 = 55$$

$$\text{Total S.A.} = 6 + 6 + 44 + 33 + 55$$

(M1) for adding up areas of their 5 faces

(A1)

144

cm²
(Total 4 marks)

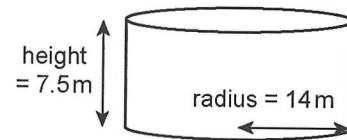
10 For this cylinder, calculate:

a its volume (to 1 d.p.)

$$Vol = \pi r^2 h$$

$$= \pi \times 14^2 \times 7.5 \quad (M1) \text{ for correct method to find Vol}$$

$$= 4618.141\dots$$



$$(A1) \quad 4618.1 \dots m^3 \quad [2]$$

b its total surface area (to 1 d.p.)

$$\begin{aligned} \text{One Circle area} &= \pi \times 14^2 \quad (M1) \text{ for correct method to find one (or two) circles} \\ &= 615.75 \end{aligned}$$

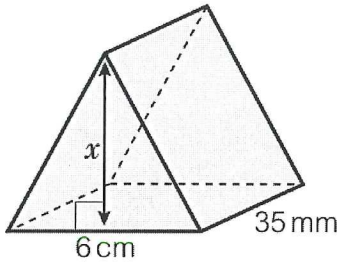
$$\begin{aligned} \text{Middle (rectangle) area} &= 2\pi r \times h \\ &= 2\pi \times 14 \times 7.5 \quad (M1) \text{ for correct method to find middle} \\ &= 659.73 \end{aligned}$$

$$\begin{aligned} \text{Total S.A.} &= 2 \text{ circles} + \text{middle} \\ &= (2 \times \pi \times 14^2) + (2 \times \pi \times 14 \times 7.5) \quad (M1) \text{ for adding 2 of their circles and their middle} \\ &= 1231.5 + 659.73 \\ &= 1891.23 \end{aligned}$$

$$(A1) \quad 1891.2 \dots m^2 \quad [4]$$

(Total 6 marks)

11 The volume of this prism is 84 cm^3 . Calculate the length x .



$$\text{Area of cross-section} = 84 \div 3.5 \quad (\text{M1}) \text{ for finding area of CS} \\ = 24$$

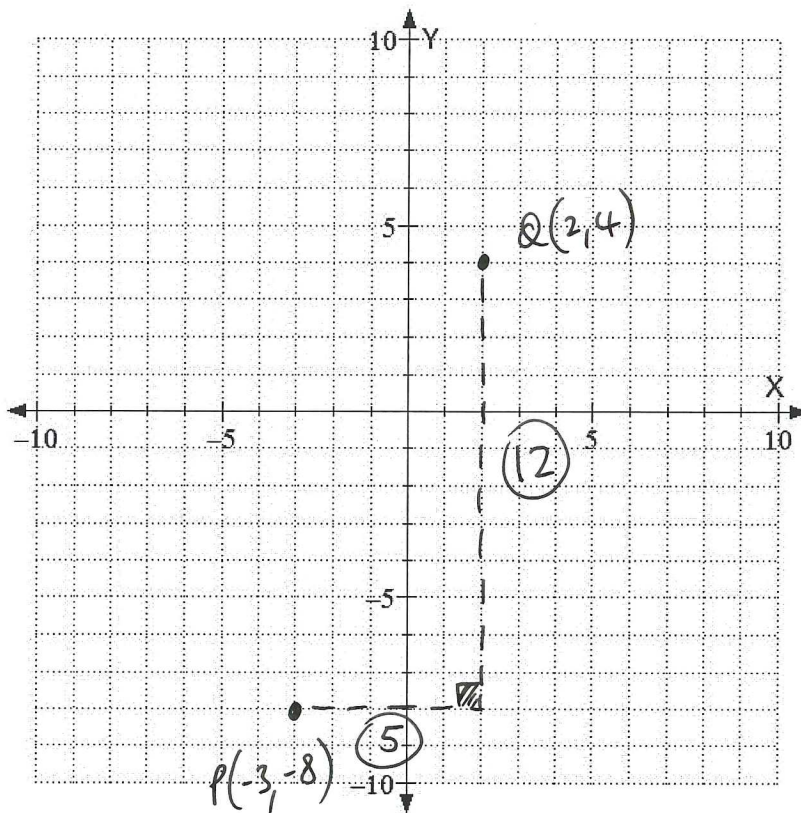
$$\frac{1}{2} \times 6 \times x = 24 \quad (\text{M1}) \text{ for correct statement to connect } x \text{ with area of CS}$$

(A1) for 8 or 8 cm
(if they write 80 then they must state mm)

8 cm
(Total 3 marks)

12 Find the distance between the point $P(-3, -8)$ and $Q(2, 4)$.

Hint: a sketch is useful.



(B1) for correctly calculating vertical or horizontal height/length
(could be embedded in working below)

$$PQ^2 = 5^2 + 12^2 \quad (\text{M1}) \text{ for any correct Pythag statement using 5, 12 and their choice of letter for hypotenuse} \\ PQ^2 = 169 \\ PQ = \sqrt{169}$$

(M1) for $\sqrt{169}$

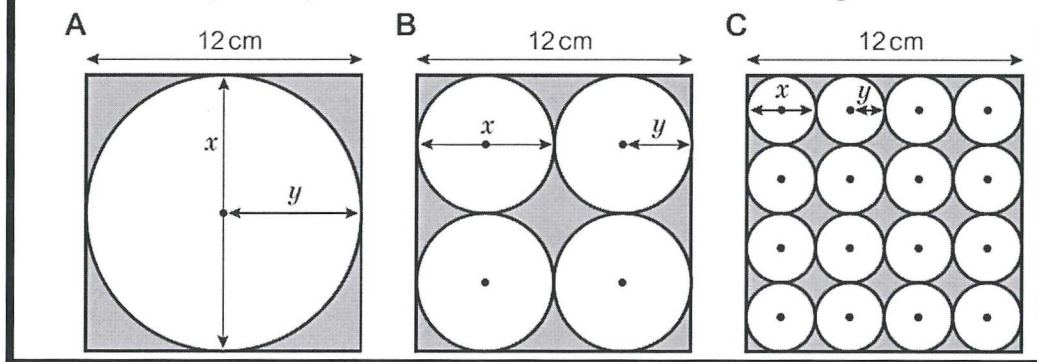
(A1) 13 units

(Total 4 marks)

[End of Test]

If you've finished, and checked your work, try this challenge.
YOU WILL **NOT** BE MARKED ON THIS SECTION

- a For each diagram A to C
- write the length of the line labelled x
 - write the length of the line labelled y
 - work out the area of one circle
 - work out the total area of the circles.
- b What can you say about the shaded area in each diagram?



DIAG A

$$x = 12$$

$$y = 6$$

$$\begin{aligned} \text{one circle} &= \pi \times 6^2 \\ &= 113.097 \end{aligned}$$

$$\begin{aligned} \text{total circles} &= 113.097 \end{aligned}$$

$$\begin{aligned} \text{shaded} &= 12^2 - \text{total circles} \\ &= \underline{\underline{30.9 \text{ cm}^2}} \end{aligned}$$

DIAG B

$$x = 6$$

$$y = 3$$

$$\begin{aligned} \text{one circle} &= \pi \times 3^2 \\ &= 28.274 \end{aligned}$$

$$\begin{aligned} \text{total circles} &= 113.097 \quad (\times 4) \end{aligned}$$

$$\begin{aligned} \text{shaded} &= 12^2 - \text{total circles} \\ &= \underline{\underline{30.9 \text{ cm}^2}} \end{aligned}$$

DIAG C

$$x = 3$$

$$y = 1.5$$

$$\begin{aligned} \text{one circle} &= \pi \times 1.5^2 \\ &= 7.069 \end{aligned}$$

$$\begin{aligned} \text{total circles} &= 113.097 \quad (\times 16) \end{aligned}$$

$$\begin{aligned} \text{shaded} &= 12^2 - \text{total circles} \\ &= \underline{\underline{30.9 \text{ cm}^2}} \end{aligned}$$

SHADED IS THE SAME ☺