

Area, perimeter and volume – Checkpoint Sec 1 Math

1. No.17

The area of a rectangle is 30 cm^2 .Work out this area in mm^2 .

$$\text{Area} = 30\text{ cm}^2$$

$$10\text{ mm} = 1\text{ cm}$$

$$100\text{ mm}^2 = 1\text{ cm}^2$$

$$1\text{ cm}^2 = 100\text{ mm}^2$$

$$30\text{ cm}^2 = ?$$

$$30\text{ cm}^2 \times 100$$

$$= \underline{\underline{3000\text{ mm}^2}}$$

$$\underline{\hspace{1cm} 3000 \hspace{1cm}} \text{ mm}^2 \quad [1]$$

2. No.22

The area of a piece of land is 4.5 hectares.

Convert 4.5 hectares into square metres.

$$1\text{ ha} = 10,000\text{ m}^2$$

$$4.5\text{ ha} = ?$$

$$4.5 \times 10,000$$

$$= \underline{\underline{45,000\text{ m}^2}}$$

$$\underline{\hspace{1cm} 45000 \hspace{1cm}} \text{ m}^2 \quad [1]$$

3. No.15

Yuri has a large rectangular card measuring 1.2 m by 0.8 m.

He wants to cut it up to make small rectangular cards each measuring 13 cm by 11.5 cm.

Work out the largest number of cards that he can make.

$$\text{Area of rectangle} = 1.2\text{ m} \times 0.8\text{ m}$$

$$= \underline{\underline{0.96\text{ m}^2}}$$

$$\text{Area of each card} = \frac{13}{100} \times \frac{11.5}{100}$$

$$= 0.13 \times 0.115$$

$$= \underline{\underline{0.01495\text{ m}^2}}$$

$$\text{Number of cards}$$

$$= \frac{0.96\text{ m}^2}{0.01495\text{ m}^2}$$

$$= 64.2$$

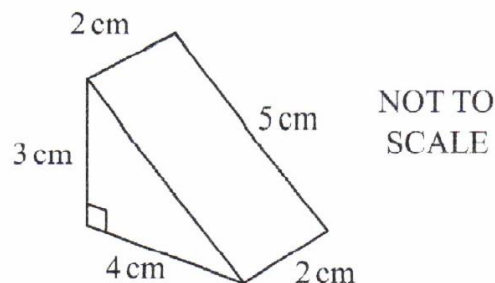
$$\approx 60\text{ cards}$$

(Truncated to an integer)

$$\underline{\hspace{1cm} 60\text{ cards} \hspace{1cm}} \quad [3]$$

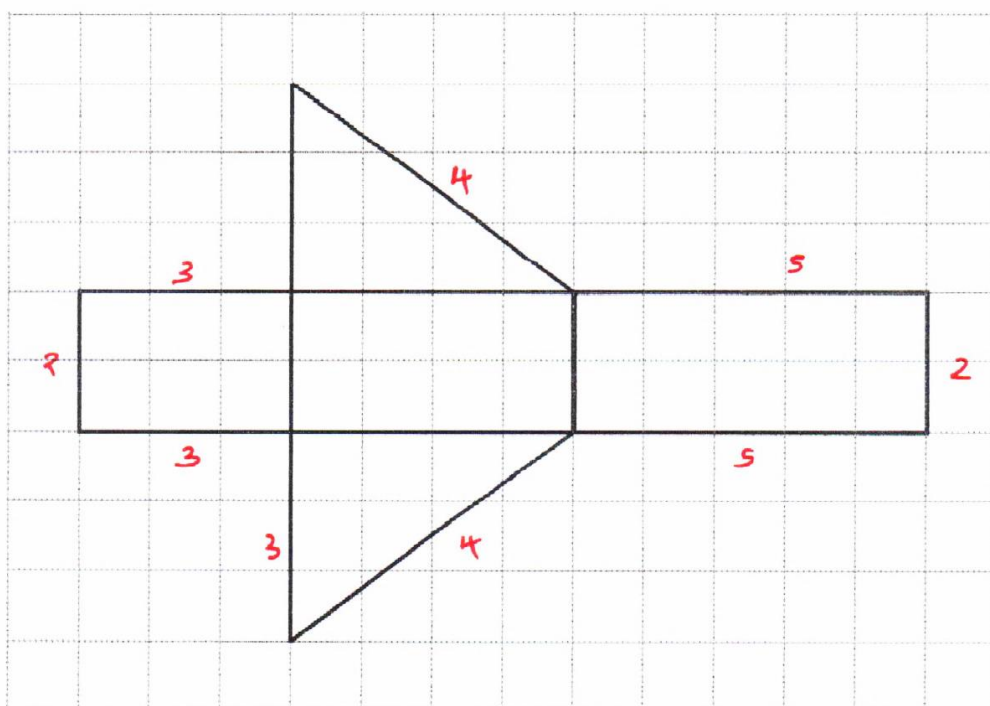
4. No.21

This is a triangular prism.



This is a net of the prism.

It is drawn on centimetre square paper.



Work out the surface area of the prism.

$$\begin{aligned} \text{Area of rectangle} &= (5 \times 2) + (3 \times 2) + (4 \times 2) \\ &= 10\text{cm}^2 + 6\text{cm}^2 + 8\text{cm}^2 \end{aligned}$$

$$\text{Area of triangle} = \frac{1}{2} \times b \times h$$

$$= \frac{1}{2} \times 4 \times 3$$

$$6\text{cm}^2 \times 2 = 12\text{cm}^2$$

$$\underline{\underline{36}} \text{ cm}^2 \quad [1]$$

$$\begin{aligned} \text{Total surface area} &= 10\text{cm}^2 + 8\text{cm}^2 + 6\text{cm}^2 + 12\text{cm}^2 \\ &= \underline{\underline{36\text{cm}^2}} \end{aligned}$$

5. No.25

- i Cube A has a volume of 125 cm^3 .
 Cube B has a side length of 125 cm .
 Cube C has a surface area of 125 cm^2 .

Write cubes A, B and C in order of size starting with the smallest.

Cube A volume = 125 cm^3 .
 All sides of a cube are equal.
 Length of each cube A
 $= \sqrt[3]{125}$ (volume of A = 125 cm^3)
 length = 5 cm

1 cm
 B = cube Length = 125 cm

<u>C</u> smallest	<u>A</u>	<u>B</u> largest
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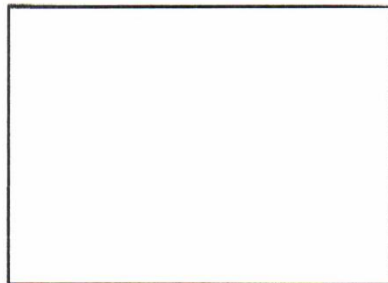
[2]

Volume of cube B
 $= 125 \times 125 \times 125$
 $= \underline{\underline{1953125 \text{ cm}^3}}$
 (Largest)

Cube C surface area = 125 cm^2
 Length of cube = 4.56 cm
 Volume = $4.56 \times 4.56 \times 4.56$
 $= \underline{\underline{94.8188 \text{ cm}^3}}$

6. No.13

Carlos builds a wooden frame.



NOT TO
SCALE

He needs two 45 cm lengths of wood and two 60 cm lengths of wood.
Carlos has a 2 metre length of wood.

Tick (✓) to show if Carlos has enough wood to build the frame.

Yes ☐

No ☒

Show your working.

$$\text{lengths of wood} = (2 \times 45) + (2 \times 60) \\ = \underline{90 \text{ cm}} + 120 \text{ cm}$$

$$\text{Total length} = \underline{\underline{210 \text{ cm}}}$$

Convert 210 cm to Metres.

$$1 \text{ M} = 100 \text{ cm}$$

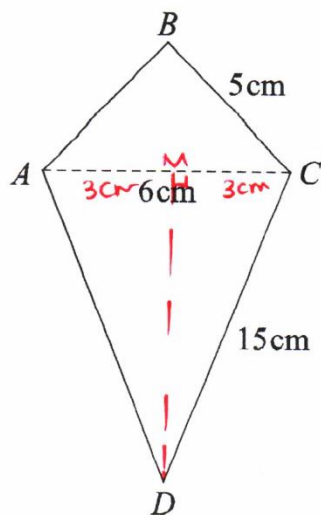
$$? = 210 \text{ cm}$$

$$\frac{210}{100} = \underline{\underline{2.1 \text{ M}}}$$

(she has not enough wood to build the frame). [2]

7. No.25

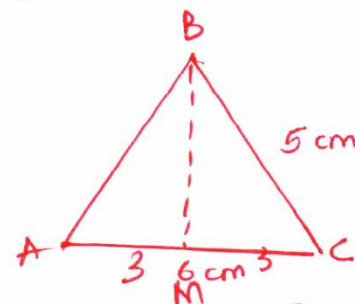
Here is a kite.

NOT TO
SCALE

$BC = 5 \text{ cm}$, $CD = 15 \text{ cm}$ and $AC = 6 \text{ cm}$.
 AC and BD are perpendicular.

Find the length of BD .

The height $MD^2 = DC^2 - MC^2$
 $MD^2 = 15^2 - 3^2$
 $MD^2 = 225 - 9$
 $MD^2 = \sqrt{216}$
 $MD = \underline{\underline{14.70 \text{ cm}}}$



$$BM^2 = 5^2 - 3^2$$

$$= 25 - 9$$

$$BM^2 = \sqrt{16}$$

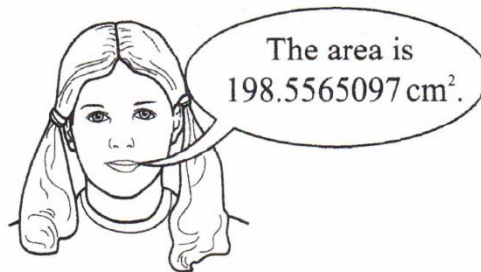
$$BM = \underline{\underline{4 \text{ cm}}}$$

Length $BD = MD + BM$
 $= 14.70 + 4 \text{ cm}$
 $= \underline{\underline{18.7}}$

18.7 cm [3]

8. No.4

Eva measures the diameter of a circle as 15.9 cm.
She uses a calculator to work out the area.
She says,



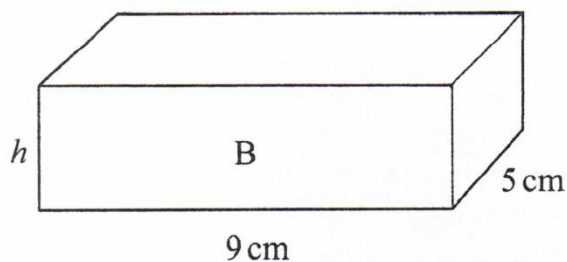
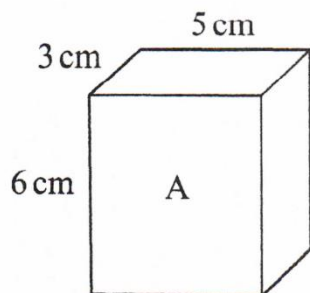
Round this answer to an appropriate degree of accuracy.

198.5565097

198.6 cm² [1]

9. No.10

The diagram shows two cuboids.



NOT TO
SCALE

The cuboids have **equal** volume.

Find the height, h , of cuboid B.

Volume of A = $L \times w \times h = (6 \times 3 \times 5)$
 $B = 9 \times 5 \times h$

$$6 \times 3 \times 5 = h \times 9 \times 5$$

$$h = \frac{6 \times 3 \times 5}{9 \times 5}$$

$h =$ 2 cm [2]

10. No.20

A farm has 150 hectares of land.

Write this area in square metres.

$$1 \text{ hectare} = 10,000 \text{ m}^2$$

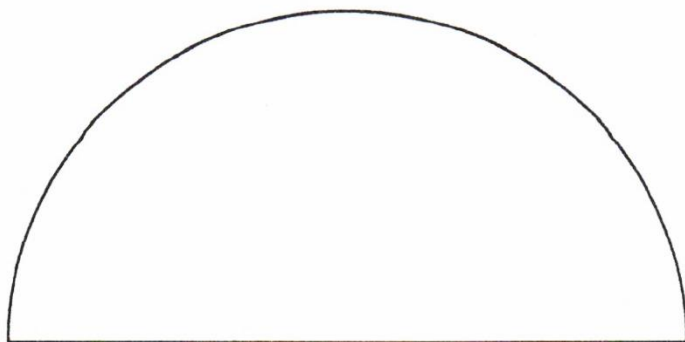
$$150 \text{ hectares} = ?$$

$$150 \times 10,000$$

$$\underline{1,500,000} \text{ m}^2 \quad [1]$$

11. No.23

The diagram shows a semicircle.



NOT TO
SCALE

The diameter of the semicircle is 12 cm.

Calculate the perimeter of the semicircle.

$$\pi D + D$$

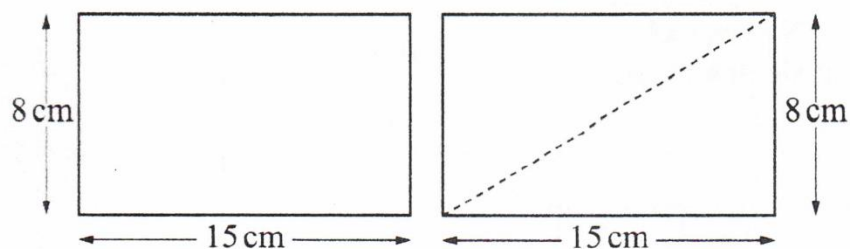
$$\pi \times 12 + 12$$

$$37.699 + 12 = 49.699$$

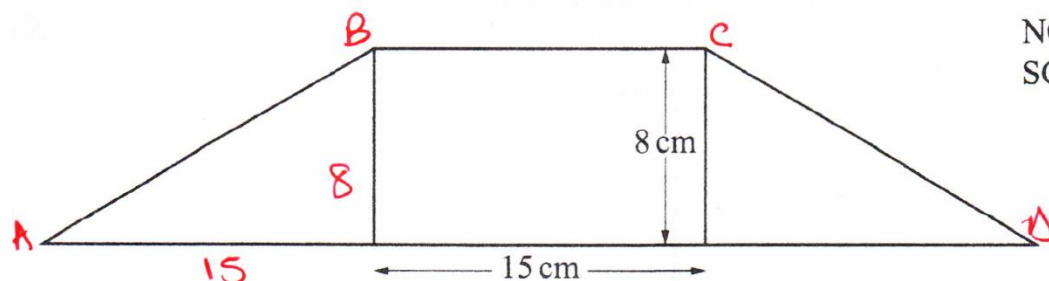
$$\underline{49.7} \text{ cm} \quad [2]$$

12. No.24

Here are two rectangles.

NOT TO
SCALE

The second rectangle is cut in half and joined to the first rectangle to make a new shape.

NOT TO
SCALE

Calculate the perimeter of the new shape.

$$AB = CD$$

$$AB^2 = 15^2 + 8^2 \quad (\text{Pythagoras theorem})$$

$$AB^2 = 225 + 64$$

$$AB = \sqrt{289}$$

$$AB = \underline{17}$$

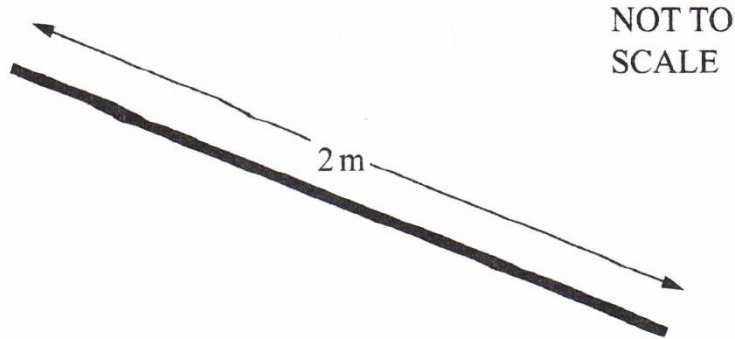
$$\underline{94} \text{ cm [2]}$$

$$15 + 15 + 15 + 17 + 15 + 17 = \underline{94}$$

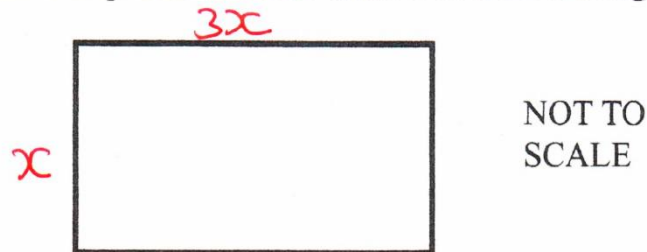
$$= \underline{94}$$

13. No.27

Ahmed has a rod 2 metres long.



He cuts the rod into four pieces and uses them to make a rectangle.



The length of the rectangle is 3 times the width.

Calculate the area of the rectangle in **square centimetres**.

Let the width be x

$$\text{Perimeter} = 2(x + 3x) = 200 \text{ cm}$$

$$8x = 200 \text{ cm}$$

$$x = \frac{200}{8} = 25$$

$$A = L \times W$$

$$A = 3(25) \times 25 = 1875$$

$$\underline{\hspace{1cm} 1875 \hspace{1cm}} \text{ cm}^2 \quad [3]$$

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