

GCSE MATHS • GRADE 4

MATHS



MODEL ANSWERS

SURFACE AREA

SCORE

/92

PERCENTAGE

%

STEM UP

- 1 A cube has a side length of 2 m.
Work out the total surface area of the cube.

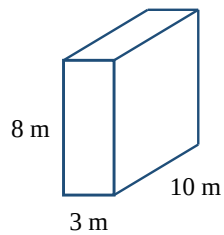
$$\text{One face} = 2 \times 2 = 4$$

$$6 \text{ faces: } 6 \times 4 = 24$$

$$24 \text{ m}^2$$

/ 1

- 2 The diagram shows a cuboid.
Work out the total surface area of the cuboid. Diagram NOT accurately drawn.

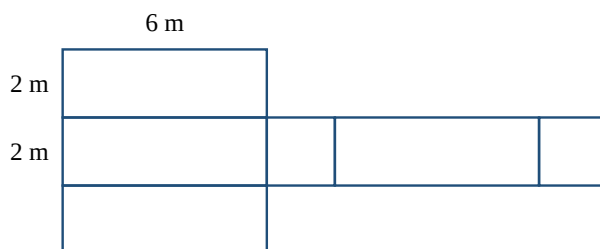


$$2 \times (3 \times 10) + 2 \times (3 \times 8) + 2 \times (10 \times 8) = 268$$

$$268 \text{ m}^2$$

/ 1

- 3 The diagram shows the net of a cuboid.
Work out the total surface area of the cuboid. Diagram NOT accurately drawn.



$$\text{Faces: } 2 \times (6 \times 2) + 2 \times (6 \times 2) + 2 \times (2 \times 2) = 56$$

$$56 \text{ m}^2$$

/ 1

- 4 A cube has a side length of 11 mm.
Work out the total surface area of the cube.

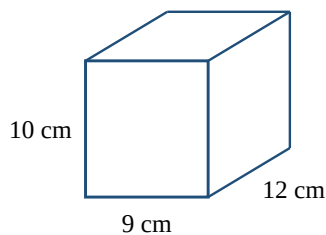
$$\text{One face} = 11 \times 11 = 121$$

$$6 \text{ faces: } 6 \times 121 = 726$$

$$726 \text{ mm}^2$$

/ 1

- 5 The diagram shows a cuboid.
Work out the total surface area of the cuboid. Diagram NOT accurately drawn.

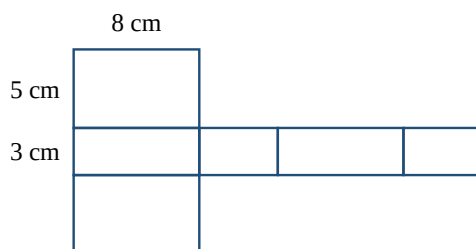


$$2 \times (9 \times 12) + 2 \times (9 \times 10) + 2 \times (12 \times 10) = 636$$

$$636 \text{ cm}^2$$

/ 1

- 6 The diagram shows the net of a cuboid.
Work out the total surface area of the cuboid. Diagram NOT accurately drawn.



$$\text{Faces: } 2 \times (8 \times 5) + 2 \times (8 \times 3) + 2 \times (5 \times 3) = 158$$

$$158 \text{ cm}^2$$

/ 1

- 7 A cube has a side length of 12 cm.
Work out the total surface area of the cube.

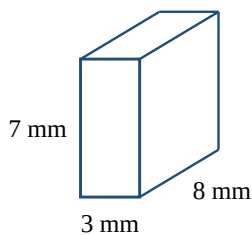
$$\text{One face} = 12 \times 12 = 144$$

$$6 \text{ faces: } 6 \times 144 = 864$$

$$864 \text{ cm}^2$$

/ 1

- 8 The diagram shows a cuboid.
Work out the total surface area of the cuboid. Diagram NOT accurately drawn.

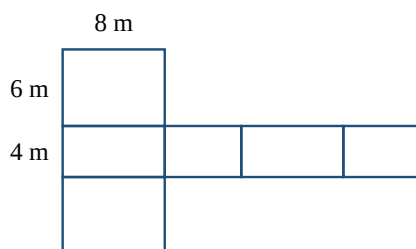


$$2 \times (3 \times 8) + 2 \times (3 \times 7) + 2 \times (8 \times 7) = 202$$

$$202 \text{ mm}^2$$

/ 1

- 9 The diagram shows the net of a cuboid.
Work out the total surface area of the cuboid. Diagram NOT accurately drawn.



$$\text{Faces: } 2 \times (8 \times 6) + 2 \times (8 \times 4) + 2 \times (6 \times 4) = 208$$

$$208 \text{ m}^2$$

/ 1

- 10** A cube has a side length of 14 m.
Work out the total surface area of the cube.

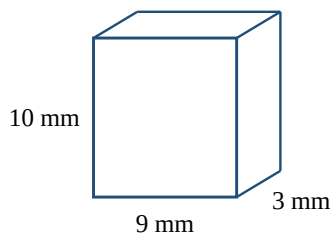
$$\text{One face} = 14 \times 14 = 196$$

$$6 \text{ faces: } 6 \times 196 = 1176$$

$$1176 \text{ m}^2$$

/ 1

- 11** The diagram shows a cuboid.
Work out the total surface area of the cuboid. Diagram NOT accurately drawn.

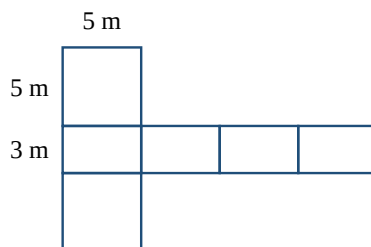


$$2 \times (9 \times 3) + 2 \times (9 \times 10) + 2 \times (3 \times 10) = 294$$

$$294 \text{ mm}^2$$

/ 1

- 12** The diagram shows the net of a cuboid.
Work out the total surface area of the cuboid. Diagram NOT accurately drawn.



$$\text{Faces: } 2 \times (5 \times 5) + 2 \times (5 \times 3) + 2 \times (5 \times 3) = 110$$

$$110 \text{ m}^2$$

/ 1

- 13 A cube has a side length of 7 mm.
Work out the total surface area of the cube.

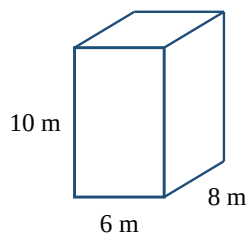
$$\text{One face} = 7 \times 7 = 49$$

$$6 \text{ faces: } 6 \times 49 = 294$$

$$294 \text{ mm}^2$$

/ 1

- 14 The diagram shows a cuboid.
Work out the total surface area of the cuboid. Diagram NOT accurately drawn.

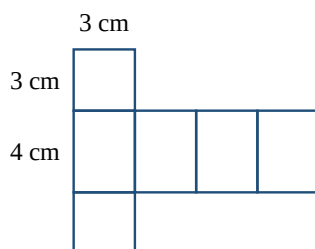


$$2 \times (6 \times 8) + 2 \times (6 \times 10) + 2 \times (8 \times 10) = 376$$

$$376 \text{ m}^2$$

/ 1

- 15 The diagram shows the net of a cuboid.
Work out the total surface area of the cuboid. Diagram NOT accurately drawn.



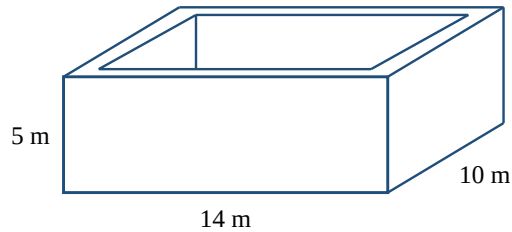
$$\text{Faces: } 2 \times (3 \times 3) + 2 \times (3 \times 4) + 2 \times (3 \times 4) = 66$$

$$66 \text{ cm}^2$$

/ 1

- 16 The diagram shows an open box in the shape of a cuboid.
The box has no lid.

Work out the total outside surface area of the box. Diagram NOT accurately drawn.

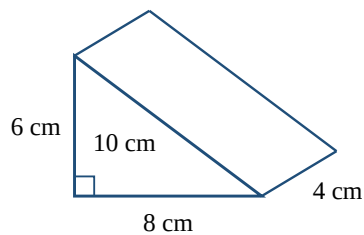


$$\begin{aligned} \text{Base } 14 \times 10 &= 140 \\ \text{two sides } 14 \times 5 \times 2 &= 140 \\ \text{two ends } 10 \times 5 \times 2 &= 100 \\ \text{total } &380 \end{aligned}$$

$$380 \text{ m}^2$$

1 / 1

- 17 The diagram shows a triangular prism.
The cross-section of the prism is a right-angled triangle.
Work out the total surface area of the prism. Diagram NOT accurately drawn.



$$\begin{aligned} \text{Two triangles: } 2 \times \frac{1}{2} \times 8 \times 6 &= 48 \\ \text{three rectangles: } (8 + 6 + 10) \times 4 &= 96 \\ \text{total } &144 \end{aligned}$$

$$144 \text{ cm}^2$$

1 / 1

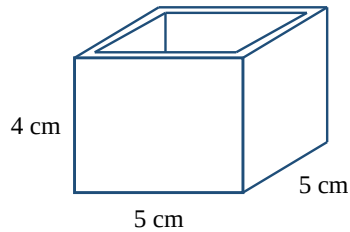
- 18 A cuboid measures 3 cm by 7 cm by 7 cm.
A cube has a side length of 4 cm.
Which solid has the greater total surface area?

$$\begin{aligned} \text{Cuboid: } 182 \text{ cm}^2 \\ \text{cube: } 6 \times 4^2 &= 96 \text{ cm}^2 \end{aligned}$$

$$\text{The cuboid (182 cm}^2 \text{ compared with 96 cm}^2)$$

1 / 1

- 19 The diagram shows an open box in the shape of a cuboid.
The box has no lid.
Work out the total outside surface area of the box. Diagram NOT accurately drawn.

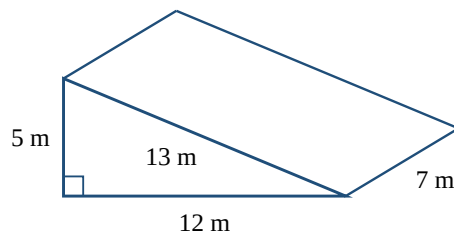


$$\begin{aligned} \text{Base } 5 \times 5 &= 25 \\ \text{two sides } 5 \times 4 \times 2 &= 40 \\ \text{two ends } 5 \times 4 \times 2 &= 40 \\ \text{total } 105 \end{aligned}$$

$$105 \text{ cm}^2$$

1 / 1

- 20 The diagram shows a triangular prism.
The cross-section of the prism is a right-angled triangle.
Work out the total surface area of the prism. Diagram NOT accurately drawn.



$$\begin{aligned} \text{Two triangles: } 2 \times \frac{1}{2} \times 12 \times 5 &= 60 \\ \text{three rectangles: } (12 + 5 + 13) \times 7 &= 210 \\ \text{total } 270 \end{aligned}$$

$$270 \text{ m}^2$$

1 / 1

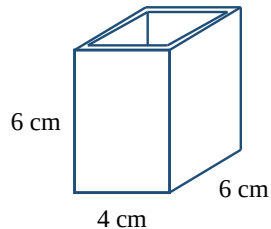
- 21 A cuboid measures 7 cm by 7 cm by 9 cm.
A cube has a side length of 5 cm.
Which solid has the greater total surface area?
You must show your working.

$$\begin{aligned} \text{Cuboid: } 350 \text{ cm}^2 \\ \text{cube: } 6 \times 5^2 &= 150 \text{ cm}^2 \end{aligned}$$

$$\text{The cuboid (350 cm}^2 \text{ compared with 150 cm}^2)$$

2 / 2

- 22 The diagram shows an open box in the shape of a cuboid.
The box has no lid.
Work out the total outside surface area of the box. Diagram NOT accurately drawn.

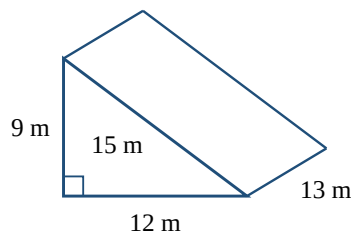


$$\begin{aligned} \text{Base } 4 \times 6 &= 24 \\ \text{two sides } 4 \times 6 \times 2 &= 48 \\ \text{two ends } 6 \times 6 \times 2 &= 72 \\ \text{total } 144 \end{aligned}$$

$$144 \text{ cm}^2$$

2 / 2

- 23 The diagram shows a triangular prism.
The cross-section of the prism is a right-angled triangle.
Work out the total surface area of the prism. Diagram NOT accurately drawn.

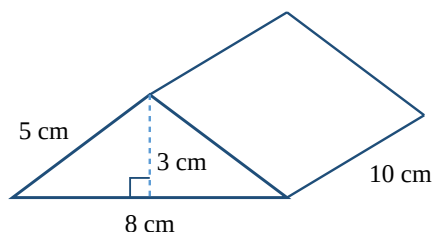


$$\begin{aligned} \text{Two triangles: } 2 \times \frac{1}{2} \times 12 \times 9 &= 108 \\ \text{three rectangles: } (12 + 9 + 15) \times 13 &= 468 \\ \text{total } 576 \end{aligned}$$

$$576 \text{ m}^2$$

2 / 2

- 24 The diagram shows a triangular prism.
The cross-section of the prism is an isosceles triangle.
Work out the total surface area of the prism. Diagram NOT accurately drawn.

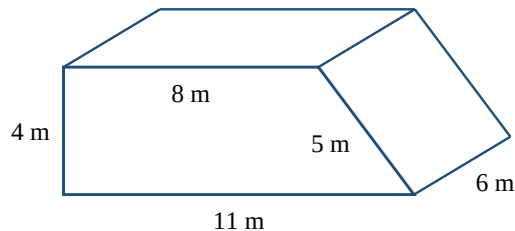


$$\begin{aligned} \text{Two triangles: } 2 \times \frac{1}{2} \times 8 \times 3 &= 24 \\ \text{rectangles: } (8 + 5 + 5) \times 10 &= 180 \\ \text{total } 204 \end{aligned}$$

$$204 \text{ cm}^2$$

2 / 2

- 25 The diagram shows a prism.
The cross-section of the prism is a trapezium.
Work out the total surface area of the prism. Diagram NOT accurately drawn.

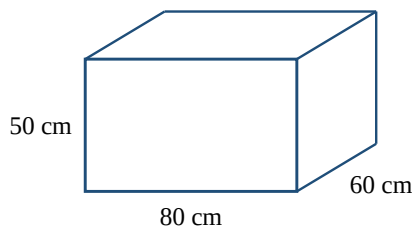


Two trapeziums: $2 \times \frac{1}{2} \times (8 + 11) \times 4 = 76$
rectangles: $(11 + 5 + 8 + 4) \times 6 = 168$
total 244

244 m²

2 / 2

- 26 The diagram shows a box in the shape of a cuboid.
5 of these boxes are going to be painted all over.
Each pot of paint covers 5 m².
Work out the number of pots of paint needed. Diagram NOT accurately drawn.

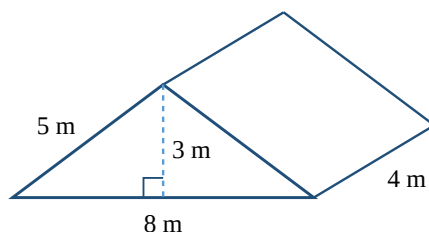


One box: $23,600 \text{ cm}^2 = 2.36 \text{ m}^2$
5 boxes: 11.8 m^2
 $11.8 \div 5 = 2.36$ so 3 pots

3 pots

2 / 2

- 27 The diagram shows a triangular prism.
The cross-section of the prism is an isosceles triangle.
Work out the total surface area of the prism. Diagram NOT accurately drawn.

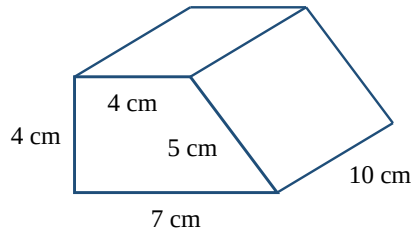


Two triangles: $2 \times \frac{1}{2} \times 8 \times 3 = 24$
rectangles: $(8 + 5 + 5) \times 4 = 72$
total 96

96 m²

2 / 2

- 28 The diagram shows a prism.
The cross-section of the prism is a trapezium.
Work out the total surface area of the prism. Diagram NOT accurately drawn.

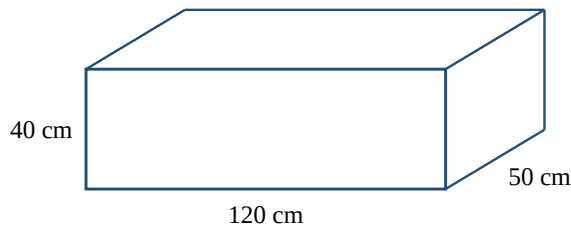


Two trapeziums: $2 \times \frac{1}{2} \times (4 + 7) \times 5 = 44$
 rectangles: $(7 + 5 + 4 + 4) \times 10 = 200$
 total 244

244 cm²

2 / 2

- 29 The diagram shows a box in the shape of a cuboid.
7 of these boxes are going to be painted all over.
Each pot of paint covers 5 m².
Work out the number of pots of paint needed. Diagram NOT accurately drawn.

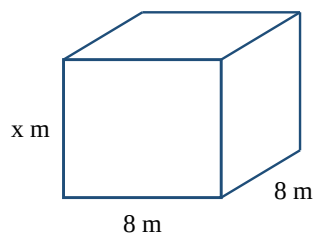


One box: $25,600 \text{ cm}^2 = 2.56 \text{ m}^2$
 7 boxes: 17.92 m^2
 $17.92 \div 5 = 3.584$ so 4 pots

4 pots

2 / 2

- 30 The diagram shows a cuboid.
The total surface area of the cuboid is 352 m².
Work out the value of x. Diagram NOT accurately drawn.



$352 = 2 \times 8 \times 8 + 2 \times 8 \times x + 2 \times 8 \times x$
 so $352 = 128 + 32x$
 $x = 224 \div 32 = 7$

x = 7

2 / 2

-

 252 m^2

2 / 2

-

so 4 pots

4 pots

2 / 2

-

$$x = 4$$

2 / 2

-

 448 cm^2

2 / 2

-

so 5 pots

5 pots

2 / 2

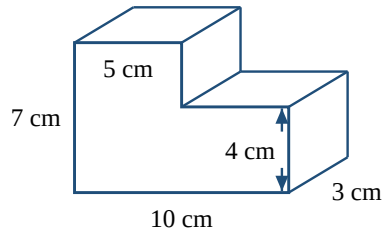
-

$$x = 252 \div 28 = 9$$

$$x = 9$$

2 / 2

- 37 The diagram shows a prism.
The cross-section of the prism is an L shape.
Calculate the total surface area of the prism. Diagram NOT accurately drawn.

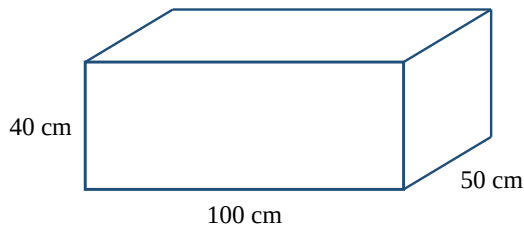


$$\begin{aligned} \text{Area of L} &= 10 \times 7 - 5 \times 3 = 55 \\ \text{two ends} &= 110 \\ \text{perimeter of L} &= 34, \text{ so sides} = 34 \times 3 = 102 \\ \text{total} &= 110 + 102 \end{aligned}$$

$$212 \text{ cm}^2$$

2 / 2

- 38 The diagram shows a box in the shape of a cuboid.
3 of these boxes are going to be painted all over.
Each pot of paint covers 6 m^2 .
Work out the number of pots of paint needed. Diagram NOT accurately drawn.

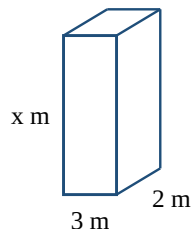


$$\begin{aligned} \text{One box: } 22,000 \text{ cm}^2 &= 2.2 \text{ m}^2 \\ \text{3 boxes: } 6.6 \text{ m}^2 \\ 6.6 \div 6 &= 1.1 \text{ so 2 pots} \end{aligned}$$

$$2 \text{ pots}$$

2 / 2

- 39 The diagram shows a cuboid.
The total surface area of the cuboid is 102 m^2 .
Work out the value of x . Diagram NOT accurately drawn.

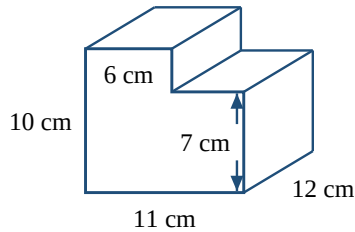


$$\begin{aligned} 102 &= 2 \times 3 \times 2 + 2 \times 3 \times x + 2 \times 2 \times x \text{ so } 102 = 12 \\ &+ 10x \\ x &= 90 \div 10 = 9 \end{aligned}$$

$$x = 9$$

3 / 3

- 40 The diagram shows a prism.
The cross-section of the prism is an L shape.
Calculate the total surface area of the prism. Diagram NOT accurately drawn.

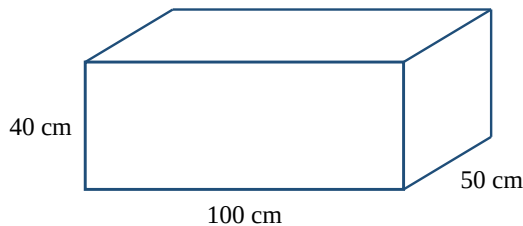


$$\begin{aligned} \text{Area of L} &= 11 \times 10 - 5 \times 3 = 95 \\ \text{two ends} &= 190 \\ \text{perimeter of L} &= 42, \text{ so sides} = 42 \times 12 \\ &= 504 \\ \text{total} &= 190 + 504 \end{aligned}$$

$$694 \text{ cm}^2$$

3 / 3

- 41 The diagram shows a box in the shape of a cuboid.
3 of these boxes are going to be painted all over.
Each pot of paint covers 3 m^2 .
Work out the number of pots of paint needed. Diagram NOT accurately drawn.

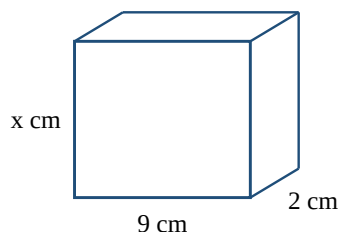


$$\begin{aligned} \text{One box: } 22,000 \text{ cm}^2 &= 2.2 \text{ m}^2 \\ 3 \text{ boxes: } 6.6 \text{ m}^2 \\ 6.6 \div 3 &= 2.2 \text{ so } 3 \text{ pots} \end{aligned}$$

$$3 \text{ pots}$$

3 / 3

- 42 The diagram shows a cuboid.
The total surface area of the cuboid is 212 cm^2 .
Work out the value of x . Diagram NOT accurately drawn.

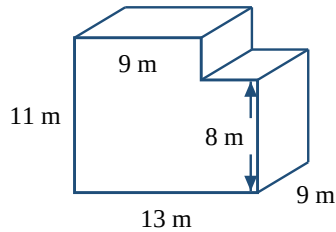


$$\begin{aligned} 212 &= 2 \times 9 \times 2 + 2 \times 9x + 2 \times 2x \text{ so} \\ 212 &= 36 + 22x \\ x &= 176 \div 22 = 8 \end{aligned}$$

$$x = 8$$

3 / 3

- 43 The diagram shows a prism.
The cross-section of the prism is an L shape.
Calculate the total surface area of the prism. Diagram NOT accurately drawn.

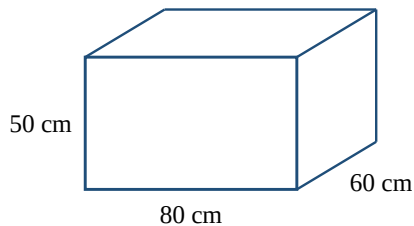


$$\begin{aligned} \text{Area of L} &= 13 \times 11 - 4 \times 3 = 131 \\ \text{two ends} &= 262 \\ \text{perimeter of L} &= 48, \text{ so sides} = 48 \times 9 = 432 \\ \text{total} &= 262 + 432 \end{aligned}$$

$$694 \text{ m}^2$$

3 / 3

- 44 The diagram shows a box in the shape of a cuboid.
8 of these boxes are going to be painted all over.
Each pot of paint covers 5 m^2 .
Work out the number of pots of paint needed. Diagram NOT accurately drawn.

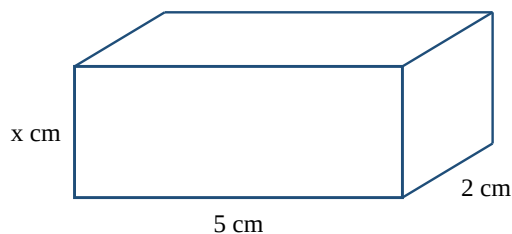


$$\begin{aligned} \text{One box: } 23,600 \text{ cm}^2 &= 2.36 \text{ m}^2 \\ 8 \text{ boxes: } 18.88 \text{ m}^2 \\ 18.88 \div 5 &= 3.776 \text{ so } 4 \text{ pots} \end{aligned}$$

$$4 \text{ pots}$$

3 / 3

- 45 The diagram shows a cuboid.
The total surface area of the cuboid is 48 cm^2 .
Work out the value of x . Diagram NOT accurately drawn.



$$\begin{aligned} 48 &= 2 \times 5 \times 2 + 2 \times 5x + \\ &2 \times 2 \times \text{so } 48 = 20 + 14x \\ x &= 28 \div 14 = 2 \end{aligned}$$

$$x = 2$$

3 / 3

-
- A diagram of a cylinder. The top circular face is shown with a dashed line across its center, labeled "40 cm". The vertical height of the cylinder is labeled "1.2 m" on the right side.

2 pots

3 / 3

-

4 pots

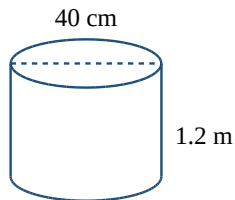
3 / 3

-

8 pots

3 / 3

- 49 The diagram shows a cylindrical tank with a top and a bottom.
 4 of these tanks are going to be painted all over.
 Each tank has a diameter of 40 cm and a height of 1.2 m.
 Each pot of paint covers 3 m^2 .
 Work out the number of pots of paint needed. Diagram NOT accurately drawn.



$$r = 0.2 \text{ m}$$

$$\text{one tank: } 2\pi \times 0.2^2 + 2\pi \times 0.2 \times 1.2 = 1.759 \text{ m}^2$$

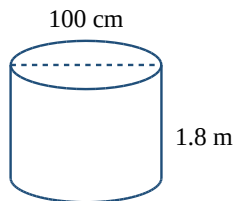
$$4 \text{ tanks: } 7.04 \text{ m}^2$$

$$\div 3 = 2.35 \text{ so } 3 \text{ pots}$$

3 pots

3 / 3

- 50 The diagram shows a cylindrical tank with a top and a bottom.
 9 of these tanks are going to be painted all over.
 Each tank has a diameter of 100 cm and a height of 1.8 m.
 Each pot of paint covers 8 m^2 .
 Work out the number of pots of paint needed. Diagram NOT accurately drawn.



$$r = 0.5 \text{ m}$$

$$\text{one tank: } 2\pi \times 0.5^2 + 2\pi \times 0.5 \times 1.8 = 7.226 \text{ m}^2$$

$$9 \text{ tanks: } 65.03 \text{ m}^2$$

$$\div 8 = 8.13 \text{ so } 9 \text{ pots}$$

9 pots

3 / 3