

Ratio of lengths, areas and volumes

Year 7 About 75 minutes No calculator 45 marks



Hints online, answers free with an account:
mathswariz.uk/worksheets/ks3-year-7-ratio-of-lengths-areas-and-volumes/

Date _____

A Do Now

Quick questions to start.

A1 Needed today [1 mark] **A2** Needed today [1 mark]

Write 18 : 30 in its simplest form.

Answer

How many millimetres are there in 6.5 cm?

Answer

A3 Last lesson [1 mark] **A4** From chapter 6 [1 mark]

Work out the value of 2^5 .

Answer

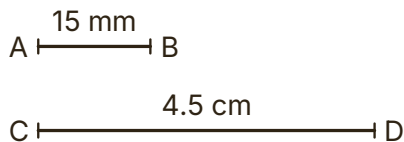
Work out the volume of a cuboid 5 cm by 3 cm by 2 cm.

Answer

B Example, then your turn

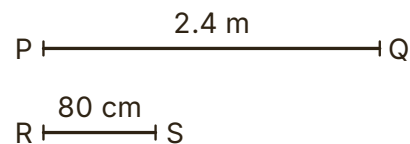
Year 7

Your teacher works through each example with you. Then try the one beside it.

EXAMPLE 1Work out the ratio of the length of AB to the length of CD . Give it in its simplest form.

Not drawn accurately

Hint Change both lengths to the smaller unit first. A ratio has no units.

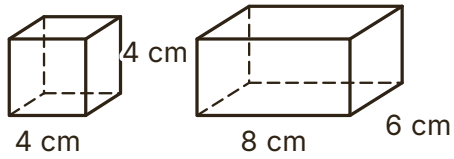
B1 [2 marks]Work out the ratio of the length of PQ to the length of RS . Give it in its simplest form.

Not drawn accurately

Answer

EXAMPLE 2

Work out the ratio of the volume of the cube to the volume of the cuboid, in its simplest form.

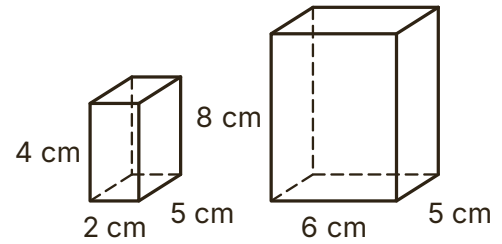


Not drawn accurately

Hint Volume of a cuboid: length $\times$ width $\times$ height.

B3 [2 marks]

Work out the ratio of the volume of the smaller cuboid to the volume of the larger cuboid, in its simplest form.

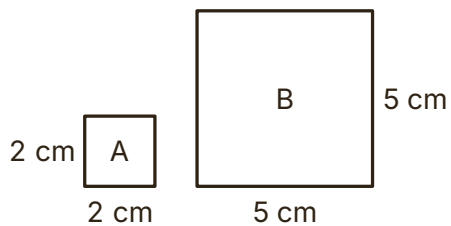


Not drawn accurately

Answer

EXAMPLE 3

For squares *A* and *B*, work out the ratio of (a) their sides, (b) their perimeters, (c) their areas. (d) Write the area ratio in the form $1 : n$.

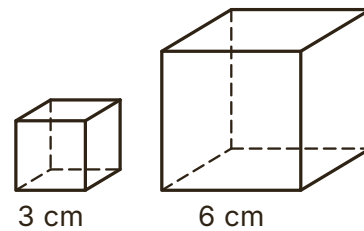


Not drawn accurately

Hint Work each one out and simplify. For the form $1 : n$, divide both sides by the first number.

B4 [3 marks]

For the two cubes, work out the ratio of (a) their edges, (b) their surface areas, (c) their volumes. Give each in its simplest form.



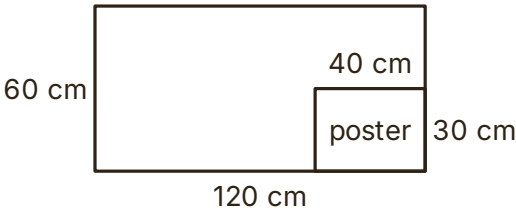
Not drawn accurately

Answer

C1 Three ropes are 40 cm, 1.2 m and 2 m long. Write the ratio of their lengths in its simplest form. [2 marks]

Answer

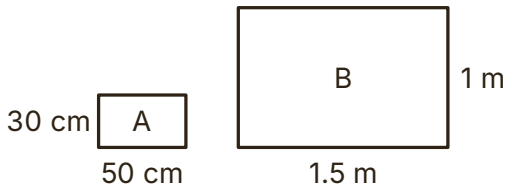
C2 A poster is pinned in one corner of a rectangular noticeboard. What fraction of the noticeboard is covered by the poster? [3 marks]



Not drawn accurately

Answer

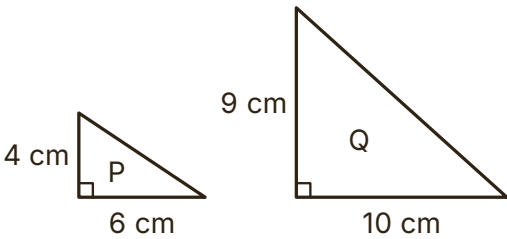
C3 Work out the ratio of the area of rectangle *A* to the area of rectangle *B*, in its simplest form. [3 marks]



Not drawn accurately

Answer

C4 Work out the ratio of the area of triangle *P* to the area of triangle *Q*, in its simplest form. [3 marks]



Not drawn accurately

Answer

- D1** Ben says, "A square with sides of 8 cm has twice the area of a square with sides of 4 cm."

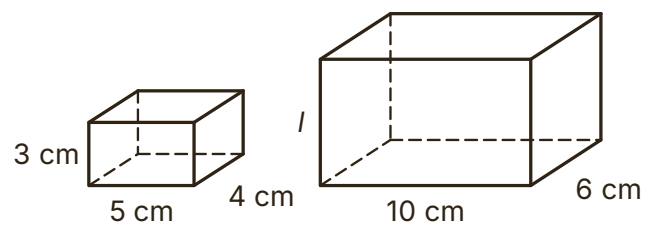
[4 marks]

Ben is wrong. Work out the ratio of the two areas, and explain what doubling the sides does to the area.

Answer

- D2** The ratio of the volume of the small box to the volume of the large box is 1 : 5. Both boxes are cuboids. Work out the height, h , of the large box.

[4 marks]



Answer $h = \dots\dots$ cm

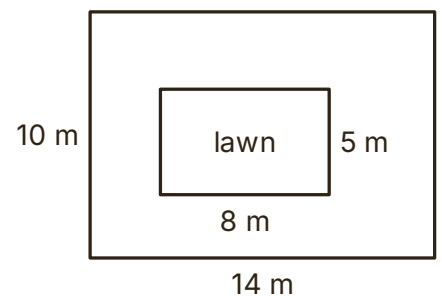
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- D3** A rectangular garden has a rectangular lawn. The rest of the garden is flower beds.

- (a) Work out the area of the lawn. [1 mark]

Answer

- (b) Work out the area of the flower beds. [1 mark]



Not drawn accurately

Answer

- (c) Write the ratio of the area of the lawn to the area of the flower beds in its simplest form. [2 marks]

Answer

- (d) Write the ratio in part (c) in the form 1 : n . [1 mark]

Answer

Total for D3: 5 marks

D4 The ratio of the volumes of two cubes is 1 : 27. The smaller cube has edges of 4 cm.

(a) Work out the length of an edge of the larger cube.

[2 marks]

Answer

(b) Work out the ratio of the surface areas of the two cubes, in its simplest form.

[3 marks]

Answer

Total for D4: 5 marks

E Extension

Stretch

No route is given. The hints are at the end of the sheet. Use one at a time.

E1 The ratio of the perimeter of square A to the perimeter of square B is 2 : 5. [5 marks]
Square B has an area of 100 cm^2 . Work out the area of square A .

Answer cm^2

Extension hints

Cover these with paper. Uncover one at a time.

- E1** **Hint 1** Work out the side of square B , then its perimeter.
Hint 2 Square B has sides of 10 cm and a perimeter of 40 cm, so square A has a perimeter of 16 cm.
Hint 3 Square A has sides of $16 \div 4 = 4$ cm.

How did it go?

Colour one circle on each line: not yet, nearly, yes.

I can write the ratio of two lengths in different units in its simplest form. ☐ ☐ ☐

I can write the ratio of two areas or two volumes, and write a ratio in the form 1 : n . ☐ ☐ ☐

I can say what happens to the area and the volume when every length is multiplied. ☐ ☐ ☐

I can find a missing length from a ratio of volumes. ☐ ☐ ☐