GCSE HIGHER · REVISION MAT 5

# Scale factors for length, area and volume

**1** A model is made to a scale of 1 : 20.

The model is 12 cm long.

How long is the real object?

**2** Show that a 2 cm by 3 cm rectangle is similar to a 6 cm by 9 cm rectangle.

Find the ratio of their areas.

**3** Is a 4 cm by 6 cm rectangle similar to a 6 cm by 8 cm rectangle?

Explain.

**4** A map has scale 1 : 20 000.

A park covers 3 $cm^2$ on the map.

Find its real area in $m^2$.

**5** Cylinder A has radius 2 cm and height 5 cm.

Cylinder B has radius 4 cm and height 10 cm.

Show that their volumes are in the ratio 1 : 8.

**6** Two similar cones are 6 cm and 9 cm tall.

The large cone has volume 270 $cm^3$.

Find the volume of the small cone.

**7** Show that a length ratio of 2 : 5 gives a volume ratio of 8 : 125.

**8** A solid is enlarged and its volume increases by 72.8%.

By what percentage does its surface area increase?

Mr&Mrs MATHS

ANSWERS · REVISION MAT 5

# Scale factors for length, area and volume

**1** **240 cm (2.4 m)**

**2** Both sides × 3

**Areas 1 : 9**

**3** 4 : 6 = 2 : 3, 6 : 8 = 3 : 4

**No**

**4** 1 cm = 200 m,
so 1 cm² = 40 000 m²

**120 000 m²**

**5** Similar with length factor 2

**Volume $2^3 = 8$**

**6** Length 2 : 3, volume 8 : 27

**80 cm³**

**7** **$2^3 : 5^3 = 8 : 125$**

**8** Volume factor 1.728 = $1.2^3$

Area factor $1.2^2 = 1.44$

**44%**

Mr&Mrs MATHS