FluidMaths

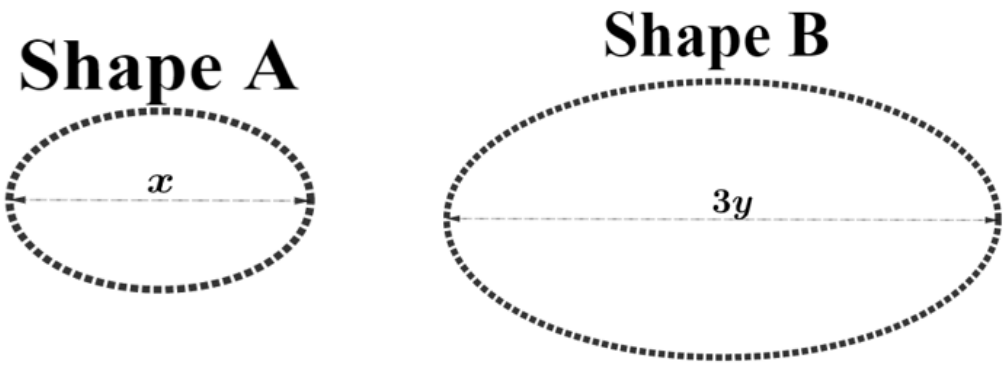
GCSE Mathematics (Grade 9-1)

Problem Solving
Similar Shapes Set 2
Area and Volume
Questions

Some useful strategies in problem-solving

- Read the question carefully
- Sketch a diagram where applicable
- Take note of key information
- Write down any formulae you may need
- Tackle the problem in bite-size rather than as a whole
- Concentrate on the part of the problem you understand and start from there
- Collaborate with a partner and share ideas
- Use a dictionary to find the meaning of any confusing words
- Check that your answers make sense in the context of the question

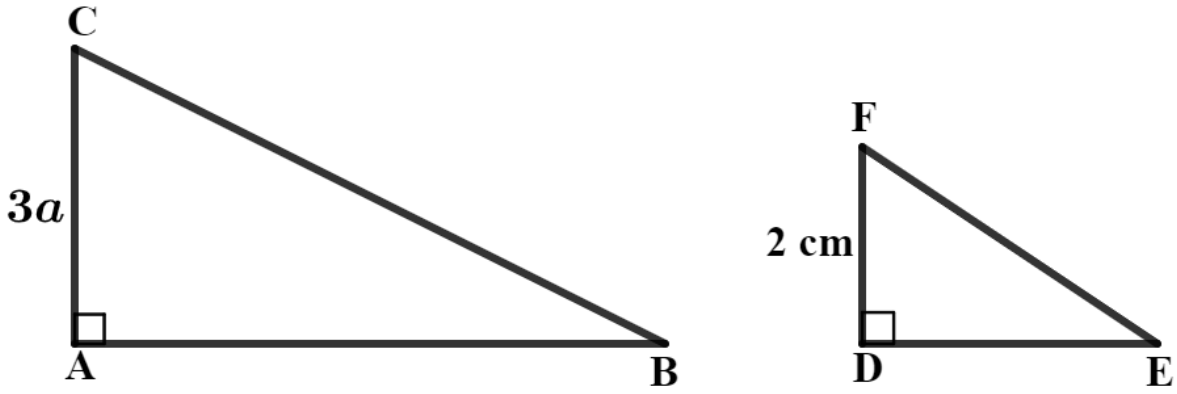
1 Two mathematically similar shapes are shown below.



The area of Shape A is 28 cm^2
The area of Shape B is 112 cm^2
Show that $y = \frac{2}{3}x$

[4marks]

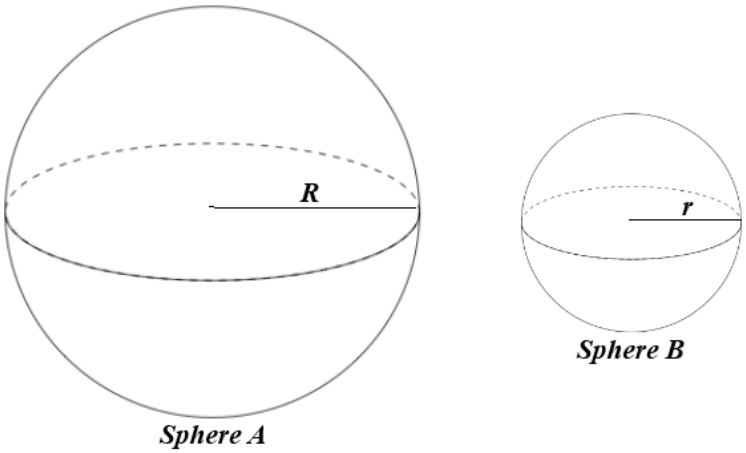
2 ABC and DEF are mathematically similar triangles



AC $= 3a$
DE $= 2$ cm
The area of triangle ABC is 24 cm^2
Show that the area of triangle DEF is equal to $\frac{32}{3a^2}$

[4marks]

3 Sphere A and Sphere B are mathematically similar



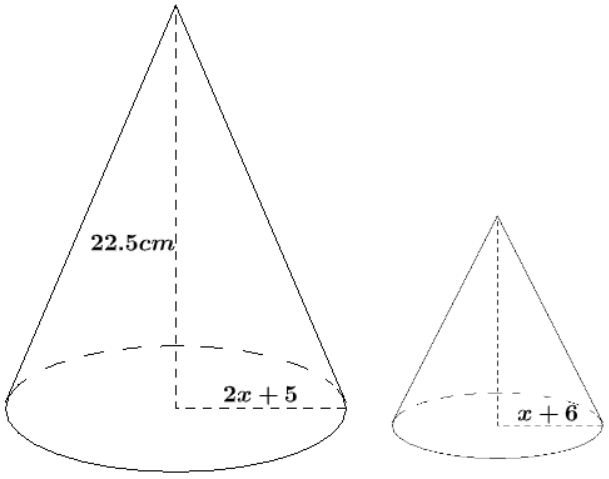
The radius of sphere A is R
The radius of sphere B is r
The volume of sphere A is 360 cm^3
The volume of sphere B is 80 cm^3
Show that $R \approx 1.65r$

[3marks]

4 Box A and Box B are mathematically similar
Box A is 40 cm wide
To make Box A, 36% less card is required than Box B.
How wide is Box B?

[3marks]

5 Two mathematically similar cones are shown below.



The vertical height of the larger cone is 22.5 cm
The radius of the larger cone is $2x + 5$
The radius of the smaller cone is $x + 6$
The surface area of the larger cone is 69% more than the surface area of the smaller cone.

a) Calculate the value of x **[4marks]**

b) Calculate the volume of the large cone.
Give your answer 2 decimal places. **[2marks]**

6 Luke makes two mathematically similar ball bearings
The ratio of their radii is 3:2.
The bearings are made using the same metal plate.
Given that the smaller medal has a mass of 16.8g.
Find:

a) The mass of the larger ball bearing. **[3marks]**

b) Show that the ratio of their masses is 27:8 **[1mark]**