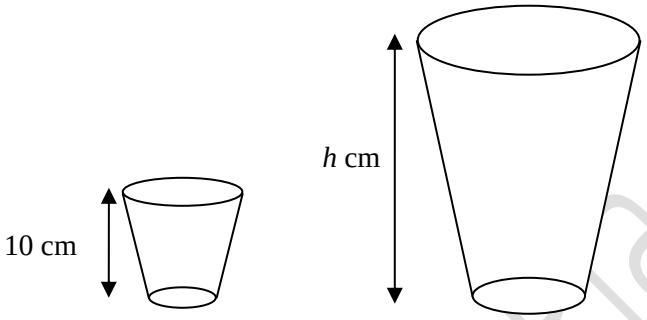
EQUITY
LEARNING PLACE

Elementary Math Topical (Similar Solids)

Question 1:

Two containers are geometrically similar. Given that the volume of the smaller container is 297 cm^3 and the volume of the bigger container is 1375 cm^3.



a) Find the ratio of the surface area of the smaller container to the larger container.

b) If the height of the smaller container is 10 cm, find the height of the larger container, *h* cm.

Question 2:

Moomoo milk is sold in bottles of 2 sizes. The bottles are geometrically similar to each other. The base diameter of the larger bottle is 8 cm and the base diameter of the smaller bottle is 6 cm.

a) If the surface area of the larger bottle is *A* cm^2, express the surface area of the smaller bottle in terms of *A*

b) The capacity of the smaller bottle is 270 ml. Calculate the capacity of the larger bottle.

Question 3:

The mass of two geometrically similar solid copper cylinders are 625 grams and 2.56 kg

a) If the larger cylinder has a radius of 16 cm, calculate the radius of the smaller cylinder.

b) If it costs $120 to electroplate the entire surface of the smaller cylinder, calculate how much it would cost to electroplate the entire surface of the larger cylinder.

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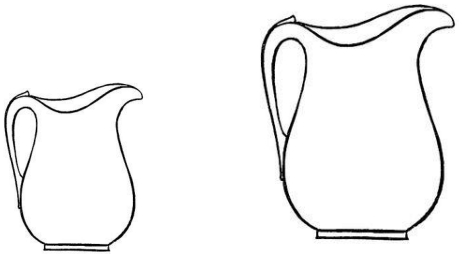
Question 4:

Two similar jugs have base areas of 45 cm^2 and 125 cm^2 respectively.



a) Find, in its simplest form, the ratio of the height of the smaller jug to the height of the larger jug.

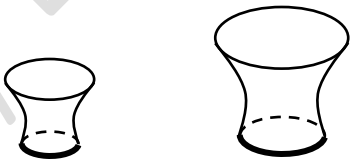
b) The surface area of the top of the smaller jug is 63 cm^2. Find the surface area of the top of the larger jug.

c) The capacity of the larger jug is 2.5 litres. Find the capacity of the smaller jug in litres.

Question 5:

The two glasses shown in the diagram are geometrically similar.

The height of the smaller and larger glass are 8 cm and 10 cm respectively.



a) The top of the larger glass has a circumference of 30 cm. Find the circumference of the top of the smaller glass.

b) Find the ratio of the surface area of the smaller glass to the surface area of the larger glass.

c) Both glasses are completely filled with fruit juice. The cost of the fruit juice in the smaller glass is 64 cents. Find the cost, in dollars, of the fruit juice in the larger glass.

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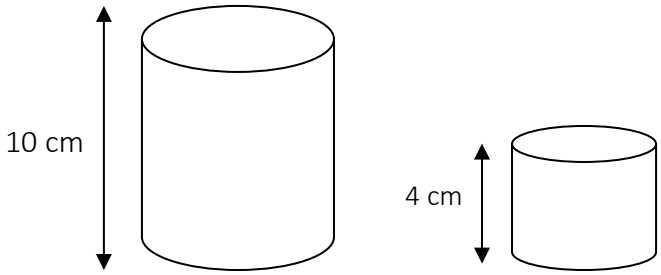
Question 6:



A vase manufacturer makes 2 geometrically similar solid glass cylinders A vase manufacturer makes 2 geometrically similar solid glass cylinders 10 cm and 4 cm respectively.

a) If the diameter of the larger cylinder is 5 cm, find the diameter of the smaller cylinder.

b) If the cross-sectional area of the bigger cylinder is 48 cm^2, calculate the cross-sectional area of the smaller cylinder.

c) If the mass of the smaller cylinder is 0.9 kg, find the mass of the bigger cylinder.

d) The manufacturer needs to paint the glass cylinders. It costs $2 to paint the big cylinder. How much does it cost to paint 1 small cylinder?

Question 7:

Two toy ships, made of the same material, are geometrically similar. One is $3\frac{3}{8}$ times as heavy as the other.

a) Given that the height of the mast of the smaller ship is 14 cm, calculate the height of the mast of the larger ship.

b) Write down the ratio of the surface area of the smaller ship to that of the larger ship, expressing your answer as a fraction in its lowest term.

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Question 8:

A cafe sells their drinks in paper cups that are two sizes. They are geometrically similar.

The base areas of cup *A* and cup *B* are 81 cm^2 and 49 cm^2 respectively.

a) Find the ratio of the height of cup *A* to the height of cup *B*.

b) Find the ratio of the volume of cup *A* to the volume of cup *B*.

c) The capacity of cup *A* is 288 cm^3. Find the capacity of cup *B*.

d) Drinks in cup *A* and *B* are sold for $1.50 and $1 each respectively. State which cup gives more value for money. Justify your answer with working.

Question 9:

Two geometrically similar jugs have volumes of 588.8 cm^3 and 1150 cm^3.

a) Find, in its simplest integer form, the ratio of the height of the smaller jug to the height of the larger jug.

b) The surface area of the larger jug is 425 cm^2. Find the surface area of the smaller jug.

c) The smaller jug has a mass of 7.07 kg. Find the mass of the larger jug.

d) Find the mass of the smaller jug as a percentage of the mass of the larger jug.

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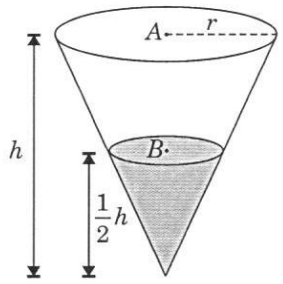
Question 10:

The diagram shows an inverted cone of height *h* and radius *r*. It contains water to a depth of $\frac{1}{2}h$.



a) Find area of surface *B* : area of surface *A*.

b) Find the volume of water if the cone can hold 480 cm^3 of water when full.

c) The cone is now inverted again such that the liquid rests on the flat circular surface of the cone as shown below. Find, in terms of *h*, an expression for *d*, the distance of the liquid surface from the top of the cone.