Guide to:
Similar shapes (area and vol)

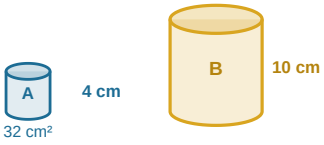
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Explanation:

If two similar shapes have **length ratio a : b** (scale factor **k**), then their **area ratio is $a^2 : b^2$** (scale factor k^2) and their **volume ratio is $a^3 : b^3$** (scale factor k^3).

Whenever you are given two areas or two volumes, always simplify the ratio first and **square root (for area) or cube root (for volume) back to the length ratio a : b** before finding any other measurement.

Example 1: Similar cylinders A and B have heights **4 cm** and **10 cm**. The surface area of A is **32 cm²**. Find the surface area of B.



Solution:

Length ratio = 4 : 10 = **2 : 5** → Area ratio = $2^2 : 5^2$ = **4 : 25**

Area of B = (32 ÷ 4) × 25 = 8 × 25 = 200 cm^2

Answer: 200 cm^2

Example 2: Similar solids P and Q have surface areas **27 cm^2** and **75 cm^2**. The volume of Q is **250 cm^3**. Find the volume of P.

Solution:

Simplify area ratio P : Q = 27 : 75 = **9 : 25** (÷ 3)
Square root for length ratio = **3 : 5**
Cube for volume ratio = $3^3 : 5^3$ = **27 : 125**
Volume of P = (250 ÷ 125) × 27 = 54 cm^3
Answer: 54 cm^3

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