GEOMETRY: MATHEMATICALLY SIMILAR SOLIDS

Best Guess Mastery Worksheet (Target Grade 7/8)

I Do

20 Solid **A** and solid **B** are mathematically similar.

The total surface area of solid **A** is 45π cm^2.

The total surface area of solid **B** is 80π cm^2.

The volume of solid **A** is 810 cm^3.

Calculate the volume of solid **B**.

..... cm^3

GEOMETRY: MATHEMATICALLY SIMILAR SOLIDS

Best Guess Mastery Worksheet (Target Grade 7/8)

We Do

Solid **P** and solid **Q** are mathematically similar.

The total surface area of solid **P** is 50π cm^2.

The total surface area of solid **Q** is 72π cm^2.

The volume of solid **P** is 500 cm^3.

Calculate the volume of solid **Q**.

..... cm^3

GEOMETRY: MATHEMATICALLY SIMILAR SOLIDS

Best Guess Mastery Worksheet (Target Grade 7/8)

You Do 1

Solid **X** and solid **Y** are mathematically similar.

The total surface area of solid **X** is 32π cm².

The total surface area of solid **Y** is 162π cm².

The volume of solid **X** is 320 cm³.

Calculate the volume of solid **Y**.

..... cm³

GEOMETRY: MATHEMATICALLY SIMILAR SOLIDS

Best Guess Mastery Worksheet (Target Grade 7/8)

You Do 2

Solid **C** and solid **D** are mathematically similar.

The total surface area of solid **C** is 12π cm^2.

The total surface area of solid **D** is 75π cm^2.

The volume of solid **C** is 160 cm^3.

Calculate the volume of solid **D**.

..... cm^3

GEOMETRY: MATHEMATICALLY SIMILAR SOLIDS

Best Guess Mastery Worksheet (Target Grade 7/8)

Challenge 1

Solid **E** and solid **F** are mathematically similar.

The volume of solid **E** is 135 cm³.

The volume of solid **F** is 320 cm³.

The total surface area of solid **E** is 45π cm².

Calculate the total surface area of solid **F**.

..... cm²

GEOMETRY: MATHEMATICALLY SIMILAR SOLIDS

Best Guess Mastery Worksheet (Target Grade 7/8)

Challenge 2

Two solid metal statues, **A** and **B**, are mathematically similar.
The height of statue **A** is 15 cm and the height of statue **B** is 25 cm.
Statue **A** has a total surface area of 270 cm².
Statue **B** has a mass of 6.25 kg.

Calculate the total surface area of statue **B**, and the mass of statue **A**.

Surface Area of **B** = ... cm²

Mass of **A** = ... kg

Answers & Worked Solutions

I Do:

1. Area Scale Factor (ASF) = $\frac{80\pi}{45\pi} = \frac{80}{45} = \frac{16}{9}$.
2. Linear Scale Factor (LSF) = $\sqrt{(\frac{16}{9})} = \frac{4}{3}$.
3. Volume Scale Factor (VSF) = $LSF^3 = (\frac{4}{3})^3 = \frac{64}{27}$.
4. Volume of **B** = $810 \times \frac{64}{27} = 30 \times 64 =$ **1920 cm³**.

We Do:

1. ASF = $\frac{72\pi}{50\pi} = \frac{36}{25}$.
2. LSF = $\sqrt{(\frac{36}{25})} = \frac{6}{5}$.
3. VSF = $(\frac{6}{5})^3 = \frac{216}{125}$.
4. Volume of **Q** = $500 \times \frac{216}{125} = 4 \times 216 =$ **864 cm³**.

You Do 1:

1. ASF = $\frac{162\pi}{32\pi} = \frac{81}{16}$.
2. LSF = $\sqrt{(\frac{81}{16})} = \frac{9}{4}$.
3. VSF = $(\frac{9}{4})^3 = \frac{729}{64}$.
4. Volume of **Y** = $320 \times \frac{729}{64} = 5 \times 729 =$ **3645 cm³**.

You Do 2:

1. ASF = $\frac{75\pi}{12\pi} = \frac{25}{4}$.
2. LSF = $\sqrt{(\frac{25}{4})} = \frac{5}{2}$.
3. VSF = $(\frac{5}{2})^3 = \frac{125}{8}$.
4. Volume of **D** = $160 \times \frac{125}{8} = 20 \times 125 =$ **2500 cm³**.

Challenge 1:

1. VSF = $\frac{320}{135} = \frac{64}{27}$.
2. LSF = $\sqrt[3]{(\frac{64}{27})} = \frac{4}{3}$.
3. ASF = $(\frac{4}{3})^2 = \frac{16}{9}$.
4. Area of **F** = $45\pi \times \frac{16}{9} = 5\pi \times 16 =$ **80π cm²**.

Challenge 2:

1. LSF = $\frac{25}{15} = \frac{5}{3}$.
2. ASF = $(\frac{5}{3})^2 = \frac{25}{9}$.
3. Surface Area of **B** = $270 \times \frac{25}{9} = 30 \times 25 =$ **750 cm²**.
4. Mass is proportional to volume. VSF = $(\frac{5}{3})^3 = \frac{125}{27}$.
5. Mass of **A** = $6.25 \div \frac{125}{27} = 6.25 \times \frac{27}{125} =$ **1.35 kg**.