PROPORTIONAL CHANGE PROBLEMS INVOLVING SOLIDS ON TAKS

Below are examples of proportional change problems involving solids in multiple choice format. Try solving the problems before looking at the solutions. (Cover the solutions with a piece of paper.) Then check your solutions against the ones given.

1. A building has a surface area of 800 square meters. A scale model of the building is created using a scale of 1 : 12. What is the approximate surface area of the model?

   A 0.46 m^2

   B 5.56 m^2

   C 66.67 m^2

   D 115,200 m^2

   Solution

   The scale factor of the model to the building is 1 : 12. Let x be the surface area of the model.

   $$\frac{1^2}{12^2} = \frac{x}{800}$$

   $$x = 800 \cdot \frac{1}{144} \approx 5.56 \text{ m}^2$$

   The correct answer is B.

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2. A cylinder has twice the height and twice the radius of another cylinder. The larger cylinder has a volume of 20 cubic meters. What is the volume of the smaller cylinder?

   F 2.5 m^3

   G 5 m^3

   H 10 m^3

   J 160 m^3

   Solution

   The scale factor of the small cylinder to the large cylinder is 1 : 2. Let x be the volume of the small cylinder.

   $$\frac{1^3}{2^3} = \frac{x}{20}$$

   $$x = 20 \cdot \frac{1}{8} = 2.5 \text{ m}^3$$

   The correct answer is F.

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3. A replica of a statue has dimensions that are $\frac{1}{3}$ of the original statue. The replica has a surface area of 1.7 square meters. Find the statue's surface area.

   A 4.913 m^2

   B 5.1 m^2

   C 15.3 m^2

   D 45.9 m^2

   Solution

   The scale factor of the statue to the replica is 3 : 1. Let x be the surface area of the statue.

   $$\frac{3^2}{1^2} = \frac{x}{1.7}$$

   $$x = 1.7 \cdot 9 = 15.3 \text{ m}^2$$

   The correct answer is C.

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