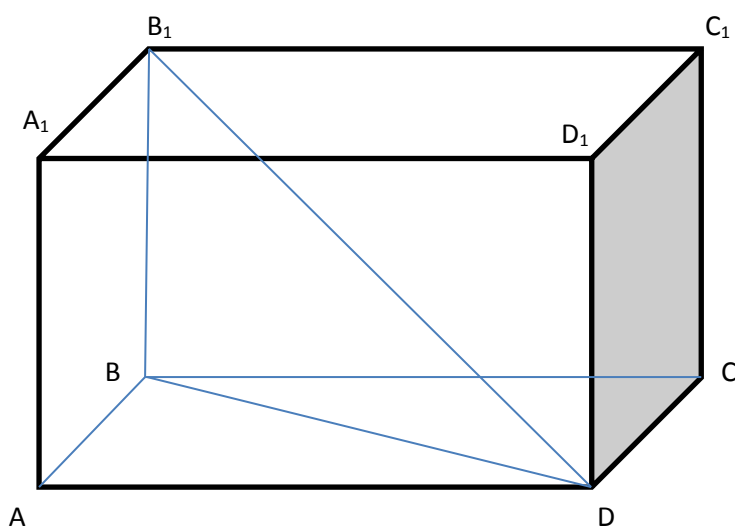


Answer on Question #64761 – Math – Geometry

Question

In a rectangular parallelepiped the length and width of the base are 12 in. and 9 in respectively. find the volume of the solid if the length of the diagonal of the solid is 25 inches.

Solution



Given

$$AB=CD=A_1B_1=C_1D_1=9 \text{ in.}, AD=BC=A_1D_1=B_1C_1=12 \text{ in.}, B_1D=25 \text{ in.}$$

We can find the bases diagonal from the right triangle ABD using the Pythagorean theorem:

$$BD = \sqrt{AB^2 + AD^2} = \sqrt{9^2 + 12^2} = \sqrt{81 + 144} = \sqrt{225} = 15 \text{ in.}$$

Angle B_1BD is right, applying the Pythagorean theorem to the right triangle BB_1D compute

$$BB_1 = \sqrt{B_1D^2 - BD^2} = \sqrt{25^2 - 15^2} = \sqrt{625 - 225} = \sqrt{400} = 20 \text{ in.}$$

Thus, the volume of the solid is

$$V = AB \cdot BC \cdot BB_1 = 9 \cdot 12 \cdot 20 = 2160 \text{ in}^3.$$

Answer: $V= 2160 \text{ in}^3$.