

Geometry: Job Estimator

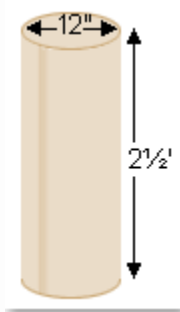
Idaho Barns

Job Description: Sell and install pre-fabricated barns and buildings. Price entire projects including labor and materials.

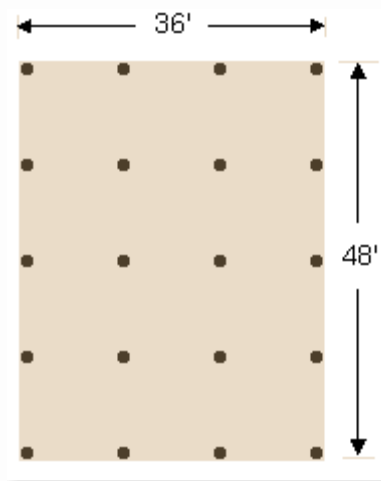
Problem:

A family wants to buy a barn to keep their animals in. The barn is 36 feet wide and 48 feet long. The foundation requirements call for concrete pillars placed every 12 feet through the structure.

The pillars are to be 2.5 feet deep and 12 inches in diameter. How much concrete will be used for this project?



The final amount needs to be calculated in cubic yards because that is how concrete is sold.



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Solution:

20 pillars are required for the building. Calculate how much concrete is needed for each pillar and multiply by 20.

$$\text{Circle area} = \pi r^2 = 3.14 \times 6 \times 6 = 113.04 \text{ square inches}$$

$$\text{Cylinder volume} = (\pi r^2) \times ht$$

$$2.5 \text{ feet} = 30 \text{ inches}$$

$$(113.04 \text{ sq in}) \times (30 \text{ in}) = 3391.2 \text{ cubic inches}$$

Convert to cubic feet

$$3391.2 \text{ cubic in} \div 1,728 \text{ in}^3/\text{ft}^3 = 1.9625 \text{ cubic ft} \times 20 = 39.25 \text{ cubic feet}$$

$$27 \text{ cubic feet} = 1 \text{ cubic yard}$$

Convert to cubic yards

$$39.25 \text{ ft}^3 \div 27\text{ft}^3/\text{yd}^3 = 1.45 \text{ cubic yards of concrete needed}$$

