

# Designer & Builder Problems



Sample Floor Plan

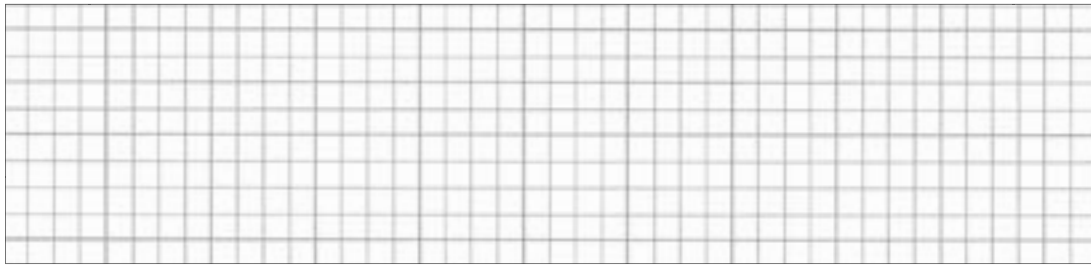


Front Elevation

▪ **Getting Started** ▪ Cut and assemble the Sample Room Addition printed on the kit's Model Construction sheet. Design your own arrangement of windows and doors. These can be cut out of the walls or you can arrange the window and door illustrations in the kit. Sketch a floor plan and then organize the kit's furniture, stairs, fireplace and other features to plan your interior design. Refer to the sample illustrations and draw the location of lights, outlets, switches, telephone jacks, and other details.



Sample Design



▪ Design a geometric floor pattern. Then, make a materials list for your project.

▪ **Paint** ▪ Determine the amount of paint needed for your project. First, you need to calculate the area to be painted. If one gallon of paint covers 400 square-feet, how much paint is needed to cover the walls and ceiling?

Sample Problem:

Area of each wall = length x height

$$10' \times 8' = 80 \text{ sq. ft.} \times 2 \text{ walls} = 160 \text{ sq. ft.}$$

$$15' \times 8' = 120 \text{ sq. ft.} \times 2 \text{ walls} = 240 \text{ sq. ft.}$$

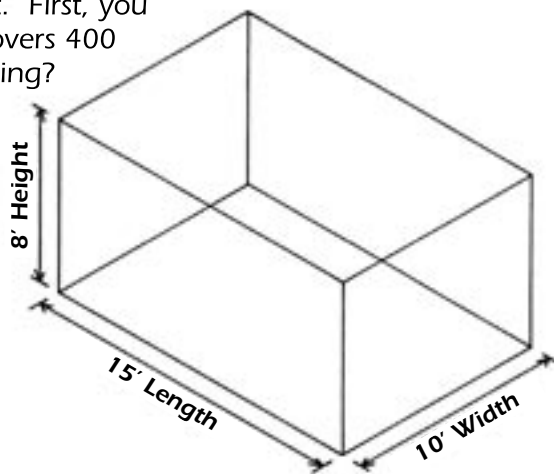
$$\text{Total area of 4 walls} = 400 \text{ sq. ft.}$$

$$400 \text{ sq. ft.} \times \frac{1 \text{ gal.}}{400 \text{ sq. ft.}} = 1 \text{ gal. of paint for walls}$$

Area of ceiling = length x width

$$15' \times 10' = 150 \text{ sq. ft.}$$

$$150 \text{ sq. ft.} \times \frac{1 \text{ gal.}}{400 \text{ sq. ft.}} = .375 \text{ gal. of paint for ceiling}$$



▪ **Wall & Floor coverings** ▪ Determine the amount of wall or floor covering needed for a selected area. Contact material supplier to determine square-foot coverage per roll, pack or other unit. For sheet materials, you can sketch the panels (the standard size for many building materials is 4 ft. by 8 ft.) on the grid side of the kit's sheets to determine the most economical layout.

▪ **Windows** ▪ For adequate natural light, the total window area in each habitable room should be a minimum of 8% of the floor area. Calculate the minimum window area for each bedroom and living space in your design, and confirm that it meets or exceeds the minimum.

Sample Problem:

Floor area of room = length x width

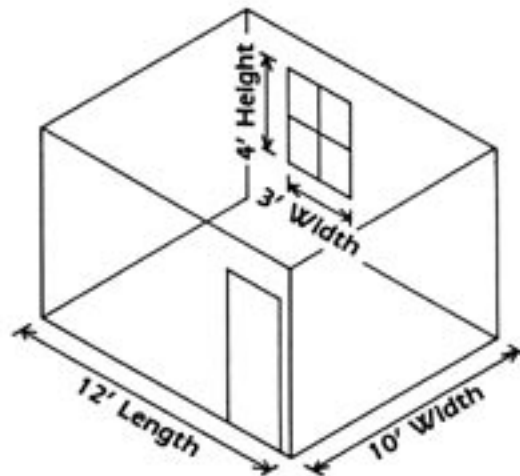
$$12' \times 10' = 120 \text{ sq. ft.}$$

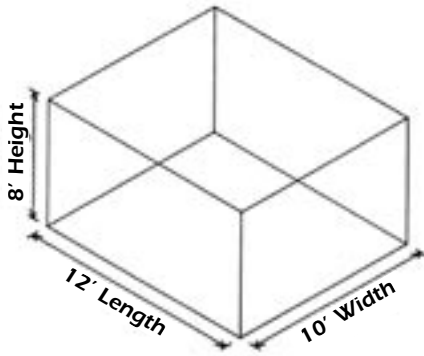
Minimum window area = 8% of 120 sq. ft. = 9.6 sq. ft.

Actual window area = height x width

$$3' \times 4' = 12 \text{ sq. ft.}$$

Therefore, the 3 ft. by 4 ft. window is adequate.





▪ **Heating, Ventilation, & Air Conditioning (HVAC)** ▪

Volume is one of the factors used to determine the size of HVAC systems. To determine the volume of a room, multiply the length times the width times the height.

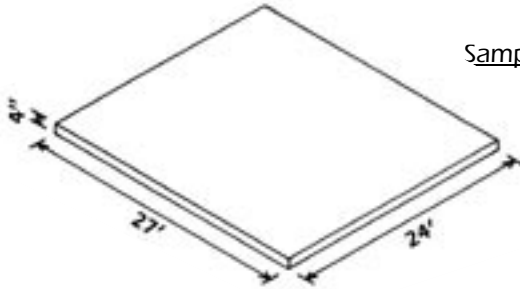
Sample Problem:

$$\text{length} \times \text{width} \times \text{height} = \text{volume}$$

$$12' \times 10' \times 8' = 960 \text{ cubic feet}$$

▪ **Concrete** ▪ Poured concrete for footings, foundation walls, and slab is measured in cubic yards.

To calculate the volume of concrete needed, multiply the length times the width times the depth. (All measurements must be in the same units; then convert to cubic yards.)



Sample Problem:

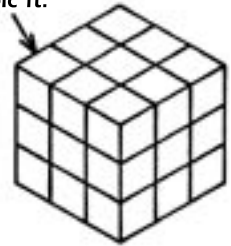
$$\text{length} \times \text{width} \times \text{depth}$$

$$27' \times 24' \times \frac{4'}{12} = 216 \text{ cubic feet}$$

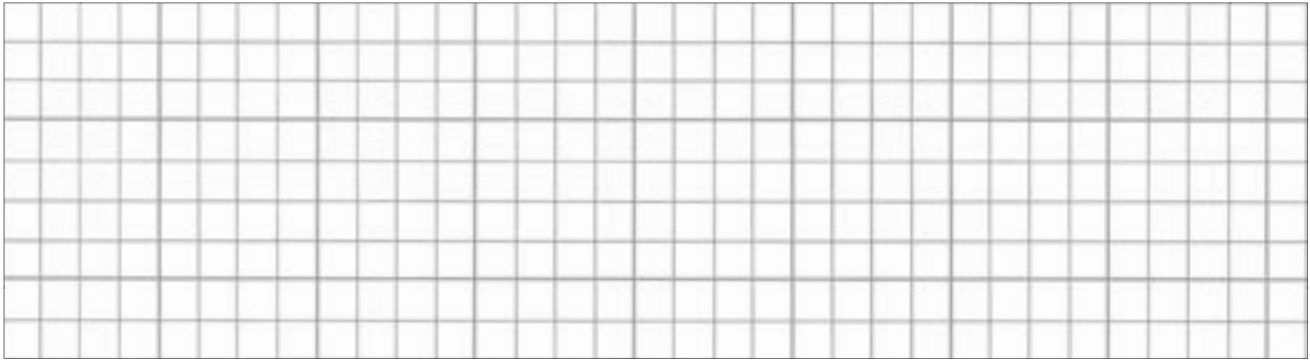
Now convert cubic feet to cubic yards

$$216 \text{ cubic ft.} \times \frac{1 \text{ cubic yard}}{27 \text{ cubic ft.}} = 8 \text{ cubic yards}$$

1 cubic ft.

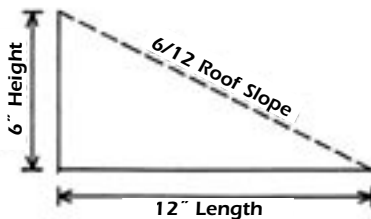


1 cubic yd. = 27 cubic ft.



▪ **Roof Design** ▪ Designers and builders refer to the slope of a roof: the ratio of the vertical rise per twelve units of horizontal run. For example, a roof which rises six inches for twelve horizontal inches has a 6/12

slope. To draw a roof with a 6/12 slope, make a right triangle with a horizontal length of 12 grid boxes and a height of 6 grid boxes; then draw the roof slope by completing the triangle. Draw the angle of the roof of your house on the above grid.



Note that the choice of the roof material depends on the slope of your roof.

This illustration at right shows two intersecting gable roofs with an 8/12 slope. Dotted lines show how to make hip roofs. Use the isometric grid pattern on the other side of this sheet to sketch your roof design.

