

## Lesson 1 Framing a Floor

### Lesson 1: Framing a Floor

#### SPECIFIC OBJECTIVES

Use addition, subtraction, multiplication and division to determine information needed to install a floor in a home.

By the end of this lesson you will understand that...

- Addition is → sum, more than, increased by, total, how many
- Subtraction is → difference, less than, decreased by, minus
- Multiply is → of, times, product, twice (x2)
- Divide is → quotient, ratio, given a total then how many of each...
- Area of a rectangle is length x width

By the end of this lesson you will be able to...

- Correctly interpret words in a problem statement and use the necessary operations to find the result
- Use the construction calculator to add, subtract, multiply and divide numbers of the same units and interpret the results
- Calculate an area of a rectangle given the sides

#### Definitions:

##### Linear foot (or lineal foot):

A 12 inch measurement of length. Because the term linear refers to a straight line, it makes sense to think of linear footage as the straight line measurement of something. ... If you choose a piece that's 12 inches wide and 5 feet long, it's still 5 linear feet.

##### Plate:

Normally a 2 X 4 or 2 X 6 that lays horizontally within a framed structure, such as:

- Sill plate- A horizontal member anchored to a concrete or masonry wall.
- Sole plate- Bottom horizontal member of a frame wall.
- Top plate- Top horizontal member of a frame wall supporting ceiling joists, rafters, or other members.

##### Joist:

Wooden 2 X 8's, 10's, or 12's that run parallel to one another and support a floor or ceiling, and supported in turn by larger beams, girders, or bearing walls.

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### Problem Situation #1: Purchasing Materials to Frame a Floor

Congratulations! You have just gotten the job as the general contractor to build a brand new house. The architect has provided you with the plans and you need to verify the materials to start working on framing the floor of the house.

1. Label the image provided to you by your instructor with as many different components as you know that make up a floor frame in a house.
2. Without using your calculator, estimate the total linear feet of sill plate material needed for the house. Write down your estimate and *explain* your strategy for finding it.

120'

3. Now calculate how many linear feet of sill plate material is needed for the house. Show the calculations you made (write down the calculations) and include units in your answer.

Find missing sides (27' and 11')

Perimeter (length all the way around)

$$11 + 11 + 11 + 22 + 27 + 38 = 120'$$

$$\textcircled{1} + \textcircled{1} + \textcircled{1} + \textcircled{2} + \textcircled{3} + \textcircled{4} = 12 \text{ boards}$$

4. You can purchase the plate material in 12' lengths, but you cannot use any scraps shorter than 6 feet. Based on these limitations, how many pieces of 12' sill plate material will you need? Be sure to show or explain how you determined your answer.

$$120' \div 12' = 10 \text{ boards} \leftarrow \text{not correct}$$

Determine by side (see circled numbers in #3)

Another thought... since 6' scrap can be used, use the scrap from the 27' side on the 38' side, so 11 boards instead of 12.

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5. Now calculate the exact cost of the lumber assuming you are buying 12' treated 2x6 boards from Home Depot for \$8.67 each (for now we will ignore tax). Round your answer to the nearest dollar.

$$\begin{array}{r} \$8.67 \times 11^{\text{boards}} = \$95.37 \\ \text{\$95} \end{array}$$

$$\begin{array}{r} \$8.67 \times 12^{\text{boards}} = \$104.04 \\ \text{\$104} \end{array}$$

6. It is now time to estimate how much you will charge to lay the subfloor if you charge \$1.19 per square foot. Be sure to write down your answer and the strategy you used to find it.

$$\$600 \rightarrow 500 \text{ ft}^2$$

$$\begin{array}{l} (\frac{1}{5}) \text{ 20\% of 500 is 100} \\ \text{so } \$1.20 \text{ is } \$500 + \$100 \end{array}$$

$$\$625 \rightarrow 500 \text{ ft}^2$$

$$\frac{1}{4} \text{ of } 500 \text{ is } 125$$

$$\begin{array}{l} \text{estimate } \$1 \rightarrow \$500 \\ \quad \quad \quad \$1.50 \rightarrow \$750 \end{array} \text{ ) about } \$600$$

7. Now calculate the exact amount you will charge. Show the calculations you made (write down what you typed into your calculator) and include units in your answer.

$$38 \times 11 = 418 \text{ ft}^2$$

$$\begin{array}{r} 11 \times 11 = 121 \text{ ft}^2 \\ \hline 539 \text{ ft}^2 \end{array}$$

$$539^{\text{ft}^2} \times \$1.19 = \frac{\text{\$641.41}}{\text{ft}^2}$$

8. Compare your answers in questions 6 and 7. Are they close? Why or why not?

Yes!

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### MAKING CONNECTIONS

Record the important mathematical ideas from the discussion.

### Practice/Homework

Pg 3 24. As is

Pg 5 29. As is

Pg 6 15. As is

Pg 6 16. As is

Pg 7 22. As is

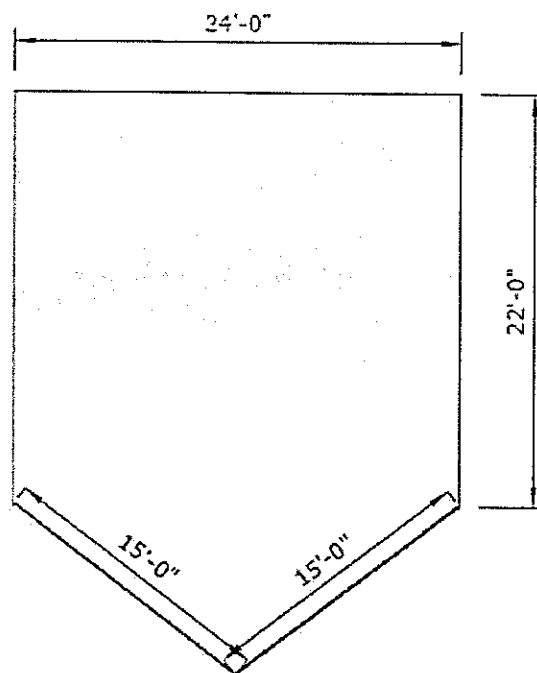
Pg 12 27. First estimate and then complete the problem. As is

28. As is

Pg 87 21. The cost for grass seed is \$0.03/sq ft. How much will seeding the yard cost?

Pg 97 2. Use any method.

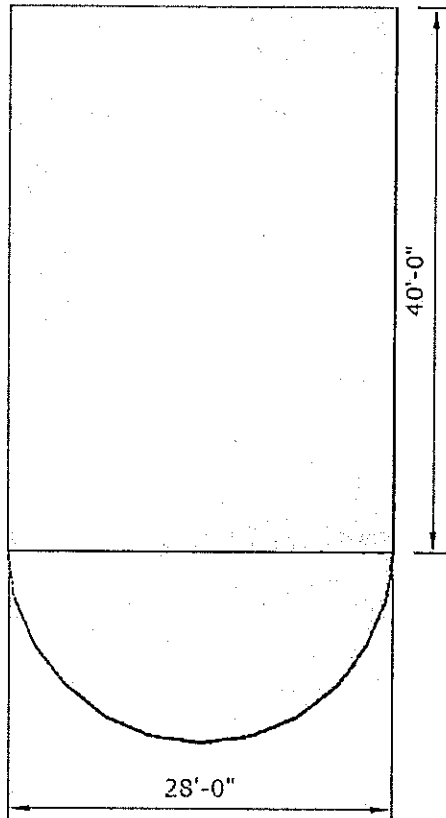
What is the perimeter of the figure shown?



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A former basketball star decides to build his home in the shape shown below. What will the perimeter of his home be?

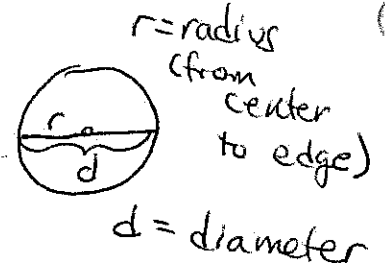


Perimeter: distance around the edge  
(add up all sides)

ft  
in  
Length

Circumference (perimeter) of circle

$$C = \pi \cdot 2r \quad C = \pi d$$
$$2\pi r$$



$$\pi = \pi^{\circ}$$
$$\approx 3.141593, \dots$$

Area: space inside a shape  
(laying tile)

ft<sup>2</sup>  
in<sup>2</sup>  
Square  
units

$$A = L \times W$$

