



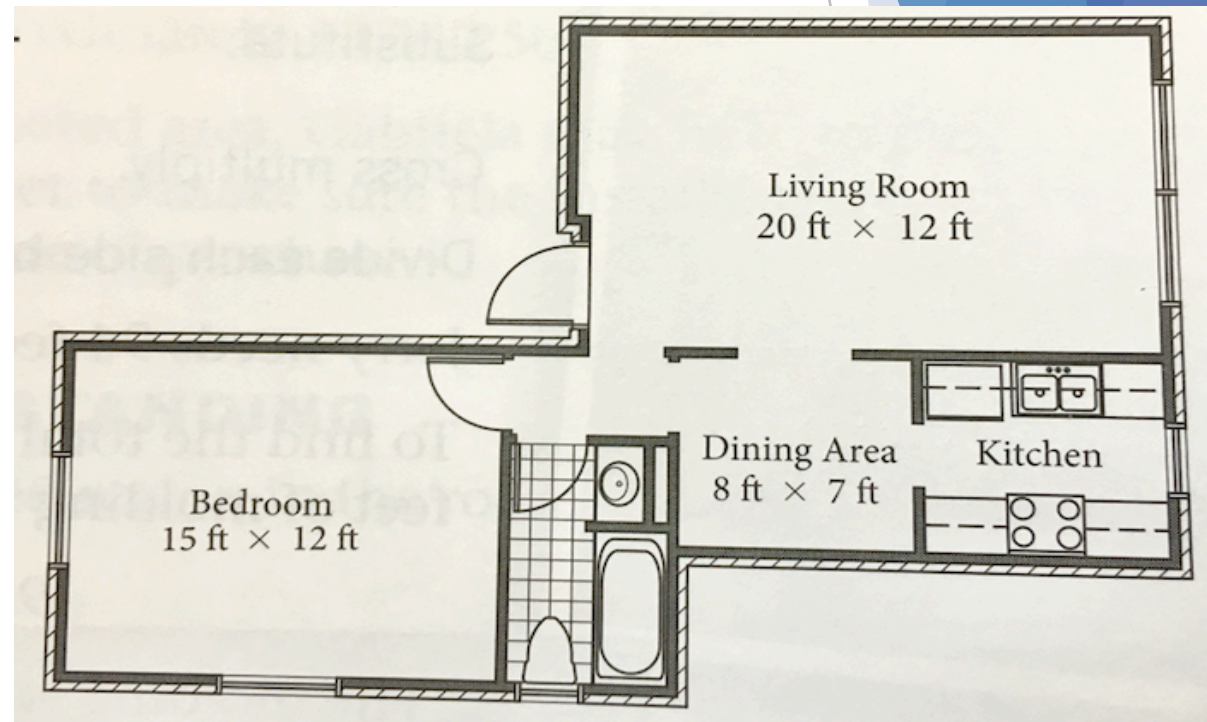
6-2: Floor Plans

Consumer Math - Unit 6

How much space do you need?

- ▶ A *floor plan* is a drawing of the layout and dimensions of rooms.
- ▶ The floor plan shown below is for a one-bedroom apartment.

- Shows layout of whole apartment
- Shows dimensions of each room
- Can figure out area of each room
- Shows doorways and which way doors open
- Shows locations of windows
- Will sometimes show furniture/appliances



- ▶ Examining a floor plan allows you to make intelligent decisions before you move in. It helps you determine what furniture will fit in each room.
- ▶ Larger spaces are usually more expensive, so deciding what you *want* vs what you *need* is important.
- ▶ Floor plans are *drawn to scale*, meaning they are drawn in the same proportion as the actual home.



Example 1:

Jerry is using the floor plans for his new home to help him purchase base molding for the place where the walls meet the floor. The plans are drawn using a scale of $\frac{1}{4}$ inch represents 1 foot. He measures the walls on the floor plan with a ruler and finds that they total $23\frac{1}{2}$ inches. If molding costs \$2.10 per foot, how much will Jerry spend on molding?



To find out how many feet of molding he'll need to buy, make a proportion.

$$\frac{0.25 \text{ inches}}{1 \text{ foot}} = \frac{23.5 \text{ inches}}{? \text{ feet}}$$

$$0.25x = 23.5$$

$$x = 94 \text{ feet}$$

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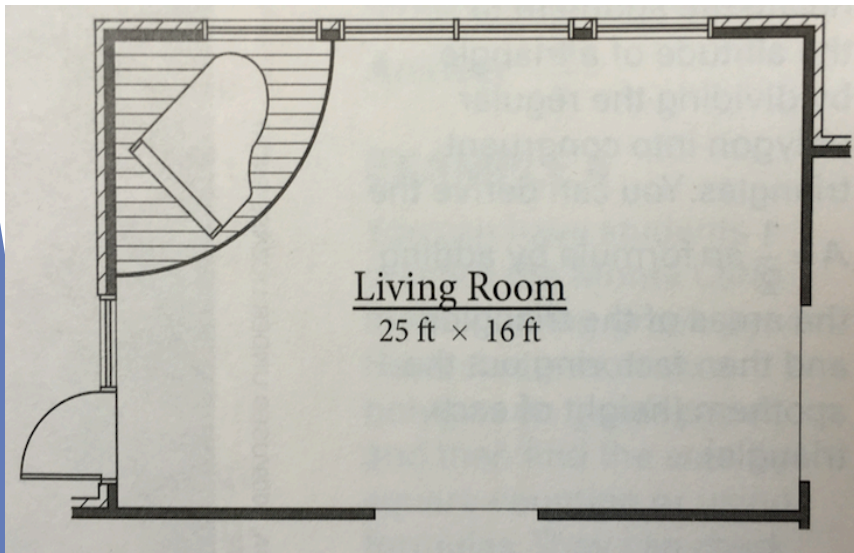


Jerry needs 94 feet of molding, which costs \$2.10 per foot.

$$94 \times 2.10 = \$197.40$$

Example 2:

Gabby plans to carpet her living room, except for the quarter-circle shown in the corner. That area will be a wood floor where she will put her piano. The radius of the quarter circle is 8 feet. If carpeting costs \$9.55 per square foot, what is the cost of the carpeting she will use in her living room?



The area of the whole living room is:

$$25 \times 16 = 400$$

If the corner was a whole circle, its area would be:

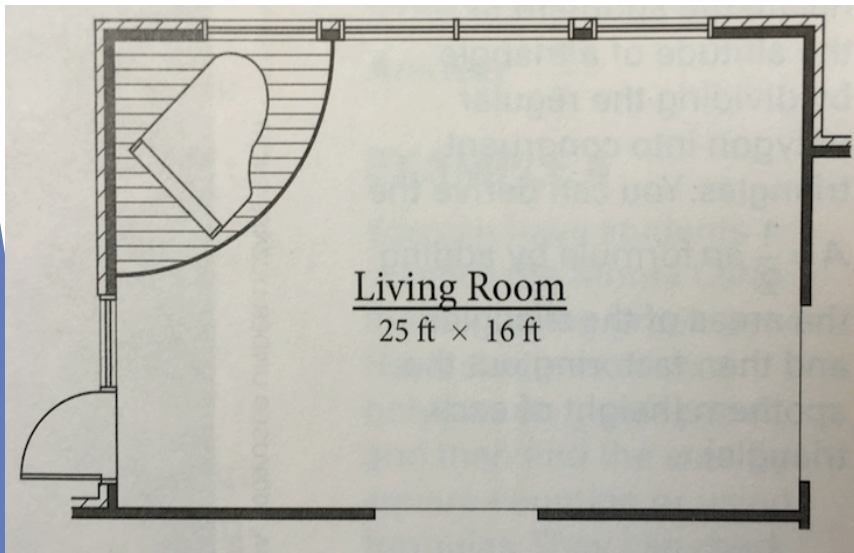
$$\pi \times r^2 = 3.14 \times 8^2 = 200.96$$

Since it's only a quarter circle, divide it by 4.

$$200.96 \div 4 = 50.24$$

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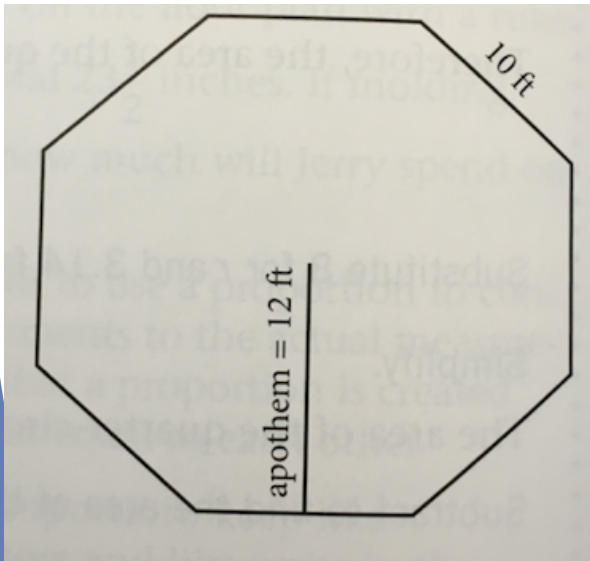


So, the area of the living room that is being carpeted is:

$$400 - 50.24 = 349.76$$

Example 3:

Delgado's Landscape Design is building a large gazebo for an apartment complex courtyard. It is in the shape of a regular octagon as shown in the diagram. Each side of the gazebo is 10 feet. They need to purchase wood for the floor. It costs \$14 per square foot for a special type of wood. Find the cost of the gazebo's floor.

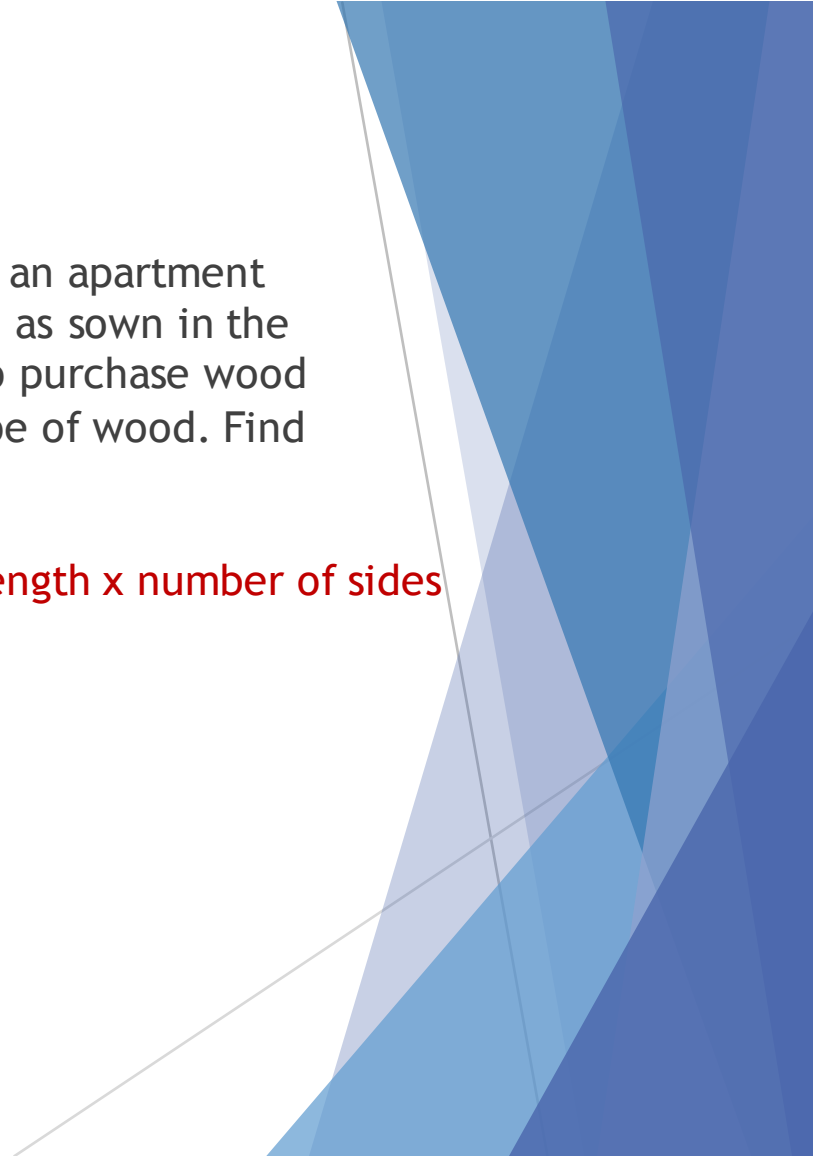


$$\text{Area} = .5 \times \text{apothem} \times \text{side length} \times \text{number of sides}$$

$$\text{Area} = .5 \times 12 \times 10 \times 8$$

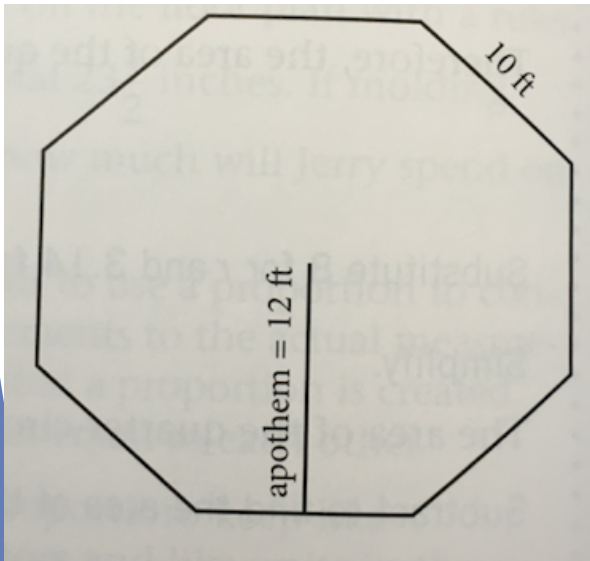
$$\text{Area} = .5 \times 12 \times 10 \times 8$$

$$\text{Area} = 480$$



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$$\text{Cost} = \text{area} \times \text{price}$$

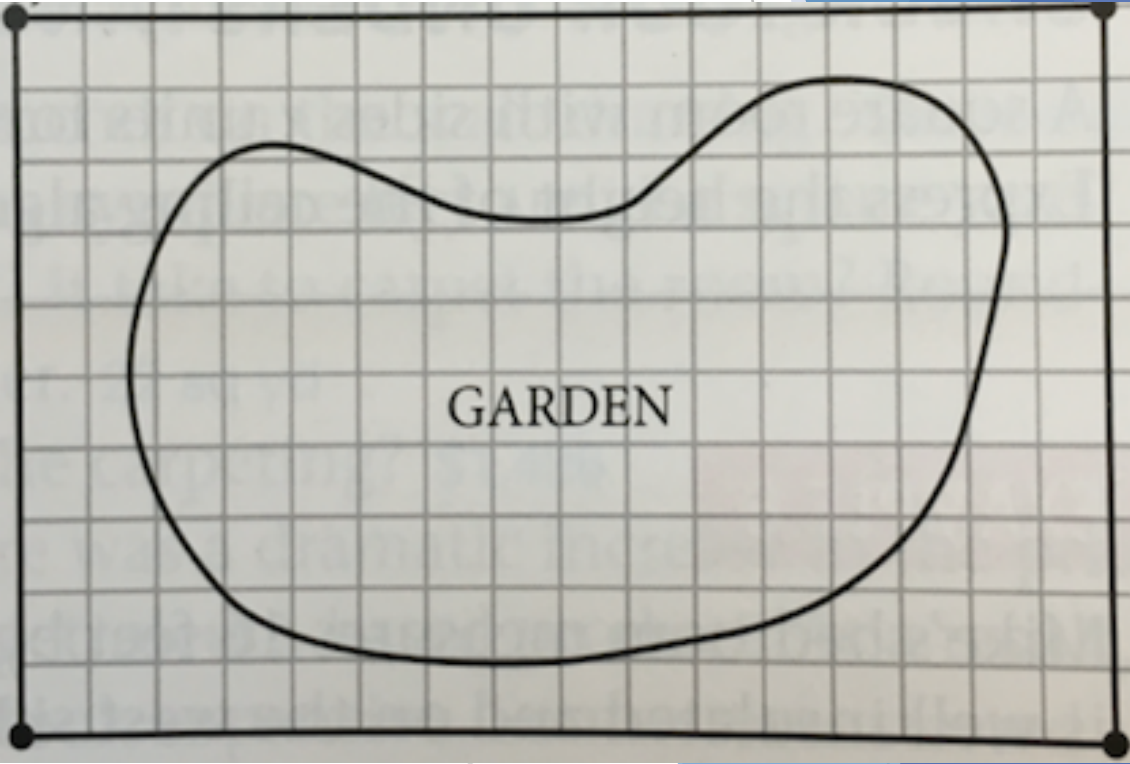
$$\text{Cost} = 480 \times \$14$$

$$\text{Cost} = \$6,720$$



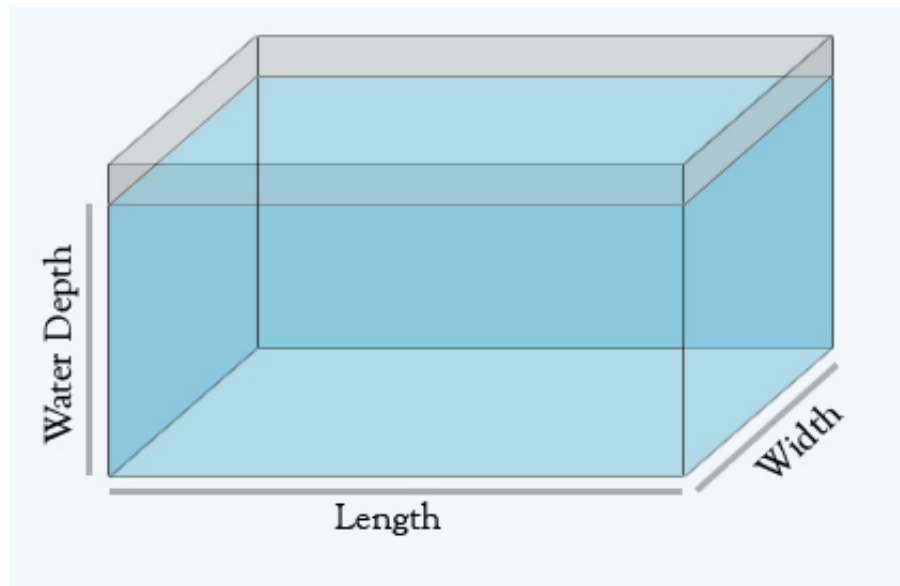
Example 4:

Estimate the area of the irregular-shaped garden in the diagram below.



Volume

- ▶ **Volume** is the amount of space inside a three-dimensional region, such as a room.
- ▶ Volume is measured in **cubic** units (such as cubic feet or cubic inches).



Example 5:

Find the volume of a room 14 feet by 16 feet with an 8-foot ceiling.

Volume = length x width x height

$$= 14 \times 16 \times 8$$

$$= 1,792 \text{ ft}^3$$



Cooling off your space

- ▶ Air conditioners are sold according to their BTU (British Thermal Units) rating. An air conditioner whose BTU corresponds with the size of the room will adequately cool and dehumidify the room.
- ▶ If a rating is too low for a room, the air conditioner won't sufficiently cool it off. If it's too high, it may shut off before removing the humidity.



- ▶ Many appliance salespeople use the formula known as “while divided by 60” to compute the correct BTU rating for the room. This formula uses the dimensions of the room as well as the direction the exterior wall faces.

- ▶ The formula is:

$$\text{BTU rating} \approx \frac{w.h.l.e.}{60}$$

w: width of room

h: height of room

i: level of insulation (lower number = better insulated)

l: length of room

e: exposure (direction the exterior wall faces)

north = 16
west = 20 east = 17
south = 18



Example 6:

Mike's bedroom measure's 16 feet by 14 feet and has a 9-foot ceiling. It is well insulated (level 10) and on the west side of the house. How large of an air conditioner should he purchase?

$$w = 16 \text{ ft}$$

$$h = 9 \text{ ft}$$

$$i = 10$$

$$l = 14 \text{ ft}$$

$$e = 20$$

$$\text{BTU rating} \approx \frac{w.h.l.e.}{60}$$

$$\approx \frac{16 \times 9 \times 10 \times 14 \times 20}{60}$$

$$\approx \frac{16 \times 9 \times 10 \times 14 \times 20}{60}$$

$$\approx \frac{403,200}{60}$$

$$\approx 6,720 \text{ BTUs}$$