

Example 1 Convert Between SI Units for Area

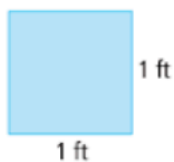


An art class is creating a mural mosaic. They know that future art classes will have to contribute to the project to complete it. Each person in the class makes a painting on a 15-cm by 15-cm panel. Then, all the panels are assembled into the mural mosaic. There are 25 students in the art class, so the panels they create will be assembled into a square with each side containing five panels. What area is required for this part of the mural?

Example 2 Work With Units for Area

Tiles imported from different countries sometimes have imperial dimensions. A tile layer may need to convert from square feet to square centimetres.

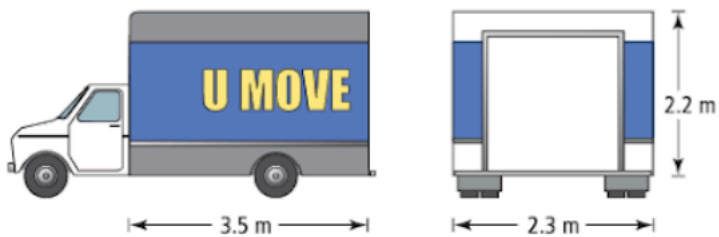
One type of floor tiles is sold in squares measuring 1 ft by 1 ft.



- What is the area of one tile in square centimetres?
- The tile layer is working with an area that measures 8 ft by 4 ft. What is the area, to the nearest hundredth of a square centimetre? to the nearest square metre?

Example 3 Work With Units for Volume

Sahid has numerous boxes to load onto a moving truck.



What is the volume of the truck, to the nearest cubic foot?

2.1 Units of Area and Volume

$$1. \text{ tiles} \rightarrow 15 \text{ cm} \times 15 \text{ cm} = 225 \text{ cm}^2$$

$$\begin{aligned} \text{total} &\rightarrow \# \text{ of tiles} \times A_1 \\ &= 25 \times 225 \\ &= 5625 \text{ cm}^2 \end{aligned}$$

The total area of the mosaic mural is 5625 cm^2 .

$$2. a) 100 \text{ cm} = 3.281 \text{ ft}$$

$$\begin{array}{r} 100 \text{ cm} \\ \times \\ \hline 3.281 \text{ ft} \end{array} \quad \begin{array}{r} x \\ \times \\ \hline 1 \text{ ft} \end{array}$$

$$x = 30.5 \text{ cm}$$

$$\begin{aligned} A &= lw \\ &= (30.5)^2 \\ &= 928.9 \text{ cm}^2 \\ &\rightarrow 929 \text{ cm}^2 \end{aligned}$$

$$\begin{aligned} b) \quad l &= 8 \times \text{length of 1 tile} \\ &= 8 \times 30.5 \\ &= 243.8 \text{ cm} \end{aligned}$$

$$\begin{aligned} w &= 4 \times \text{width of 1 tile} \\ &= 4 \times 30.5 \\ &= 121.9 \text{ cm} \end{aligned}$$

$$\begin{aligned} A &= lw \rightarrow 243.8 \times 121.9 \\ &= 29726 \text{ cm}^2 \end{aligned}$$

$$\begin{aligned} 100 \text{ cm} &= 1 \text{ m} \\ (100)^2 &= 1 \text{ m}^2 \\ 10000 \text{ cm} &= 1 \text{ m}^2 \end{aligned}$$

$$\text{Square meters} = \frac{29726 \text{ cm}^2}{10000 \text{ cm}^2} = 2.9 \rightarrow 3 \text{ m}^2$$

$$3. \quad 1 \text{ m} = 3.281 \text{ ft}$$

$$l = 3.5 \text{ m}$$

$$w = 2.3 \text{ m}$$

$$h = 2.2 \text{ m}$$

$$\begin{array}{r} 1 \text{ m} \\ \times \\ \hline 3.281 \text{ ft} \end{array} \quad \begin{array}{r} = 3.5 \\ \times \\ \hline l \end{array}$$

$$\begin{array}{r} 1 \text{ m} \\ \times \\ \hline 3.281 \text{ ft} \end{array} \quad \begin{array}{r} = 2.3 \\ \times \\ \hline w \end{array}$$

$$\begin{array}{r} 1 \text{ m} \\ \times \\ \hline 3.281 \text{ ft} \end{array} \quad \begin{array}{r} = 2.2 \\ \times \\ \hline h \end{array}$$

$$Q = 11.4835$$

$$w = 7.5463$$

$$h = 7.2182$$

$$\begin{aligned} V &= lwh \rightarrow 11.4835 \times 7.5463 \times 7.2182 \\ &= 625.5 \rightarrow 626 \text{ ft}^3 \end{aligned}$$

