

1. a) Convert 7 yd. to:
i) feet ii) inches
b) Convert 62 in. to:
i) feet and inches
ii) yards, feet, and inches

Solution

- a) i) Since 1 yd. = 3 ft., to convert yards to feet multiply by 3.
 $7 \text{ yd.} = 7(3 \text{ ft.})$
 $7 \text{ yd.} = 21 \text{ ft.}$
- ii) Since 7 yd. = 21 ft. and 1 ft. = 12 in., to convert feet to inches multiply by 12.
 $7 \text{ yd.} = 21(12 \text{ in.})$
 $7 \text{ yd.} = 252 \text{ in.}$
- b) i) Since 12 in. = 1 ft., to convert inches to feet, divide by 12.
 $62 \text{ in.} = \frac{62}{12} \text{ ft.}$ Write this improper fraction as a mixed number.
 $62 \text{ in.} = 5\frac{2}{12} \text{ ft.}$
 $62 \text{ in.} = 5 \text{ ft. } 2 \text{ in.}$
- ii) $62 \text{ in.} = 5 \text{ ft. } 2 \text{ in.}$
Since 3 ft. = 1 yd.
 $5 \text{ ft.} = 1 \text{ yd. } 2 \text{ ft.}$
and $62 \text{ in.} = 1 \text{ yd. } 2 \text{ ft. } 2 \text{ in.}$

2. Ben buys baseboard for a bedroom. The perimeter of the bedroom, excluding closets and doorway, is 37 ft.
- What length of baseboard is needed, in yards and feet?
 - The baseboard material is sold by the yard. It costs \$5.99/yd. What is the cost of material before taxes?

Solutions**a) Method 1**

To convert feet to yards, divide by 3.

$$37 \text{ ft.} = \frac{37}{3} \text{ yd.}$$

$$37 \text{ ft.} = 12\frac{1}{3} \text{ yd.}$$

So, 37 ft. = 12 yd. 1 ft.

The length of baseboard needed is 12 yd. 1 ft.

Method 2

Use a proportion. Let x represent the length in yards.

The ratio of x yards to 37 ft. is equal to the ratio of 1 yd. to 3 ft.

Write a proportion.

$$\frac{x}{37} = \frac{1}{3} \quad \text{Multiply each side by 37.}$$

$$37\left(\frac{x}{37}\right) = 37\left(\frac{1}{3}\right)$$

$$x = \frac{37}{3}$$

$$x = 12\frac{1}{3}$$

$12\frac{1}{3}$ yd. is 12 yd. 1 ft.

The length of the baseboard needed is 12 yd. 1 ft.

- b)** The length of baseboard needed is greater than 12 yd., so Ben must buy 13 yd. of baseboard material.

The cost, C , is:

$$C = 13(\$5.99)$$

$$C = \$77.87$$

Before taxes, the materials will cost \$77.87.

Lesson 1.1 Check Your Understanding

3. Tyrell has 4 yd. of cord to make friendship bracelets.
Each bracelet needs 8 in. of cord.
- How many bracelets can Tyrell make?
 - Use unit analysis to check the conversions.

Solution

- a) Since the length of a bracelet is measured in inches, convert the length of the material to inches.

Convert 4 yd. to inches.

$$1 \text{ yd.} = 3 \text{ ft.}$$

So,

$$4 \text{ yd.} = 4(3 \text{ ft.})$$

$$4 \text{ yd.} = 12 \text{ ft.}$$

$$1 \text{ ft.} = 12 \text{ in.}$$

So,

$$12 \text{ ft.} = 12(12 \text{ in.})$$

$$12 \text{ ft.} = 144 \text{ in.}$$

$$\text{The number of bracelets is: } \frac{144}{8} = 18$$

Tyrell can make 18 bracelets.

- b) To convert yards to inches, first convert yards to feet, then convert feet to inches.
Write a conversion factor for yards and feet,

$$\text{with feet in the numerator: } \frac{3 \text{ ft.}}{1 \text{ yd.}}$$

Write a conversion factor for feet and inches,

$$\text{with inches in the numerator: } \frac{12 \text{ in.}}{1 \text{ ft.}}$$

$$\begin{aligned} \text{Then, } 4 \text{ yd.} \times \frac{3 \text{ ft.}}{1 \text{ yd.}} \times \frac{12 \text{ in.}}{1 \text{ ft.}} &= \frac{4 \cancel{\text{yd.}}}{1} \times \frac{3 \cancel{\text{ft.}}}{1 \cancel{\text{yd.}}} \times \frac{12 \text{ in.}}{1 \cancel{\text{ft.}}} \\ &= (4 \times 3 \times 12) \text{ in.} \\ &= 144 \text{ in.} \end{aligned}$$

Since this measurement is equal to the measurement in part a, the conversion is verified.

4. On the map with a scale of 1:4 750 000, the distance between Seward and Anchorage in Alaska is $1\frac{3}{4}$ in. What is the distance between these two towns to the nearest mile?

Solution

The map scale is 1 in. represents 4 750 000 in.

$1\frac{3}{4}$ in. represents

$$1\frac{3}{4}(4\,750\,000\text{ in.}) = 8\,312\,500\text{ in.}$$

Divide by 12 to convert 8 312 500 to feet:

$$\frac{8\,312\,500}{12} = 692\,708.\bar{3}$$

Divide by 5280 to convert $692\,708.\bar{3}$ ft. to miles:

$$\frac{692\,708.\bar{3}}{5280} = 131.1947\dots$$

The distance between Seward and Anchorage is approximately 131 mi.