




1.1 Imperial Measures of Length

Imperial Unit	Abbreviation	Referent	Relationship Between Units
Inch	in.	Thumb length 	
Foot	ft.	Foot length 	1 ft. = 12 in.
Yard	yd.	Arm span 	1 yd. = 3 ft. 1 yd. = 36 in.
Mile	mi.	Distance walked in 20 minutes	1 mi. = 1760 yd. 1 mi. = 5280 ft. 1 mi. = 63 360 in.

Example: Convert the following to inches:

$$a) 3 \text{ ft.} \times \frac{12 \text{ in.}}{1 \text{ ft.}}$$

$$= 36 \text{ in.}$$

$$b) 9 \text{ yd.} \times \frac{36 \text{ in.}}{1 \text{ yd.}}$$

$$= 324 \text{ in.}$$

$$c) 5 \text{ ft. } 6 \text{ in.}$$

$$5 \text{ ft.} \times \frac{12 \text{ in.}}{1 \text{ ft.}} + 6 \text{ in.}$$

$$= 66 \text{ in.}$$

Example: Convert the following to feet:

$$a) 4 \text{ yd.} \times \frac{3 \text{ ft.}}{1 \text{ yd.}}$$

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

$$b) 2 \text{ mi.} \times \frac{5280 \text{ ft.}}{1 \text{ mi.}}$$

$$= 10\,560 \text{ ft.}$$

$$c) 40 \text{ in.} \times \frac{1 \text{ ft.}}{12 \text{ in.}}$$

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

Example: Convert the following to yards:

$$a) 3 \text{ mi.} \times \frac{1760 \text{ yd.}}{1 \text{ mi.}}$$

$$= 5280 \text{ yd.}$$

$$b) 20 \text{ ft.} \times \frac{1 \text{ yd.}}{3 \text{ ft.}}$$

$$= 6 \frac{2}{3} \text{ yd.}$$

Example: Add.

a) $2 \text{ ft. } 7 \text{ in.}$
 $+ 3 \text{ ft. } 6 \text{ in.}$

$= 5 \text{ ft } 13 \text{ in}$
 $= 5 \text{ ft} + \underbrace{12 \text{ in}} + 1 \text{ in}$
 $= 6 \text{ ft } 1 \text{ in.}$

b) $5 \text{ yd. } 2 \text{ ft.}$
 $+ 2 \text{ yd. } 2 \text{ ft.}$

$7 \text{ yd. } 4 \text{ ft.}$
 $= 7 \text{ yd. } \underbrace{3 \text{ ft}} + 1 \text{ ft.}$
 $= 8 \text{ yd. } 1 \text{ ft.}$

Example: Subtract.

a) $4 \text{ ft. } 3 \text{ in.}$
 $- 2 \text{ ft. } 6 \text{ in.}$

$2 \text{ ft } 3 \text{ in.}$
 $- 6 \text{ in.}$

 $2 \text{ ft} - 3 \text{ in.}$
 $1 \text{ ft} + 12 \text{ in.} - 3 \text{ in.}$
 $= 1 \text{ ft. } 9 \text{ in.}$

b) 5 yd.
 $- 3 \text{ yd. } 1 \text{ ft.}$

$2 \text{ yd} - 1 \text{ ft.}$
 $= 1 \text{ yd.} + 3 \text{ ft.} - 1 \text{ ft.}$
 $= 1 \text{ yd. } 2 \text{ ft.}$

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

$1\frac{3}{4} \text{ in.} = 1.75 \text{ in.}$

$1.75 \times 4750000 = 8312500 \text{ in} \times \frac{1 \text{ mi.}}{63360 \text{ in.}}$
 $= 131 \text{ mi.}$

Example: Ben buys baseboard for a bedroom. The perimeter of the bedroom, excluding closets and doorway, is 37 ft.

a) What length of baseboard is needed, in yards and feet?

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

b) The baseboard material is sold by the yard. It costs \$5.99/yd. What is the cost of material before taxes?

You have to buy 13 yards.

$13 \times \$5.99$
 $= \$77.87$