

Expressing Area in Different Units

Metric

Linear Measure	Area Measure (square units)
1 km = 1000 m	1 km ² = (1000 m x 1000 m) = 1 000 000 m ²
1 hm = 100 m	1 hm ² = (100 m x 100 m) = 10 000 m ² **
1 dam = 10 m	1 dam ² = (10 m x 100m) = 100 m ²
1 m (base unit)	1 m ² (base unit)
1 dm = 0.1 m 1 m = 10 dm	1 dm ² = (0.1 m x 0.1 m) = 0.01 m ²
1 cm = 0.01 m 1 m = 100 cm	1 cm ² = (0.01 m x 0.01 m) = 0.0001 m ²
1 mm = 0.001 m 1 m = 1000 mm	1 mm ² = (0.001 m x 0.001 m) = 0.000 001 m ²

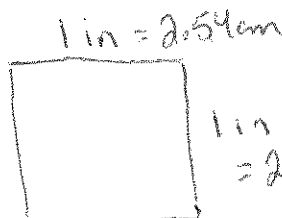
**1 hm² (square hectometer) = 1 ha (hectare)

Imperial Units

Linear Measure	Area Measure (square units)
1 ft = 12 in	1 ft ² = (12 in x 12 in) = 144 in ²
1 yd = 3 ft	1 yd ² = (3 ft x 3 ft) = 9 ft ²
1 mi = 1780 yd	1 mi ² = (1780 yd x 1780 yd) = 3 097 600 yd ²
1 mi = 5280 ft	1 mi ² = (5280 ft x 5280 ft) = 27878400 ft ²

Metric to Imperial

Linear Measure	Area Measure (square units)
1 in = 2.54 cm	1 in ² = (2.54 cm x 2.54 cm) = 6.45 cm ²
1 ft = 30.48 cm	1 ft ² = (30.48 cm x 30.48 cm) = 929.03 cm ²
1 yd = 0.9144 m	1 yd ² = (0.9144 m x 0.9144 m) = 0.84 m ²
1 mi = 1.609 km	1 mi ² = (1.609 km x 1.609 km) = 2.59 km ²



$$\begin{aligned}
 1 \text{ in} &= A = l \times w \\
 &= 1 \text{ in} \times 1 \text{ in} \\
 &= 1 \text{ in}^2
 \end{aligned}$$

$$\begin{aligned}
 A &= l \times w \\
 &= 2.54 \times 2.54 \\
 &= 6.45 \text{ cm}^2
 \end{aligned}$$

Setting up conversion problems: This method works for ALL conversion problems!

1. Set up a proportion with equivalent fractions.

$$\frac{\quad}{\quad} = \frac{\quad}{\quad}$$

First Fraction:
values from data
table

Second Fraction:
values from
question
(known/unknown)
x

Match units in numerators and denominators

Example:

Convert 349 in^2 to cm^2

$$\frac{1 \text{ in}^2}{6.45 \text{ cm}^2} = \frac{349 \text{ in}^2}{x \text{ cm}^2}$$

$$6.45 \times 349 \div 1 = 2251.05 \text{ cm}^2$$

Practice:

$234 \text{ m}^2 = ? \text{ yd}^2$

$$\frac{0.84 \text{ m}^2}{1 \text{ yd}^2} = \frac{234 \text{ m}^2}{x \text{ yd}^2}$$

$$1 \times 234 \div 0.84 = 278.57 \text{ yd}^2$$

$150 \text{ cm}^2 = ? \text{ in}^2$

$$\frac{6.45 \text{ cm}^2}{1 \text{ in}^2} = \frac{150 \text{ cm}^2}{x \text{ in}^2}$$

$$1 \times 150 \div 6.45 = 23.25 \text{ in}^2$$

$0.55 \text{ ft}^2 = ? \text{ cm}^2$

$$\frac{1 \text{ ft}^2}{929.03 \text{ cm}^2} = \frac{0.55 \text{ ft}^2}{x \text{ cm}^2}$$

$$929.03 \times 0.55 \div 1 = 510.97 \text{ cm}^2$$

$32.4 \text{ km}^2 = ? \text{ mi}^2$

$$\frac{2.59 \text{ km}^2}{1 \text{ mi}^2} = \frac{32.4 \text{ km}^2}{x \text{ mi}^2}$$

$$1 \times 32.4 \div 2.59 = 12.50 \text{ mi}^2$$

$$(1 \text{ mi})^2 (1.609 \text{ km})^2$$

Assignment PG 103 # 1-3