

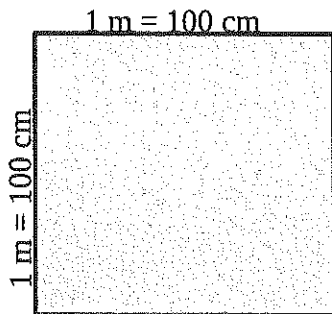
Chapter 4: Area Measurement

Name: _____

Relating Area Units

The relationship between square units is not the same as the relationships between linear measures.

Linear Measure: 1 m = 100 cm



$$A_{\text{square}} = l \times w$$

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$$A_{\text{square}} = 1 \text{ m} \times 1 \text{ m}$$

$$A_{\text{square}} = 100 \text{ cm} \times 100 \text{ cm}$$

$$A_{\text{square}} = \underline{1 \text{ m}^2}$$

$$A_{\text{square}} = \frac{10000 \text{ cm}^2}{(100^2)}$$

Area Measure: 1 m² = 10 000 cm²

Metric

Linear Measure	Area Measure (square units)
1 km = 1000 m	1 km ² = (1000 m × 1000 m) = <u>1 000 000</u> m ²
1 hm = 100 m	1 hm ² = (100 m × 100 m) = <u>10 000</u> m ² **
1 dam = 10 m <i>decameter</i>	1 dam ² = (10 m × 10 m) = <u>100</u> m ²
1 m (base unit)	1 m ² (base unit)
1 dm = 0.1 m <i>decimeters</i> 1 m = 10 dm	1 dm ² = (0.1 m × 0.1 m) = <u>0.01</u> m ²
1 cm = 0.01 m 1 m = 100 cm	1 cm ² = (0.01 m × 0.01 m) = <u>0.0001</u> m ²
1 mm = 0.001 m 1 m = 1000 mm	1 mm ² = (0.001 m × 0.001 m) = <u>0.000001</u> 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 × 12 in) = <u>144</u> in ²
1 yd = 3 ft	1 yd ² = (3 ft × 3 ft) = <u>9</u> ft ²
1 mi = 1760 yd	1 mi ² = (1760 yd × 1760 yd) = <u>3 097 600</u> yd ²
1 mi = 5280 ft	1 mi ² = (5280 ft × 5280 ft) = <u>2 787 8400</u> ft ²

Example: Convert the following area measurements

1. $23 \text{ km}^2 = ? \text{ m}^2$

$$\frac{1 \text{ km}^2}{1000000 \text{ m}^2} = \frac{23 \text{ km}^2}{x \text{ m}^2}$$

$$= 23000000 \text{ m}^2$$

2. $4235690 \text{ m}^2 = ? \text{ hm}^2$

$$\frac{10000 \text{ m}^2}{1 \text{ hm}^2} = \frac{4235690 \text{ m}^2}{x \text{ hm}^2}$$

$$= 423.569 \text{ hm}^2$$

3. $102087878 \text{ cm}^2 = ? \text{ m}^2$

$$\frac{1 \text{ cm}^2}{0.0001 \text{ m}^2} = \frac{102087878 \text{ cm}^2}{x \text{ m}^2}$$

$$= 10208.7878 \text{ m}^2$$

4. $0.000342 \text{ m}^2 = ? \text{ mm}^2$

$$\frac{0.000001 \text{ m}^2}{1 \text{ mm}^2} = \frac{0.000342 \text{ m}^2}{x \text{ mm}^2}$$

$$= 342 \text{ mm}^2$$

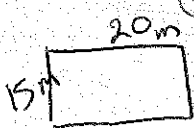
5. $17 \text{ dm}^2 = ? \text{ cm}^2$

$$\frac{1 \text{ dm}^2}{0.01 \text{ m}^2} = \frac{17 \text{ dm}^2}{x \text{ m}^2} = 0.17 \text{ m}^2$$

$$\frac{0.0001 \text{ m}^2}{1 \text{ cm}^2} = \frac{0.17 \text{ m}^2}{x \text{ cm}^2} = 1700 \text{ cm}^2$$

Practice:

1. How many square meters is a yard with dimensions 15 m by 20 m? Express this area in square decameters. (dam^2)



$$A = l \times w$$

$$A = 20 \times 15$$

$$A = 300 \text{ m}^2$$

$$\frac{100 \text{ m}^2}{1 \text{ dam}^2} = \frac{300 \text{ m}^2}{x \text{ dam}^2}$$

$$= 3 \text{ dam}^2$$

2. A driveway measures 600 square feet. The cost to pave the driveway is \$12.25 per square yard. How much will this job cost?

$$\frac{9 \text{ ft}^2}{1 \text{ yd}^2} = \frac{600 \text{ ft}^2}{x \text{ yd}^2} = 66.66 \dots \text{ yd}^2$$

$$= 66.66 \text{ yd}^2 \times \$12.25 / \text{yd}^2$$

$$= \$816.67$$

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3. The corn maze and Pendray Farms is 2.4 hectares in area. What is this area in square meters?

$$2.4 \text{ ha} = 2.4 \text{ hm}^2$$

$$\frac{1 \text{ hm}^2}{10000 \text{ m}^2} = \frac{2.4 \text{ hm}^2}{x \text{ m}^2}$$

$$= 24000 \text{ m}^2$$