Mathematics 10C

Unit M: Measurement and trigonometry

Proportional conversions between SI and imperial units

A six-foot fence

- The fence is 6 ft tall.
- The gate hardware is marked in centimetres.
- The same height needs both names.

Equal lengths, two names

- The length 1 ft is the same object as 12 in.
- The length 1 in is the same object as 2.54 cm.

Key terms

proportion

A statement that two ratios are equal, used here to change a measurement from one unit to another. ($\frac{a}{b} = \frac{c}{d}$)

conversion factor

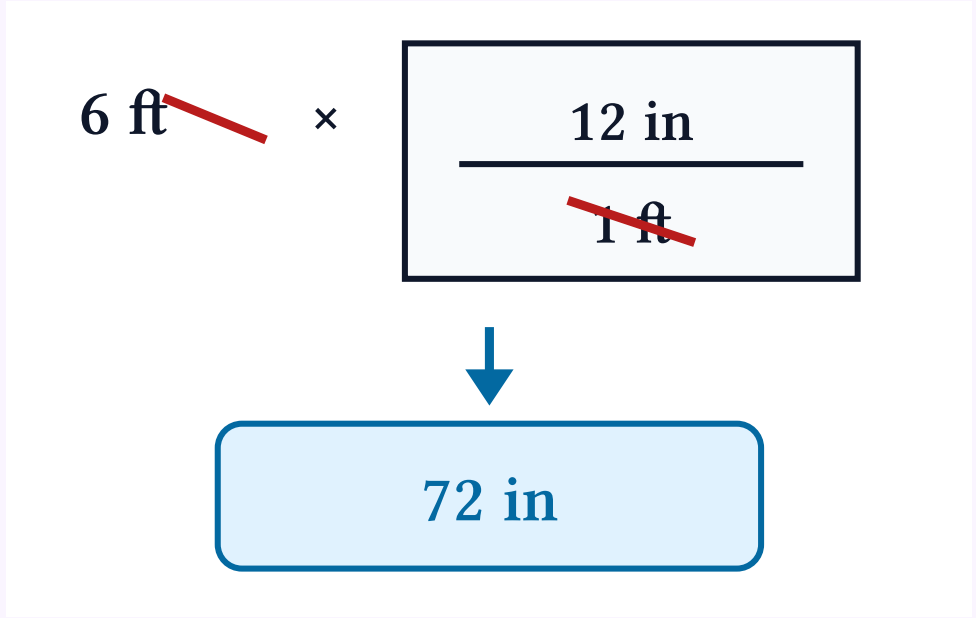
A ratio of equal lengths written in two units, arranged so the unwanted unit cancels. ($\frac{2.54\ \text{cm}}{1\ \text{in}}$)

unit analysis

A check that multiplies quantities with their units and simplifies the units that remain. (units cancel in a product)

Feet into inches

- Start with 6 ft.
- Multiply by 12 in⁄1 ft.
- The feet cancel and 72 in remain.



Inches into centimetres

- Start with 72 in.
- Multiply by 2.54 cm⁄1 in.
- The product is 182.88 cm.

Two steps in one line

- The fence is 6 ft.
- The chain is 12 in⁄1 ft, then 2.54 cm⁄1 in.
- The height is 182.88 cm.

6 ft fence

× 12 in/ft

× 2.54 cm/in

Miles into kilometres

- The sign says 2 mi.
- Use the rounded factor 1 mi = 1.609 km.
- The product is 3.218 km.

2 mi sign

2 × 1.609 km/mi

≈ 3.22 km

Which way the count moves

- Changing to a smaller unit raises the count.
- Changing to a larger unit lowers the count.

Count moves opposite size

Smaller unit → bigger number

Larger unit → smaller number

A 3-yard panel

- The panel is 3 yd wide.
- Use 3 ft⁄1 yd, then 12 in⁄1 ft.
- The width is 108 in.

Quick check

- Convert 5 ft to centimetres.
- Use 12 in = 1 ft and 2.54 cm = 1 in.

Conversion factors

- Write the length as a fraction over 1.
- Multiply by a factor that equals one length.