

Converting between units

Starter

1. **(Review of last lesson)** John is telling a friend that he had a lorry load of top soil delivered for his garden. He says that he had about 4 cubic metres delivered and that, with VAT, he paid about £80. The volume is given to the nearest cubic metre. The cost is given to the nearest £5. Find the maximum price that John could have paid for one cubic metre of top soil.

Working:

$$3.5 \leq \text{soil} < 4.5$$

$$77.50 \leq \text{cost} \leq 82.49$$

$$\text{Upper bound (cost)} = \frac{82.49}{3.5} \approx \text{£}23.568\dots = \text{£}23.57.$$

The maximum price of one cubic metre of top soil is £23.57.

E.g. 1 Copy and complete:

- | | | | |
|-----|--------------------------------|-----|---------------------------------|
| (a) | 50000 mm \equiv _____ km | (b) | 2.69 km \equiv _____ cm. |
| (c) | 7 gallons \equiv _____ pints | (d) | 3.5 miles \equiv _____ yards. |
| (e) | 40 ounces \equiv _____ lb | (f) | 8 st 9 lb \equiv _____ lb |

Working:

(a) 50000 mm \equiv 5000 cm \equiv 50 m \equiv 0.05 km

(b) 2.69 km \equiv 2690 m \equiv 269000 cm

(c) 7 gallons \equiv $7 \times 8 = 56$ pints

(d) 3.5 miles \equiv $3.5 \times 1760 = 6160$ yards.

(e) 40 ounces \equiv $\frac{40}{16} = 2.5$ lb

(f) 8 st 9 lb \equiv $8 \times 14 + 9 = 121$ lb

E.g. 2 Find the percentage decrease in mass when the imperial ton become the metric tonne.

Working:

Metric: 1 tonne \equiv 1000 kg \approx $1000 \times 2.2 = 2200$ lb

Imperial: 1 ton \equiv 2240 lb

$$\text{Percentage decrease} = \frac{\text{Difference}}{\text{Original}} \times 100\%$$

$$= \frac{2240 - 2200}{2240} \times 100\%$$

$$= 1.79\% \text{ (3 s.f.)}$$

E.g. 3 Copy each statement and fill in the missing numbers:

- (a) 4.5 feet \approx _____ cm (b) 12 gallons \approx _____ litres
(c) 750 litres \approx _____ pints (d) 30 km \approx _____ miles
(e) 50 cm \approx _____ inches (f) 70 mph \approx _____ km/h

- Working:**
- (a) 6.7 feet $\approx 6.7 \times 30 = 201$ cm
- (b) 12 gallons $\approx 4.5 \times 12 = 54$ litres
- (c) 750 litres $\approx \frac{750}{1.8} = 416.\dot{6}$ pints
- (d) 30 km $\approx \frac{30}{1.6} = 18.75$ miles
- (e) 50 cm $\approx \frac{50}{2.5} = 20$ inches
- (f) 70 mph $\approx 70 \times 1.6 = 112$ km/h

E.g. 4 A car's petrol consumption is 55 miles per gallon. How far, in kilometres, could it travel if the capacity of its petrol tank is 40 litres? Give your answer to the nearest km.

Working: 40 litres $\approx \frac{40}{4.5}$ gallons

N.B. Do not round half way through a question.

$$\text{Distance travelled in miles} \approx \frac{40}{4.5} \times 55 = \frac{4400}{9}$$

$$\text{Distance travelled in miles} \approx \frac{4400}{9} \times 1.6 = 782 \text{ km}$$

Video: [Length conversions \(metric to imperial\)](#)

Video: [Mass conversions \(metric to imperial\)](#)

Video: [Capacity conversions \(metric to imperial\)](#)

[Solutions to Starter and E.g.s](#)

Exercise

- 9-1 class textbook: p306 M10.1 Qu 1-9 odd; p308 M10.2 Qu 1-11 odd
A*-G class textbook: p268 M10.1 Qu 1-10 odd; p270 M10.2 Qu 1-14 odd
9-1 homework book: p102 M10.1 Qu 1, 2ace..., 3-6; p103 M10.2 Qu 1ace..., 2-7
A*-G homework book: p74 M10.1 Qu 1ace..., 2-6, 7ace; p75 M10.2 Qu 1-5