

Linear Conversion

Starter

1. **(Review of last lesson)** Bronze is a metal alloy which for one purpose contains copper and tin in the ratio 3 : 22 by mass. What mass of copper is needed to make 5 kg of this bronze?

Working:

$$5 \text{ kg} \equiv 5000 \text{ g}$$

$$3 + 22 = 25 \text{ parts}$$

$$1 \text{ part} = \frac{5000}{25} = 200 \text{ g}$$

$$\text{Mass of copper} = 3 \times 200 = 600 \text{ g}$$

2. Jack and Mary have sweets in the ratio 3 : 4. If Jack eats 2 sweets the ratio becomes 2 : 3. Find how many sweets Jack and Mary originally had.

Working:

The ratio is 3 : 4.
 Let Jack have $3x$ sweets and Mary have $4x$ sweets.
 Jack eats 2 sweets: Jack now has $3x - 2$ sweets.
 The ratio $3x - 2 : 4x$ is equivalent to the ratio 2 : 3

$$\text{So } \frac{3x - 2}{2} = \frac{4x}{3}$$

Cross-multiply $3(3x - 2) = 2 \times 4x$
 Expand the brackets $9x - 6 = 8x$
 $x = 6$

Jack = $3x = 3 \times 6 = 18$ sweets
 Mary = $4x = 4 \times 6 = 24$ sweets

3. If £1 is worth \$1.30, convert: (a) £18 to dollars (b) \$60 to pounds

Working:

(a) £1 is worth \$1.30 so £18 is worth $18 \times 1.30 = \$23.40$
or
 $\text{£}1 \equiv \$1.30$
 $\text{£}18 \equiv 18 \times 1.30 = \23.40

(b) $\$60 \equiv 60 \div 1.30 = \text{£}46.15$
or
 $\$1.30 \equiv \text{£}1$
 Dividing by 1.30 gives $\$1 \equiv \text{£} \frac{1}{1.30}$
 So $\$60 \equiv \text{£}60 \times \frac{1}{1.30} = \text{£}46.15$

- E.g. 1** Given that £1 = \$1.33 and \$1 = €1.21, convert: (a) £500 to € (b) €2500 to £.

Working:

(a) $\text{£}500 \equiv 500 \times 1.33 = \665
 $\$665 \equiv 665 \times 1.21 = 804.65$ euros

(b) $\text{€}2500 \equiv \$ \frac{2500}{1.21}$ *leave as a fraction to avoid rounding errors*
 $\$ \frac{2500}{1.21} \equiv \frac{\frac{2500}{1.21}}{1.33} = \text{£}1553.47$

E.g. 2 There are 16 oz (ounces) to 1 lb (pound), and 2.2 lb in kg. Convert 1.5 kg to ounces.

Working: $1.5 \text{ kg} \equiv 1.5 \times 2.2 \text{ lb} \equiv 1.5 \times 2.2 \times 16 \text{ oz} = 52.8 \text{ oz}$

E.g. 3* Janet is on a business trip to Paris then New York. She exchanges £700 to Euros at a rate of € 1 = £0.88. In Paris she spends €340 and then exchanges the remaining euros to dollars at a rate of €1 = \$1.15. How many dollars did she have to spend in New York?

Working: $£700 \equiv \frac{700}{0.88} \text{ euros}$ *leave as a fraction to avoid rounding errors*

In Paris she spent €340: she now has € $\left(\frac{700}{0.88} - 340 \right)$ left

She converted this amount to \$: $\left(\frac{700}{0.88} - 340 \right) \times 1.15 = \$ 523.77$

Video: [Conversion graphs](#)

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

Exercise

p122 Ex 7.4 Qu 1-10

[Textbook answers \(only available during a lockdown\)](#)