

Ratio

Word Problems

Example

Desmond collected some Australian and American stamps. The number of Australian stamps was thrice the number of American stamps. If he gave away 186 Australian stamps and 50 American stamps, $\frac{2}{3}$ of his stamps left would be Australian stamps. How many more Australian stamps than American stamps had he?

Solution:

Before

Australian stamps : American stamps

3 u

1 u

(− 186)

(− 50)

After

Australian stamps : American stamps

2 p

1 p

Australian stamps $\rightarrow \frac{2}{3}$

American stamps $\rightarrow \frac{1}{3}$

$\frac{2}{3} \rightarrow 2 p$

$\frac{1}{3} \rightarrow 1 p$

Number of Australian stamps in units: $3 u - 186 = 2 p$ — Case 1

Number of American stamps in units: $1 u - 50 = 1 p$ — Case 2

Case 2 ($\times 2$):

$2 u - 100 = 2 p$ — Case 3

Case 1 = Case 3:

$3 u - 186 = 2 u - 100$

$3 u - 2 u = 186 - 100$

$1 u = 86$

Since Desmond had 1 u of American stamps, he had 86 American stamps.

Adapted:

Conquer Model Drawing for Upper Primary Levels

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We can now find the number of Australian stamps:

1 u \rightarrow 86 stamps

3 u \rightarrow ? stamps

$$86 \times 3 = 258$$

Lastly, we can find how many more Australian stamps than American stamps he had:

Australian stamps \rightarrow 258

American stamps \rightarrow 86

$$258 - 86 = 172$$

He had 172 more Australian stamps than American stamps.

Solve the following word problems using models or the unitary method.

Working

1 At first, Alvin and Kelvin had \$1550 and \$1200 respectively. They each bought the same karaoke set and their money left was in the ratio of 13 : 6. Find the cost of the karaoke set.

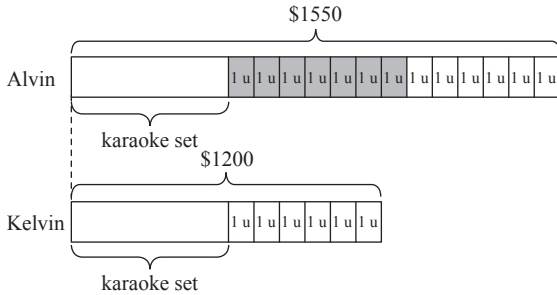
2 James made some chairs and tables in the ratio of 4 : 7. He gave $\frac{1}{5}$ of the chairs to Dave and $\frac{2}{3}$ of the tables to Roy. What was the ratio of the number of tables to the number of chairs given away?

Solutions:

Ratio

1. Amount of money (in units) left:

Alvin : Kelvin
13 6



Since Alvin and Kelvin each bought the same karaoke set, 7 u represents the difference between Alvin's and Kelvin's share. We can find the amount of money represented by 7 u:

$$7 \text{ u} \rightarrow \$1550 - \$1200 = \$350$$

Since 7 u represents \$350, we can find the amount of money represented by 1 u:

$$7 \text{ u} \rightarrow \$350$$

$$1 \text{ u} \rightarrow ?$$

$$\$350 \div 7 = \$50$$

Since 1 u represents \$50, we can now find the cost of the karaoke set. We can take Kelvin's model diagram as our reference:

Kelvin:

$$6 \text{ u} + \text{cost of the karaoke set} = \$1200$$

$$(\$50 \times 6 \text{ u}) + \text{cost of the karaoke set} = \$1200$$

$$\$300 + \text{cost of the karaoke set} = \$1200$$

$$\text{Cost of the karaoke set} = \$1200 - \$300$$

$$= \$900$$

The cost of the karaoke set was \$900.

2. chairs : tables
4 7

chairs $\left[\begin{array}{|c|c|c|c|} \hline 1 \text{ u} & 1 \text{ u} & 1 \text{ u} & 1 \text{ u} \\ \hline \end{array} \right] \times \frac{1}{5} \text{ to Dave}$

tables $\left[\begin{array}{|c|c|c|c|c|c|c|} \hline 1 \text{ u} & 1 \text{ u} & 1 \text{ u} & 1 \text{ u} & 1 \text{ u} & 1 \text{ u} & 1 \text{ u} \\ \hline \end{array} \right] \times \frac{2}{3} \text{ to Roy}$

$$\text{Fraction of chairs to Dave: } \frac{1}{5} \times 4 \text{ u} = \frac{4}{5}$$

$$\text{Fraction of tables to Roy: } \frac{2}{3} \times 7 \text{ u} = \frac{14}{3}$$

chairs : tables

$$\begin{array}{ccc} \frac{4 \times 3}{5 \times 3} & : & \frac{14 \times 5}{3 \times 5} \\ \frac{12}{15} & & \frac{70}{15} \\ \frac{12}{6} & \xrightarrow{\div 2} & \frac{70}{35} \\ 2 & & 2 \end{array}$$

The ratio of the number of tables to the number of chairs given away was 35 : 6.