

# Money 1

This class will show you how to deal with ratios, direct and indirect proportions as well as the relationship between speed, distance and time.

## Ratio

To express one quantity as a ratio of another

Step 1: Make sure both quantities are in the same unit.

Step 2: Remove the units and write the numbers as a ratio.

Step 3: Simplify if possible.

**Example 1** Express 30cm as a ratio of 3m

Step 1 Write both in cm. 3m = 300cm

Step 2 30 : 300

Step 3 1 : 10

**Example 2** Express 75c as a ratio of €1.50

$$€1.50 = 150c$$

$$75 : 150$$

$$1 : 2$$

## To divide a number in a given ratio

Step 1 Add the ratios.

Step 2 Divide the number by this total.

Step 3 Multiply the result in step 2 by each separate ratio.

**Example 3** Divide €360 in the ratio 4:5

$$4 + 5 = 9 \text{ parts in total.}$$

$$9 \text{ parts} = 360$$

$$1 \text{ part} = \frac{360}{9} = 40 \text{ can use the calculator here if need be.}$$

$$4 \text{ parts} = 40 \times 4 = 160$$

$$5 \text{ parts} = 40 \times 5 = 200$$

**Example 4** Divide 140m in the ratio  $\frac{2}{3} : \frac{1}{2}$

**Note** Must get a common denominator between the two fractions to express the ratio as whole numbers.

$$\frac{2}{3} : \frac{1}{2} = \frac{4}{6} : \frac{3}{6} \text{ now we can drop the common denominator}$$

We need to divide 140 in the ratio 4:3

$$7 \text{ parts} = 140$$

$$1 \text{ part} = 20$$

$$4 \text{ parts} = 80$$

$$3 \text{ parts} = 60$$

**Example 5** Divide €522 between A, B and C so that A gets twice B's share and C gets three times A's share.

Always take your time and try and write down a ratio in two's first

Ratio A : B = 2:1 since A gets twice B's share.

Ratio C : A = 3:1 since C gets three times A's share.

Now we can attempt to make a ratio using all three A, B and C. We must try to decide who has got the least and relate everyone else to this.

$$\begin{array}{ccc} \text{A:} & \text{B:} & \text{C} \\ 2 & 1 & 6 \end{array}$$

B is bottom of the pile. A gets 2 (twice B) and C gets 6 (3 times A)

Continue as above 9 parts = €522

$$1 \text{ part} = \text{€}58 = \text{B's share}$$

$$2 \text{ parts} = \text{€}116 = \text{A's share}$$

$$6 \text{ parts} = \text{€}348 = \text{C's share}$$

## Given the ratio and one of the answers

This time we have to let the required ratio equal the answer to form our equation.

**Example 6** A sum of money is divided in the ratio 4:5, if the larger amount is €60 find the smaller amount.

The larger ratio is 5 and the larger amount is 60 so

$$5 \text{ parts} = 60$$

$$1 \text{ part} = 12$$

$$4 \text{ parts} = 48$$

**Example 7** A piece of tape is divided in the ratio of 2:9 if the difference between the two resultant pieces is 140cm find the length of tape.

The difference between the ratios is 7 and the difference is 140cm so

$$7 \text{ parts} = 140$$

$$1 \text{ part} = 20$$

$$2 \text{ parts} = 40$$

$$9 \text{ parts} = 180$$

Piece of tape = 220cm long.

## Direct Proportions

As the quantity goes up the other quantity goes up. We always try to see what the cost of ONE item is - this is called the unitary method.

**Example 8** If a car travels 120 km on 8 litres of petrol, find

- (i) how far it will travel on 17 litres at the same rate of consumption?
- (ii) how many litres will be required for a journey of 280 km?

(i) 8 litres = 120 km as usual make a simple equation

$$1 \text{ litre} = \frac{120}{8} = 15 \text{ km}$$

$$17 \text{ litres} = 15 \times 17 = 255 \text{ km}$$

(ii) For every 15 km traveled we need 1 litre.

$$280 \text{ km} = \frac{280}{15} = 16.7 \text{ litres}$$

## Foreign Exchange

**Example 9** Find the value of \$4350 in Euros when the conversion is €1 = \$1.20

$$\text{\$1.20} = \text{€1}$$

\$2.40 would = €2 and if we keep going we should be able to figure out that we need to divide the amount of Dollars given by 1.2

$$\text{\$4350} = \frac{4350}{1.2} = \text{€3645}$$

**Note** The conversion rate must be stated on the paper so we do not have to know it.

**Example 10** If \$1 = €0.82 find the value of €520 in Dollars.

Try as always with money to put yourself in the position of going into the bank with €520 to convert to Dollars. You know that \$1 = €0.82 so that for every 82c you have you get \$1, so €1.62 will get you \$2 and so on. You have to divide the number of Euros you have by 0.82 to find the number of Dollars.

$$\text{\$520} = \frac{520}{0.82} = 634.146 \text{ which is round to nearest cent to €634.15}$$

## Inverse Proportion

As the quantity goes up the other quantity goes down. These questions are based in and around time.

As speed decreases the time taken to do a job increases.

As the number of men on a job increases the time taken decreases.

**Example 11** It takes 12 men 15 days to build a house, how long will 20 men take to build the same house.

12 men take 15 days

1 man takes  $12 \times 15 = 180$  days. (1 man must take longer)

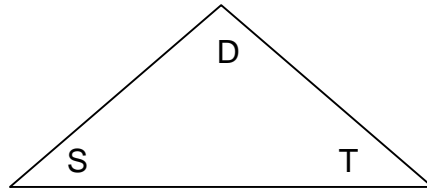
$$20 \text{ men take } \frac{180}{20} = 9 \text{ days}$$

## Distance - Speed – Time

This comes down to two types of questions.

Type 1 Questions where we must make use of “Dad’s silly triangle”.

Type 2 To convert from m/s to km/h, or visa versa.



$$\text{Distance} = \text{Speed} \times \text{Time}$$

$$\text{Speed} = \frac{\text{Distance}}{\text{Time}}$$

$$\text{Time} = \frac{\text{Distance}}{\text{Speed}}$$

**Example 12** A cyclist started a journey of 56km at 1015 and finished the journey at 1135 hours. Calculate the average speed of the cyclist in km/hr.

When we deal with time we always change it to hours unless told to use minutes.

$$1135 - 1015 = 1 \text{ hour } 20 \text{ minutes}$$

$$20 \text{ minutes} = \frac{1}{3} \text{ of an hour.}$$

$$\text{Speed} = \frac{\text{Distance}}{\text{Time}}$$

$$= \frac{56}{1\frac{1}{3}} = 42\text{km/h use the calculator.}$$

**Note**  $a\frac{b}{c}$  is the fraction button on the calculator.

Need to know 2 conversions

$$1 \text{ km} = 1000\text{m}$$

$$1 \text{ hour} = 3600 \text{ seconds.}$$

**Example 13** Convert 3m/s into Km/h

$$3\text{m/s} = 10800\text{m/h}$$

1000m = 1km so to convert from meters to kilometers divide by 1000.

$$3\text{m/s} = 10800\text{m/h} = 10.8\text{km/h.}$$