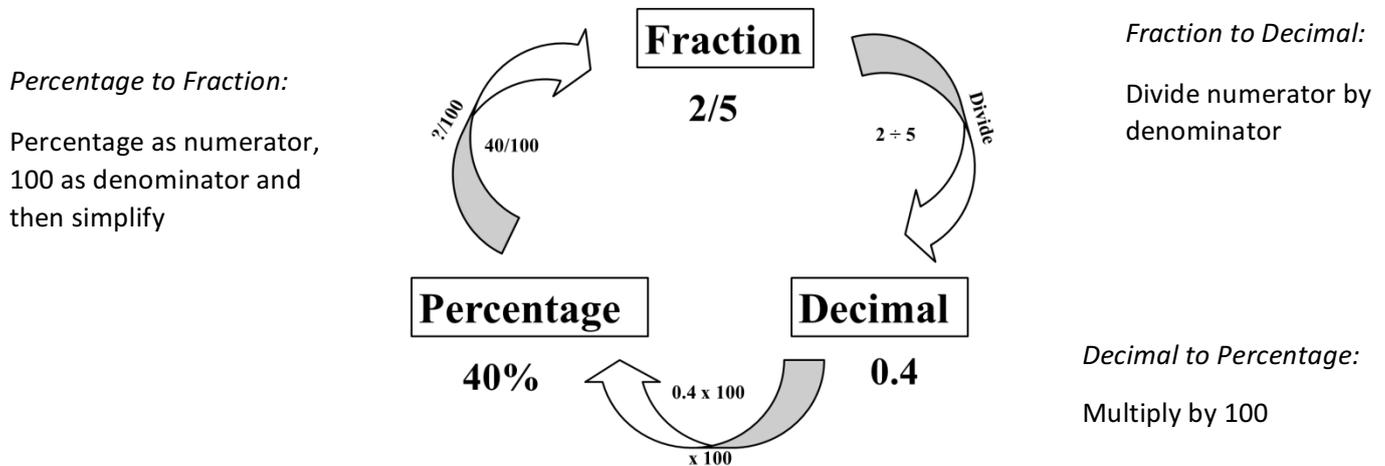# Guide for Ratio & Proportion – MAC Calculation policy

Converting between fractions, decimals and percentages

Percentage to Fraction:

Percentage as numerator, 100 as denominator and then simplify

Fraction to Decimal:

Divide numerator by denominator

Decimal to Percentage:

Multiply by 100

Percentages

Whilst pupils should be familiar with many operations involving percentages in mathematics lessons it is not proposed to elaborate on all of them in this booklet. The following is a sample of operations which pupils will be expected to use in other areas. It is important to reiterate that "per cent" means "out of 100" (compare to century, Cents in a dollar etc).

Calculating percentages of a quantity

Methods for calculating percentages of a quantity vary depending upon the percentage required. Pupils should be aware that fractions, decimals and percentages are different ways of representing part of a whole and know the simple equivalents

eg 10% = $^1/_{10}$ 12% = 0.12

Where percentages have simple fraction equivalents, fractions of the amount can be calculated.

eg.   i) To find 50% of an amount, halve the amount.
        ii)To find 75% of an amount, find a quarter by dividing
            by four and then multiply it by three.

Most other percentages can be found by finding 10%, by dividing by 10, and then finding multiples or fractions of that amount

eg.   To find 30% of an amount first find 10% by dividing the
        amount by 10 and then multiply this by three.
        30% = 3x10%
Similarly: 5% = half of 10% and 15% = 10% + 5%
Most other percentages can be calculated in this way.

When using the calculator it is usual to think of the percentage as a decimal. Pupils should be encouraged to convert the question to a sentence containing mathematical symbols. ('of' means X)

> eg. Find 27% of £350 becomes
>> 0.27 X £350 =

and this is how it should be entered into the calculator.

Calculating the amount as a percentage

In every case the amount should be expressed as a fraction of the original amount and then converted to a percentage in one of the following ways:

i)   What is 15 as a percentage of 60?
     (using simple fractions)

$$\frac{15}{60} \quad = \quad \frac{1}{4} \quad = \quad 25\%$$

ii)   What is 27 out of 50 as a percentage?
      (using equivalent fractions)

$$\frac{27 \times 2}{50 \times 2} \quad = \quad \frac{54}{100} \quad = \quad 54\%$$

iii)   What is 39 as a percentage of 57?
       (Using a calculator)

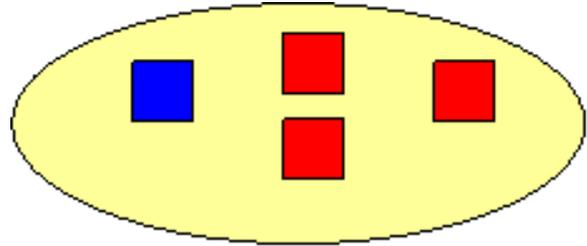$$\frac{39}{57} \quad = 39 \div 57 = 0.684 \text{ (to 3 d.p.)} = 68.4\%$$

Ratio and Proportion

Ratio compares one quantity with another.
Proportion compares the quantity out of the total.
E.g. In this diagram:

	Blue to Red
Ratio	1 : 3
Proportion	¼ : ¾

Dividing a quantity in to a given ratio

To divide a quantity in a given ratio
e.g. Divide £60 in the ratio 2 : 3

1. Add the parts of the ratio (find the total number of parts)

2 + 3 = 5

2. Divide the quantity by the total number of parts (find the size of each part)

60 ÷ 5 = 12

3. Multiply by the number of shares

12 x 2 = 24
12 x 3 = 48
The two amounts are £24 and £48

Proportion – Unitary method

Find the amount for one quantity and use this to find the required number of quantities.

E.g. Courtney buys 3 tins of soup for £1.95
Imogen buys 5 tins of soup. How much does she pay?
1. Find the cost of one tin:
£1.95 ÷ 3 = £0.65
2. Multiply the cost of one tin by five
£0.65 x 5 = £3.25

Exchange rates
Example exchange rate: £1 : €1.15

x 1.15

Cost in Pounds   Cost in Euros

÷ 1.15