Percentages

Find 30% of £520

100% = £520
÷ 10   ÷ 10
10% = £52
x 3   x 3
30% = £156

Find 15% of £120

100% = £180
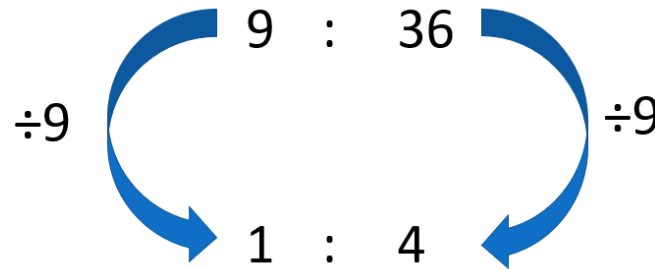÷ 10   ÷ 10
10% = £18
÷ 2   ÷ 2
5 % = £9

10% + 5 % = £18 + £9

15 % = £27
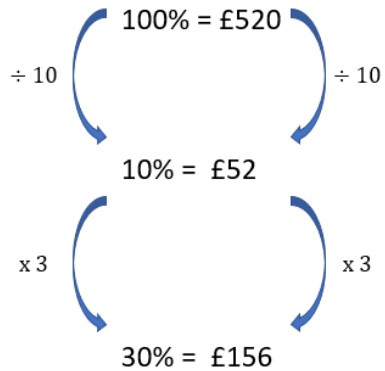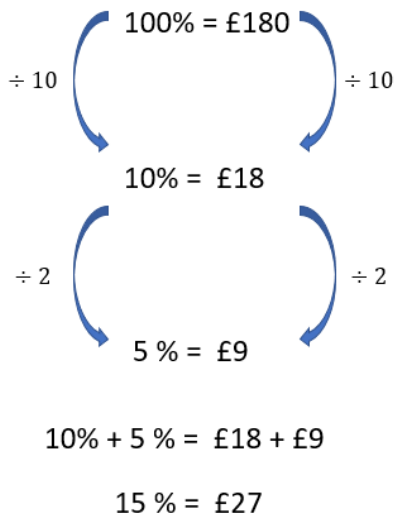
Ratio

Simplifying Ratio: **The Golden Rule:** Divide both by the highest common factor

9 : 36

÷9   ÷9

1 : 4

The ratio of apples to bananas is 4:3

How many apples are there?
How many bananas are there?

apples	apples	apples	apples	bananas	bananas	bananas

Apples	Apples	Apples	Apples	Bananas	Bananas	Bananas	
4	4	4	4	4	4	4	There **could** be 16 apples: 12 bananas

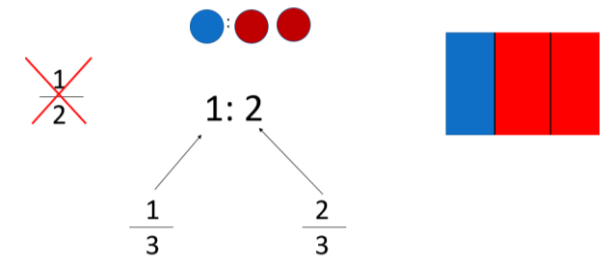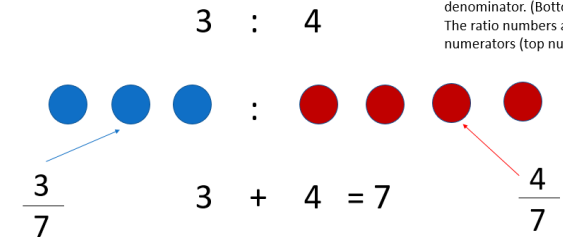| Apples	Apples	Apples	Apples	Bananas	Bananas	Bananas	
10	10	10	10	10	10	10	There **could** be 40 apples: 30 bananas Etc.

Converting ration to Fractions

Converting Ratio to Fractions

Converting ratios to fractions: The golden rule!

Add the ratios together. This is your new denominator. (Bottom number.)
The ratio numbers are your new numerators (top numbers).

3 : 4

$\frac{3}{7}$ 3 + 4 = 7 $\frac{4}{7}$

$\frac{1}{2}$ 1: 2

$\frac{1}{3}$ $\frac{2}{3}$

Which deal is the best value?

Eat Fresh   **Max-Mart**

2 for 68p   3 for 96p

CHEAPEST

68p ÷ 2 = 34p each

96p ÷ 3 = 32p each

price per item = total cost ÷ quantity

Ratio

The ratio of apples to bananas is 4:3

How many apples are there?
How many bananas are there?

apples	apples	apples	apples	bananas	bananas	bananas

Apples 4	Apples 4	Apples 4	Apples 4	Bananas 4	Bananas 4	Bananas 4

There **could** be 16 apples: 12 bananas

Apples 10	Apples 10	Apples 10	Apples 10	Bananas 10	Bananas 10	Bananas 10

There **could** be 40 apples: 30 bananas Etc.

Simple Interest

Example: You invest £300 at an interest rate of 4% per year.

Simple interest 4% of 300 = 12, so it increases by £12 per year.	Value of investment after 1 year	Value of investment after 2 years	Value of investment after 3 years	Quick way of calculating the new value of the investment after 3 years
£300	£312	£ 324	£336	300 + 36

+12   +12   +12
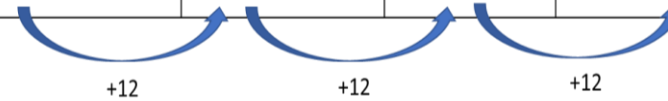
Direct proportion: Best buys

Which deal is the best value?

Eat Fresh   **Max-Mart**

2 for 68p   3 for 96p
                     ✔ CHEAPES

68p ÷ 2 = 34p each

96p ÷ 3 = 32p each

price per item = total cost ÷ quantity

Reverse Percentages

I go to a sale. I see an item that says 20% off. It is now £400. What was the full price of the item?

Firstly, lets write this scenario out mathematically.
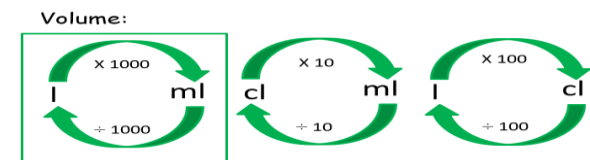
The full price – 20% = 80%

100% – 20% = £400
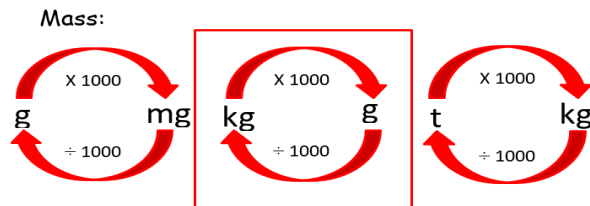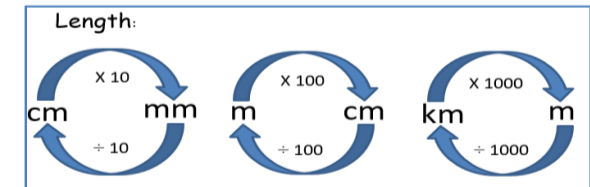
80% = £400

1% = £5

100% = £500

In other words, 100% of the price, the full price, is equal to £500.

Metric Conversions

Length:

cm	X 10 / ÷ 10	mm
m	X 100 / ÷ 100	cm
km	X 1000 / ÷ 1000	m

Mass:

g	X 1000 / ÷ 1000	mg
kg	X 1000 / ÷ 1000	g
t	X 1000 / ÷ 1000	kg

Volume:

l	X 1000 / ÷ 1000	ml
cl	X 10 / ÷ 10	ml
l	X 100 / ÷ 100	cl

Box Plots

- **Box Plots** are used to represent the spread of numerical data

Scores in 20 tests

3, 5, 8 , 9, 10 , 12, 13 13, 14, 15, 15, 16, 16, 16, 17, 18, 18, 19, 19, 19

Lowest value

Lower quartile

median

Upper quartile

Highest value
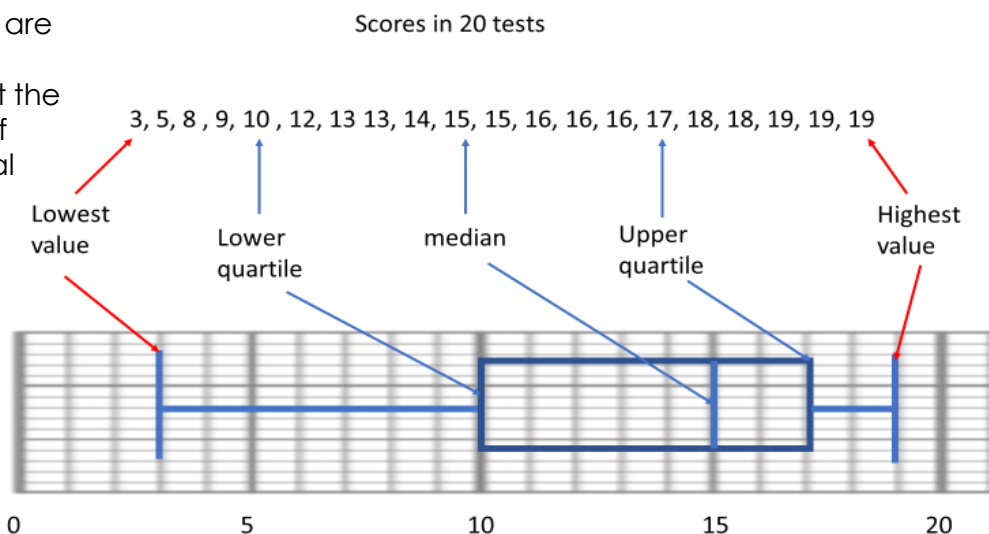
Cumulative Frequency Graphs
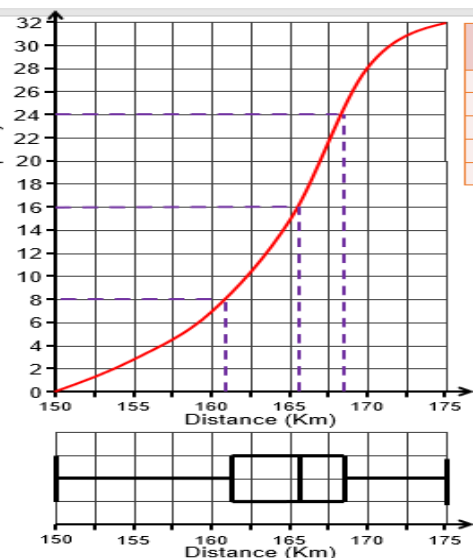
Cumulative frequency graphs allow us to estimate the lower quartile, upper quartile and median of grouped frequency data (see the dotted lines on the graph.)

Distance, d Km	Freq.	Cumulative Frequency
150 < d ≤ 155	3	3
155 < d ≤ 160	4	7
160 < d ≤ 165	8	15
165 < d ≤ 170	13	28
170 < d ≤ 175	4	32

The co-ordinates are taken from the upper limit and cumulative frequency of each interval. So the last co-ordinate is (175,32)

Mean, Median, Mode & Range

For the data points: 3, 3, 3, 7, 8, 9, 9
- The **mode** is the most common data point: 3

- The **median** is the middle number (Once you've lined them up from smallest to largest): 7
- There are three numbers to the left of 7 and three numbers to the right, so 7 is the median.

- To find the **mean,** you divide the total by the number of data points:
  $3 + 3 + 3 + 7 + 9 + 10 + 14 = 42$
  $42 \div 7 = 6$, so the mean is 6.

- The mean is the total shared between each data point. In the example above, it is like saying that 7 friends have a total of £42, so they each have about £6 on average. However it does not tell us how the much the amounts vary from each other. For that we need to find the range.

- The **range** is the difference between the smallest and largest data point: $9 – 3 = 6$ so the range is 6.

- The **interquartile range** is the difference between the upper quartile and the lower quartile.

- The range and interquartile range are not averages, so they do not give us a sense of the size of the numbers. They are measures of how spread out the data is: the lower the range and the interquartile range, the more consistent the numbers are.