The concept of percentages depends on the principle that '1'(a whole) is represented by 100 percentage points(100%). That is, 1% =1/100 th of the whole.

Converting a fraction to a % - To do this simply multiply the fraction by 100 and cancel.

$\frac{3}{4}$, $\frac{3}{4}\times 100 = \frac{300}{4} = 75\%$

$\frac{5}{6}$, $\frac{5}{6}\times 100 = \frac{500}{6} = 83.\dot{3}\%$

$\frac{2}{7}$, $\frac{2}{7}\times 100 = \frac{200}{7} = 28.57\%$

Converting a % to a fraction - For a whole number % divide by 100 and cancel. If the % has one decimal place, divide by 1000 and cancel, two decimal places, 10000, and so on.

35% $\frac{35}{100} = \frac{7}{20}$

72% $\frac{72}{100} = \frac{36}{50} = \frac{18}{25}$

12.5% $\frac{125}{1000} = \frac{25}{200} = \frac{5}{40} = \frac{1}{8}$

Converting a decimal to a % - Multiply the decimal number by 100.

0.69	$0.69\times100=69\%$
0.13	$0.13\times100=13\%$
1.35	$1.35\times100=135\%$
0.953	$0.953\times100=95.3\%$
0.0025	$0.0025\times100=0.25\%$

Converting a % to a decimal - Divide the decimal number by 100. This has the effect of moving the decimal point two places to the left.

$$12.6\% = \frac{12.6}{100} = 0.126$$

$$79.2\% = \frac{79.2}{100} = 0.792$$

$$34.9\% = \frac{34.9}{100} = 0.349$$

$$125.6\% = \frac{125.6}{100} = 1.256$$

$$0.25\% = \frac{0.25}{100} = 0.0025$$

Calculating the % of a given quantity - Simply multiply by the % and divide by 100. If the % has one decimal place, divide by 1000, two places, divide by 10000 and so on.

example #1 - what is 25% of £360?

$$\frac{25}{100}\times 360 = \frac{25\times 360}{100} = \frac{360}{4} = £90$$

example #2 - what is 17.5% of £3000?

$$\frac{175}{1000}\times 3000 = \frac{175\times 3000}{1000} = 175\times 3 = £525$$

example #3 - what is 1.25% of £800?

$$\frac{125}{10000}\times 800 = \frac{125\times 800}{10000} = \frac{125\times 8}{100} = \frac{5\times 8}{4} = 5\times 2 = £10$$

Calculation of % increase - Add 100 to the % increase. Express this figure as a fraction of 100. Then multiply out with the given quantity.

example #1 - what is the final figure when a sum of £2000 is increased by 18%?

$$100 + 18 = 118\%$$

$$2000 \times \frac{118}{100} = 20 \times 118 = £2360$$

example #2 - what is the new salary if the old salary of £30,000 is increased by 5%?

$$100 + 5 = 105\%$$

$$30000 \times \frac{105}{100} = \frac{30000 \times 105}{100} = 300 \times 105 = £31500$$

example #3 - A car costing £12,000 has its price increased by 3%. What is its new price?

$$100 + 3 = 103\%$$

$$12000 \times \frac{103}{100} = \frac{12000 \times 103}{100} = 120 \times 103 = £12360$$

Calculation of % decrease - The % decrease is subtracted from 100, converted to a decimal, then multiplied by the original quantity.

example #1 - A car costing £5000 has its price reduced by 5%. What is its new price?

$$100 - 5 = 95\%$$

$$\frac{95}{100} \times 5000 = \frac{95 \times 5000}{100} = 95 \times 50 = £4,750$$

example #2 - An old house originally valued at £85,000 has its price reduced by 10%. What is its new price?

$$100 - 10 = 90\%$$

$$\frac{90}{100} \times 85000 = \frac{90 \times 85000}{100} = 90 \times 850 = £76,500$$

example #3 - Workers at a factory earn £12,000 per annum. If their wages are cut by 2.5%, what is their new wage?

$$100 - 2.5 = 97.5\%$$

$$\frac{97.5}{100} \times 12000 = \frac{975 \times 12000}{1000} = 975 \times 12 = £11,700$$

Calculation of 'reversed' percentages - The key to solving this type of problem is to work out the value of one percentage point(1%). This done by dividing the original quantity by 100 plus the % increase. Then multiply this value by 100 to obtain the original number.

example#1 - A foreign car costs 15,000 euros including 8% tax. What is the price of the car without the tax added?

value of 1 % point is :

$$\frac{15000}{108}$$

to get the original cost we multiply the 1% point by 100

$$\frac{15000}{108}\times 100 = \frac{15000\times 100}{108} = \frac{5000\times 100}{36} = \frac{500000}{36} = 13888.89 \text{ euro}$$

example#2 - A factory worker receives a salary of £18,000 after a 5% pay rise. What was the salary of the worker before?

value of 1 % point is :

$$\frac{18000}{105}$$

to get the original salary we multiply the 1% point by 100

$$\frac{18000}{105}\times 100 = \frac{18000\times 100}{105} = \frac{1800000}{105} = 17,142.86$$

example#3 - A farmer has a flock of 1210 sheep that have increased their number by 10% over the year. How many sheep were there the year previous?

value of 1 % point is :

$$\frac{1210}{110}$$

to get the original number of sheep we multiply the 1% point by 100

$$\frac{1210}{110} \times 100 = \frac{121000}{110} = 1,100$$