Fractions, Decimals and Percentages - Class 6

Fractions, decimals and percentages are 3 different ways for showing a part of an integer (whole number). This class will focus on decimals, percentages and conversions.

What is a percentage?

Percentage (also shown by the sign %) means parts out of 100 where 100% means the total of an original number.

There are some common conversions which it is useful to know off by heart as it will save you time in the exam and help with your understanding of these topics.

Fraction	Decimal	%
$\frac{1}{2}$	0.5	50%
$\frac{1}{3}$	0.33	33%
$\frac{1}{4}$	0.25	25%
$\frac{1}{5}$	0.2	20%
$\frac{1}{10}$	0.1	10%

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Fractions ------> Decimals ------> Percentages

Example:

$\frac{3}{8}$ ---> 0.375 ---> 37.5%

To turn $\frac{3}{8}$ into a decimal, we divide using the bus stop method

$$\begin{array}{r} 0.375 \\ 8\overline{)\,3.000} \\ \scriptstyle 3\ \ 6\ \ 4 \end{array}$$

To change 0.375 into a percentage we multiply by 100 (move the decimal 2 places to the right)

$$0.375 \text{ --> } 37.5\%$$

Percentages ------> Decimals ------> Fractions

Example:

60% ---> 0.60 ---> $\frac{3}{5}$

To turn 60% into a decimal, we divide by 100 (move the decimal 2 places to the left, when we can't see a decimal we can add one at the end of a number)

$$60.\% \text{ --> } 0.60 \text{ or } 0.6$$

To change 0.6 into a fraction, we need to write the digits of the decimal as the numerator with the value column of the final digit as the denominator. (e.g. tenths -> divide by 10, hundredths -> divide by 100), then we simplify the fraction if possible

$$\frac{6}{10} \text{ --> } \frac{3}{5}$$

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Percentages WITHOUT a Calculator

Find 16% of £180

First we start by finding 100%, 10% and 1% (dividing by 10 each time)

100% = 180
10% = 18
1% = 1.8

Next we split the percentage into what we need to find, i.e. 16% = 10% + 6%

10% = 18
6% = 6 x 1.8 = 10.80

Final Answer = 18 + 10.80 = £28.80

Find £180 increased by 16%

For this question, we repeat the method shown at the top of the page and then add this answer onto £180.

Final Answer = 180 + 28.80 = £208.80

Find £180 decreased by 16%

For this question, we repeat the method shown at the top of the page and then subtract this answer from £180.

Final Answer = 180 - 28.80 = £151.20

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Handy calculations!

To find...

- **20%** - divide by 5 OR divide by 10 and then multiply by 2
- **50%** - divide by 2
- **5%** - divide by 10 and then divide by 2
- **1%** - divide by 100 (2 decimal places to the left)

Percentages WITH a Calculator

Find 16% of £180

First, we start by finding the decimal multiplier for 16% (divide by 100) and then multiply this by £180

16% = 0.16

Final Answer = 0.16 x 180 = £28.80

Find £180 increased by 16%

First, we start by finding the decimal multiplier for a 16% increase and then multiply this by £180

100% + 16% = 116% = 1.16

Final Answer = 1.16 x 180 = £208.80

Find £180 decreased by 16%

First, we start by finding the decimal multiplier for a 16% decrease and then multiply this by £180

100% - 16% = 84% = 0.84

Final Answer = 0.84 x 180 = £151.20

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Amanda bought a house for £300,000. Over the next couple of years, the value of the house increased by 15%. What is the new value of the house, after 1 year?

John earned a salary of £17,600 per year. He receives a raise of 12.5%. What is his new salary?

Asics is running a 35% discount on their running shoes. If shoes normally cost £120, what is their new price?

Tatiana bought a new car for £12,600. On leaving the garage, the value of the car was immediately reduced by 12.6%. What is the new value of the car?

Simple and Compound Interest

Simple interest lives up to its name and is simpler to calculate as you receive the same amount of interest each year.

For example, if you received 10% interest on £100 for 5 years, it means you would receive £10 each year so £50 in total.

Josh receives 15% simple interest on an investment of £250 for 3 years. How much money will he receive over a 3-year period?

Compound interest is when the interest builds on itself, year on year (or any other time period). The value of the interest DOES NOT stay the same.

For example, if you received 10% compound interest on £100 for 2 years, it would work out as follows:

100% + 10% = 110% = 1.10
100 x 1.10 x 1.10 = £121

2 years means you multiply 100 by 1.10 TWICE ---> 100×1.10^2

3 years means you multiply 100 by 1.10 THREE TIMES ---> 100×1.10^3

and so on...

NOTE: Money is ALWAYS to 2 decimal places and won't be specified.

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Questions:

Perrie invests £25000 for 3 years in a savings account.
She gets 2.7% per annum compound interest.

Calculate the total amount of interest Perrie will get after 3 years.

A new phone costs £679
The value of the phone decreases at a rate of 4% per year.

Work out the value of the phone at the end of 3 years.

Percentage Change

$$\text{Percentage Change} = \frac{\text{Difference}}{\text{Original}} \times 100$$

The difference is the gap between the original amount and the new value with the original being the amount we started with.

Effectively, you are writing the difference as a fraction of the original and then turning it, first to a decimal and then to a percentage.

Example:

Robin buys a watch for £80
He sells the watch for £56

Work out his percentage loss.

Difference = 80 - 56 = 24
Original = 80 (price before the change, not necessarily the lower number)

$$\frac{24}{80} \times 100 = 30\%$$

Question:

Sean pays £10 for 24 chocolate bars.
He sells all 24 chocolate bars for 50p each.
Work out Sean's Profit margin.

Reverse Percentages

A common question is where you are given an amount after the percentage change and you have to get back to the original.

To do this with a calculator, simply work out what the percentage as a multiplier and divide the amount by this!

Moving 'backwards' = divide

Moving 'forwards' = multiply

The value of Michelle's car has decreased by 15%.
The car now has a value of £13,600
Work out the value of Michelle's car before the decrease.

15% decrease = 100% - 15% = 0.85

13600 ÷ 0.85 = £16,000

Question:

In a sale, the normal price of a boat is reduced by 15%
The sale price of the boat is £272000
Work out the normal price of the boat.

Worded Problems

Questions:

Elena spent 120 minutes at a sports centre.
She played badminton for 50 minutes.

She used the swimming pool for $\frac{1}{6}$ of the 120 minutes

She used the gym for 20% of the 120 minutes.
She then spent the rest of the 120 minutes in the cafe.
Work out the total time, in minutes, that Elena spent in the cafe.