PERCENTAGES

What do I need to be able to do?

You should be able to:

- Find percentages of amounts
- Increase or decrease by a percentage
- Find percentage change
- Find the original amount.
- Express one number as a fraction of another
- Increase or decrease using multipliers
- Work with simple interest
- Work with compound interest

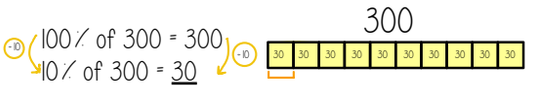
Key Words

- Percent: parts per hundred
- Simple Interest: interest calculated as a percent of the original amount
- Compound Interest: interest calculated on the amount borrowed plus the previous interest
- Multiplier: the number that you are multiplying by
- Increase: make bigger
- Decrease: make smaller

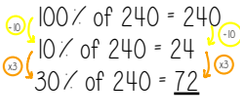
Percentage of an Amount

Find 10% of 300

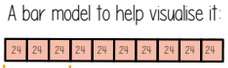
300 shared into 10 equal parts (300 ÷ 10)



Find 30% of 240



A bar model to help visualise it:



24 x 3 = 72

Finding 10% is always a good place to start!

Find 81% of 480

100% of 480 = 480
10% of 480 = 48
1% of 480 = 48

100% of 480 = 480
10% of 480 = 48
80% of 480 = 384

80% + 1% = 81% so we need to add 48 and 384.

81% of 480 = 3888

Percentage Increase/Decrease

An antique clock has increased in value by 12%. If it's original price was £400, what is the new price?

Method 1

12% increase means we have 112% of the original price. So we are now finding 112% of £400

100% of £400 = £400
10% of £400 = £40
2% of £400 = £8

112% of £400 = £448

Method 2

We need to find 12% of £400

100% of £400 = £400
10% of £400 = £40
2% of £400 = £8

12% of £400 = £48

We are increasing by 12%, so adding 12% on. £400 + £48 = £448

Helpful Percentages

It is helpful to remember the relationships between some percentages to help speed up the process!

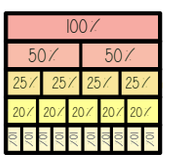
50% is half of 100%. To find 50% of something, we can divide it by 2

25% is a quarter of 100%. To find 25% of something, we can divide it by 4

10% is one tenth of 100%. To find 10% of something, we can divide it by 10.

20% is one fifth of 100%. To find 20% of something, we can divide it by 5

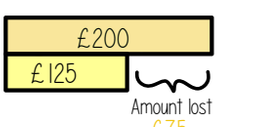
A useful one to remember: 12.5% is one eighth of 100% (as it is half of 25%)



Percentage Change

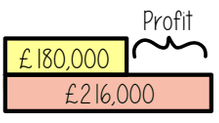
Difference in value / Original value x 100

I bought a phone for £200. A year later it sold for £125. What was the % loss?



75/200 x 100 = 37.5%

I bought a house for £180,000. I sold it for £216,000. What was the % profit?



Profit = £216,000 - £180,000 = £36,000

36,000/180,000 x 100 = 20%

Expressing One Number as a Percentage of Another

Express 12 as a percentage of 20

12/20 = 60/100 = 60%

Equivalent fractions

37 out of 50 people in a class are Manchester United fans What percentage of the class support Manchester United?

37/50 = 74/100 = 74%

Equivalent fractions

Multipliers

What multiplier wold represent an increase of 15%?

We are finding 100% + 15%, so 115%.

As a decimal this is 1.15

What multiplier wold represent an decrease of 15%?

We are finding 100% - 15%, so 85%.

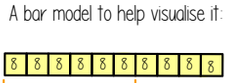
As a decimal this is 0.85

Finding the Original

60% of a number is 48. What is the number?

60% of x = 48
10% of x = 8
100% of x = 80

A bar model to help visualise it:



48

As a quick sense check, our answer should be BIGGER than 48! Always make sure you look back at your answer and make sure it makes sense

A pair of shoes are on sale for 87.5% off. The sale price is £49.50, how much did they cost originally?

87.5% off means we are left with 12.5%. So 12.5% = £49.50,

12.5% of x = £49.50
25% of x = £99
100% of x = £396

Simple Interest

I put £1000 in a bank account. It earns simple interest of 10% per year. How much will be in the account after 5 years?

INTEREST:

Simple interest means we calculate the interest the initial amount will earn and add that amount on each year

10% of £1000 = £100.

So each year, the account will gain £100 interest.

£1000 + (£100 x 5) = £1500

5 years

Compound Interest

I put £1000 in a bank account. It earns compound interest of 10% per year. How much will be in the account after 5 years?

INTEREST:

Compound interest means we work out the interest each year and the original amount plus any interest in the account.

- 10% of £1000 = £100.

So after year 1, the account will have £1100.

- 10% of £1100 = £110

So after year 2, the amount is £1210 etc...

If we are increasing by 10% each time, this is the same as finding 110% of the amount, or multiplying by 1.1 (see multipliers). So another way we can work this out is:

£1000 x 1.1 x 1.1 x 1.1 x 1.1 x 1.1

Or £1000 x 1.1^5 = £1610.51

5 years

I know which account I'd go for!