



# SUBJECT: Maths

## UNIT:

### Year 11 Number / Statistics

#### Find a percentage of an amount using combinations of percentages

One way to find a percentage of an amount is to use 1%, 10% and 50% as building blocks.

1. Write the percentage as the sum of two or more of 1%, 10% and 50%
2. Work out the percentages.
3. Sum the percentages to get the total percentage.

1%

10%

50%

#### Find a percentage of an amount using a calculator

There is more than one way to work out a percentage of an amount using a calculator:

#### Convert the percentage to a decimal, then find the percentage of the amount.

1. Divide the percentage value by 100
2. Multiply by the amount.

Or

#### Work out 1% of the amount, then find the percentage of the amount.

1. Divide the amount by 100
2. Multiply by the percentage value.

**Example** 65% of 360

$$65\% = 50\% + 10\% + 5\%$$

$$50\% \text{ of } 360 = 360 \div 2$$

$$10\% \text{ of } 360 = 360 \div 10$$

$$5\% \text{ of } 360 = \frac{1}{2} \text{ of } (360 \div 10)$$

$$65\% = 50\% + 10\% + 5\%$$

$$65\% \text{ of } 360 = 180 + 36 + 18 = 234$$

**Example** 73% of 680

$$73\% \text{ of } 680 = 73 \div 100 \times 680$$

$$73 \div 100 \times 680 =$$

#### Creating a pie chart

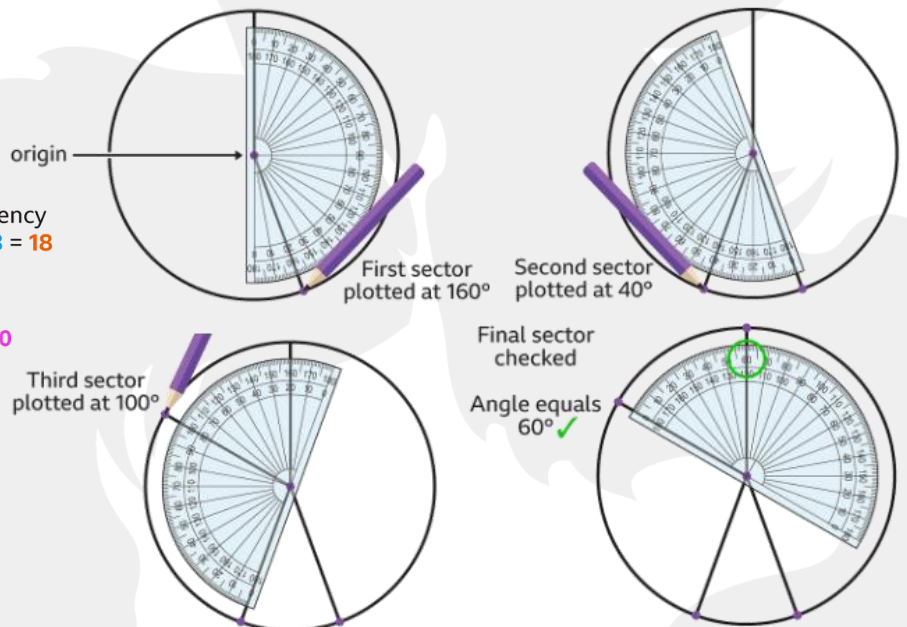
##### Example

Transport	Frequency
Walk	8
Cycle	2
Car	5
Bus	3
Total = 18	

Total frequency  
 $8 + 2 + 5 + 3 = 18$

One friend  
 $360 \div 18 = 20$

Angle
$8 \times 20 = 160^\circ$
$2 \times 20 = 40^\circ$
$5 \times 20 = 100^\circ$
$3 \times 20 = 60^\circ$
Total = $360^\circ$





### Adding and subtracting negative numbers

A number line can be used to add and subtract negative numbers.

#### Adding with negative numbers

##### Example

What is  $-4 + 5$ ?

To add  $-4$  and  $5$ , draw the starting number on a number line and count to the **right** when **adding** numbers.



So,  $-4 + 5 = 1$

#### Subtracting with negative numbers

##### Example

What is  $-2 - 2$ ?

To subtract  $2$  from  $-2$ , start at  $-2$  on a number line, and count to the **left** when **subtracting** numbers.

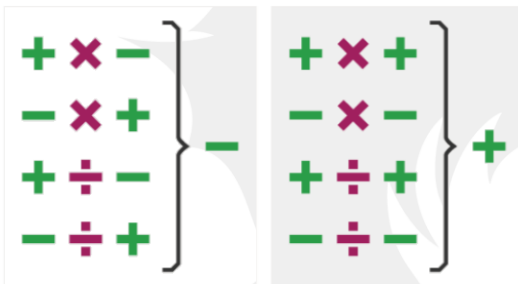


$-2 - 2 = -4$

### Multiplying and dividing negative numbers

The rules for multiplying and dividing numbers are:

- two signs that are **different** become a **negative** sign
- two signs that are the **same** become a **positive** sign



##### Examples

- Same signs give a positive:  $(-4) \times (-5) = 20$
- Same signs give a positive:  $20 \div 5 = 4$
- Different signs give a negative:  $(-14) \div 2 = -7$
- Different signs give a negative:  $14 \div -2 = -7$

##### Example

What is  $4 - (-2)$ ?

To subtract  $-2$  from  $4$ , start at number  $4$  on a number line, and count to the right. So,  $4 - (-2) = 6$ .



### Rules for adding and subtracting negative numbers

When two **signs** are written next to each other, the rules for adding and subtracting numbers are:

- two signs that are **different** become a **negative** sign
- two signs that are the **same** become a **positive** sign



##### Examples

- Same signs give a positive:  $3 + (+2) = 3 + 2 = 5$
- Same signs give a positive:  $3 - (-2) = 3 + 2 = 5$
- Different signs give a negative:  $3 + (-2) = 3 - 2 = 1$
- Different signs give a negative:  $3 - (+2) = 3 - 2 = 1$

### Adding fractions with the same denominators

$$\frac{2}{11} + \frac{5}{11} + \frac{1}{11} = \frac{\square}{11}$$

$$\frac{2 + 5 + 1}{11} = \frac{8}{11}$$

### Adding fractions with different denominators

$$\frac{3}{5} + \frac{1}{10} = \frac{3 \times 2}{5 \times 2} + \frac{1}{10} = \frac{6}{10} + \frac{1}{10}$$

$$\frac{6}{10} + \frac{1}{10} = \frac{7}{10}$$

$$\frac{1}{3} + \frac{1}{2} + \frac{2}{5} = ?$$

$$\frac{1}{3} = \frac{\square}{30} \quad \frac{1}{2} = \frac{\square}{30} \quad \frac{2}{5} = \frac{\square}{30}$$

$$\frac{10 + 15 + 12}{30} = \frac{37}{30} = 1\frac{7}{30}$$