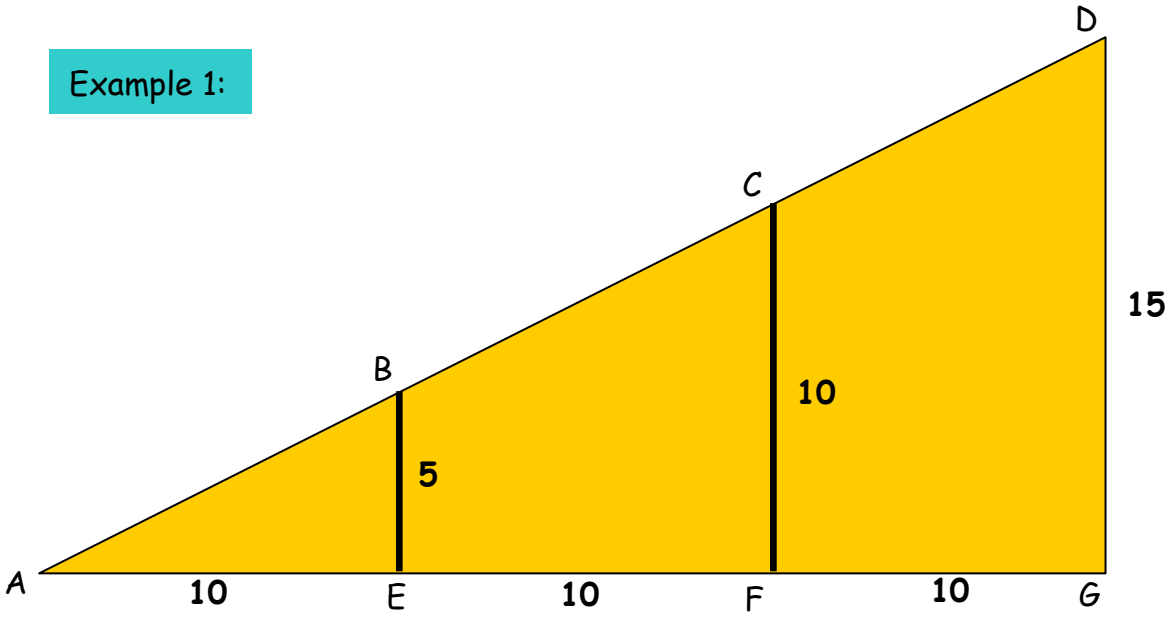
Gradient.

You should be able to calculate the gradient of either a slope of inclination or declination.

To find the gradient of a slope, we use the following formula.

$$\text{Gradient} = \frac{\text{Vertical Distance}}{\text{Horizonta Distance}}$$

Example 1:

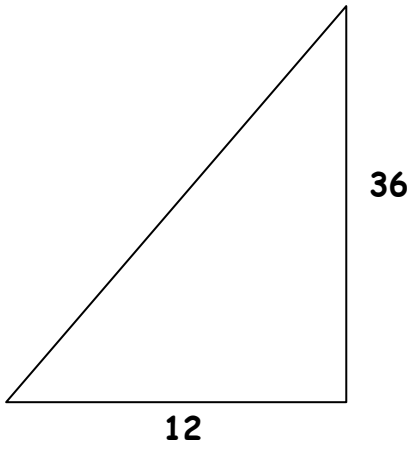


Can you see that $\frac{BE}{AE} = \frac{CF}{AF} = \frac{DG}{AG}$

$\frac{5}{10} = \frac{10}{20} = \frac{15}{30}$

This shows us that if we have a continuous straight line, the gradient, i.e. the steepness of the slope never changes, unless the line itself changes direction. Here we can see that the gradient = $\frac{1}{2}$ when we simplify the fraction

Example 2: Find the gradient of the following line.



Note that gradient doesn't have any units. It is just a value. The steeper the slope, the bigger the gradient.

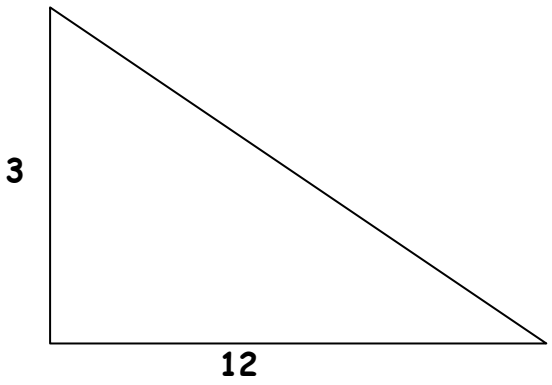
$$Gradient = \frac{VD}{HD}$$

$$Gradient = \frac{36}{12}$$

$$Gradient = 3$$

Do not confuse finding the gradient with finding the size of the 3rd side of the right angled triangle. (**That's Pythagoras**). We merely draw in the vertical and horizontal lines as a guide to help us identify the vertical and horizontal dimensions.

Example 3: Find the gradient of the following line.



$$Gradient = \frac{VD}{HD}$$

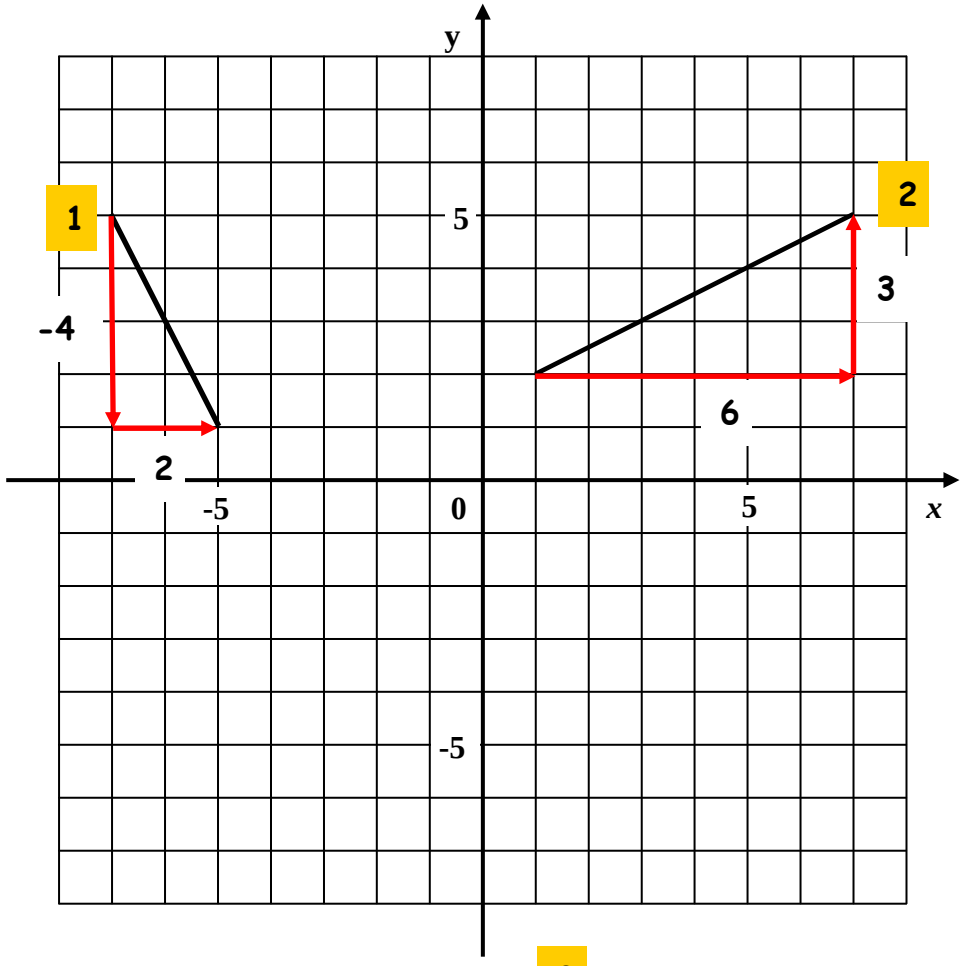
$$Gradient = \frac{3}{12}$$

$$Gradient = -\frac{1}{4}$$

When we measure a downward slope, we say it has a **negative** gradient. The reasons for this will become clear when you do Higher Maths, but for now just remember that if it is a climbing slope, it has a positive gradient. If it is a falling slope, it has a negative gradient. The formula stays the same.

Also note that, the gradient won't always work out to be a whole number, if this is the case, as in example 1 and 3, we usually just leave it as a fraction. You may find a question like this in the non-calculator paper.

Example 4: Work out the gradient of the following lines on this co-ordinate grid.



1

$$Gradient = \frac{VD}{HD}$$

$$Gradient = \frac{-4}{2}$$

$$Gradient = -\frac{2}{1} = -2$$

2

$$Gradient = \frac{VD}{HD}$$

$$Gradient = \frac{3}{6}$$

$$Gradient = \frac{1}{2}$$