

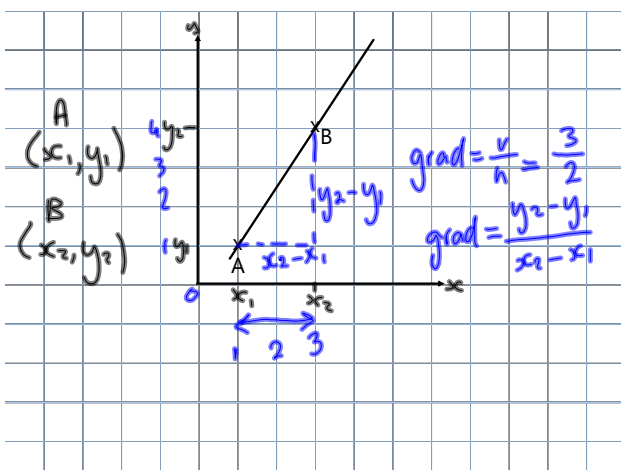
Starter

Fully factorise the following:

- 1)  $3a^2 - 75 = 3(a^2 - 25) = 3(a+5)(a-5)$
- 2)  $2a^2 - 5a - 12 = (2a + 3)(a - 4)$
- 3)  $2a^2 + 22a + 56 = 2(a^2 + 11a + 28) = 2(a+4)(a+7)$
- 4)  $12a^2 + 27a + 6 \rightarrow = 3(4a^2 + 9a + 2)$
- 5)  $16m^2 - 9a^2 = 3(2a - 1)(2a + 2)$

Today's Learning:

To calculate the gradient of a straight line using a formula.



Gradient of a Straight Line 9/2/17

The gradient of a line can be calculated by using  $\frac{\text{vertical distance}}{\text{horizontal distance}}$

Or, given coordinates of points on the line  $(x_1, y_1)$  and  $(x_2, y_2)$ , we can use

$$\text{gradient} = \frac{y_2 - y_1}{x_2 - x_1}$$

**Parallel** lines have the same gradient.

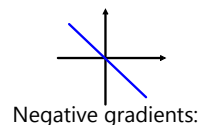
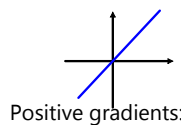
E.g. Find the gradient of the straight line that passes through

- 1)  $(4, 4)$  and  $(6, 8)$ .

$$\begin{aligned} \text{gradient} &= \frac{y_2 - y_1}{x_2 - x_1} \\ &= \frac{8 - 4}{6 - 4} = \frac{4}{2} = 2 \end{aligned}$$

- 2)  $(-4, -3)$  and  $(2, 10)$

$$\begin{aligned} \text{gradient} &= \frac{y_2 - y_1}{x_2 - x_1} = \frac{10 - (-3)}{2 - (-4)} \\ &= \frac{13}{6} \end{aligned}$$



**Starter**

Answer the factorising exam questions as well as you can.

You can use your notes!

Today's Learning:

To finish gradient of a straight line.

**Without a calculator**, find the **gradient** of the straight line joining these points:

ANSWERS

- |                               |                   |
|-------------------------------|-------------------|
| 1) (-1, 3) and (-2, 10)       | 1) -7             |
| 2) (-1, -5) and (-2, -2)      | 2) -3             |
| 3) (3, -5) and (5, -6)        | 3) $-\frac{1}{2}$ |
| 4) (2.5, 6) and (3.5, 7.5)    | 4) 1.5            |
| 5) (-3.7, 4.5) and (3.5, 6.5) | 5) $\frac{1}{36}$ |
| 6) (2.2, 1.4) and (-0.2, 2.2) | 6) $-\frac{1}{3}$ |

★ If points are **collinear**, they all lie on the same straight line. (To prove collinearity, two straight lines must share a point and have the same gradient).

e.g. If A(-4, -2), B(-1, 1) and C(8, k) are collinear, find the value of k.

$$AB \text{ gradient} = \frac{y_2 - y_1}{x_2 - x_1} = \frac{1 - (-2)}{-1 - (-4)} = \frac{3}{3} = 1$$

$$BC \text{ gradient} = 1$$

$$\frac{y_2 - y_1}{x_2 - x_1} = 1$$

$$\frac{k - 1}{8 - (-1)} = 1$$

$$\frac{k - 1}{9} = 1$$

$$k - 1 = 9$$

$$k = 10$$