Straight Lines - Lesson 3

Straight Line Equations
(Given 2 Coordinates)

<u>LI</u>

- Find the equation of a straight line when told 2 coordinates.
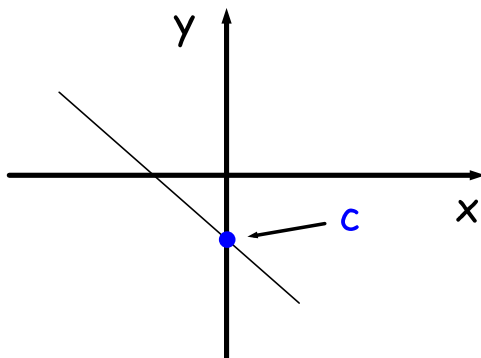
<u>SC</u>

- Find gradient.

- Find y - intercept.
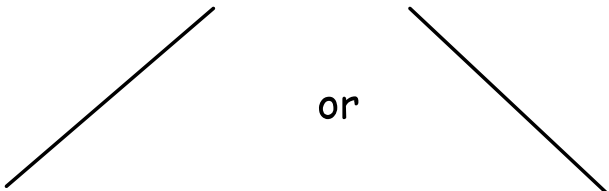
Jun 14-09:25

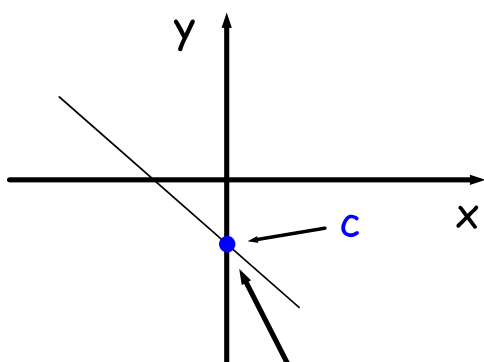The Equation of a Straight Line is :

$$y = mx + c$$

gradient   y - intercept

c is where the line
crosses the y - axis

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Types of Line Equations

y

x

y = number

x = number

or   y = m x + c

c is where the line crosses the y - axis

This point has coordinates (0, c)

Example 1

Find the equation of the straight line passing through the points $(0, 3)$ and $(4, 11)$.

Gradient

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

$$m = \frac{11 - 3}{4 - 0}$$

$$m = \frac{8}{4}$$

$$\underline{m = 2}$$

$$\begin{array}{l} x_1\ y_1 \\ (0, 3) \end{array}$$

$$\begin{array}{l} (4, 11) \\ x_2\ y_2 \end{array}$$

y - intercept

Since one of the coordinates is $(0, 3)$,

$$\underline{c = 3}$$

$$\therefore \boxed{y = 2x + 3}$$

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<u>Example 2</u>

Find the equation of the straight line passing through the points $(4, 1)$ and $(-2, 19)$.

<u>Gradient</u>

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

$$\begin{array}{c} x_1 \ y_1 \\ (4, 1) \end{array}$$

$$m = \frac{19 - 1}{-2 - 4}$$

$$\begin{array}{c} (-2, 19) \\ x_2 \ y_2 \end{array}$$

$$m = \frac{18}{-6}$$

$$m = -3$$

<u>y - intercept</u>

$$y = mx + c$$

$$y = -3x + c$$

Use one of the coordinates in the question
(doesn't matter which one)

$(4, 1)$

$$1 = -3(4) + c$$

$$1 = -12 + c$$

$$c = 13$$

$$\therefore \boxed{y = -3x + 13}$$

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<u>Example 3</u>

Find the equation of the straight line passing through the points $(4, -2)$ and $(-4, -4)$.

<u>Gradient</u>

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

$$\begin{matrix} x_1 & y_1 \\ (4, & -2) \end{matrix}$$

$$m = \frac{-4 - (-2)}{-4 - 4}$$

$$\begin{matrix} (-4, & -4) \\ x_2 & y_2 \end{matrix}$$

$$m = \frac{-2}{-8}$$

$$\underline{m = 1/4}$$

<u>y - intercept</u>

$$y = mx + c$$

$$y = (1/4)x + c$$

Use one of the coordinates in the question
(doesn't matter which one)

$$(4, -2)$$

$$-2 = (1/4)(4) + c$$

$$-2 = 1 + c$$

$$\underline{c = -3}$$

$$\therefore \boxed{y = (1/4)x - 3}$$

Find the equation of the straight line passing through the points :

1) $(0, 3)$ and $(1, 1)$

2) $(-1, 4)$ and $(0, 4)$

3) $(4, 4)$ and $(3, -5)$

4) $(0, 2)$ and $(5, 5)$

5) $(2, -1)$ and $(-4, 5)$

6) $(2, -3)$ and $(3, -5)$

7) $(2, 5)$ and $(-1, -4)$

8) $(0, 5)$ and $(3, 3)$

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Find the equation of the straight line passing through the points :

1) $(0, 3)$ and $(1, 1)$ $y = -2x + 3$

2) $(-1, 4)$ and $(0, 4)$ $y = 4$

3) $(4, 4)$ and $(3, -5)$ $y = 9x - 32$

4) $(0, 2)$ and $(5, 5)$ $y = (3/5)x + 2$

5) $(2, -1)$ and $(-4, 5)$ $y = -x + 1$

6) $(2, -3)$ and $(3, -5)$ $y = -2x + 1$

7) $(2, 5)$ and $(-1, -4)$ $y = 3x - 1$

8) $(0, 5)$ and $(3, 3)$ $y = -(2/3)x + 5$