Straight Line Graphs

- Drawing Straight line graphs
- The gradient
- The gradient from coordinates
- The y intercept y = mx + c
- Other forms / rearranging equatio

Straight Line Graphs

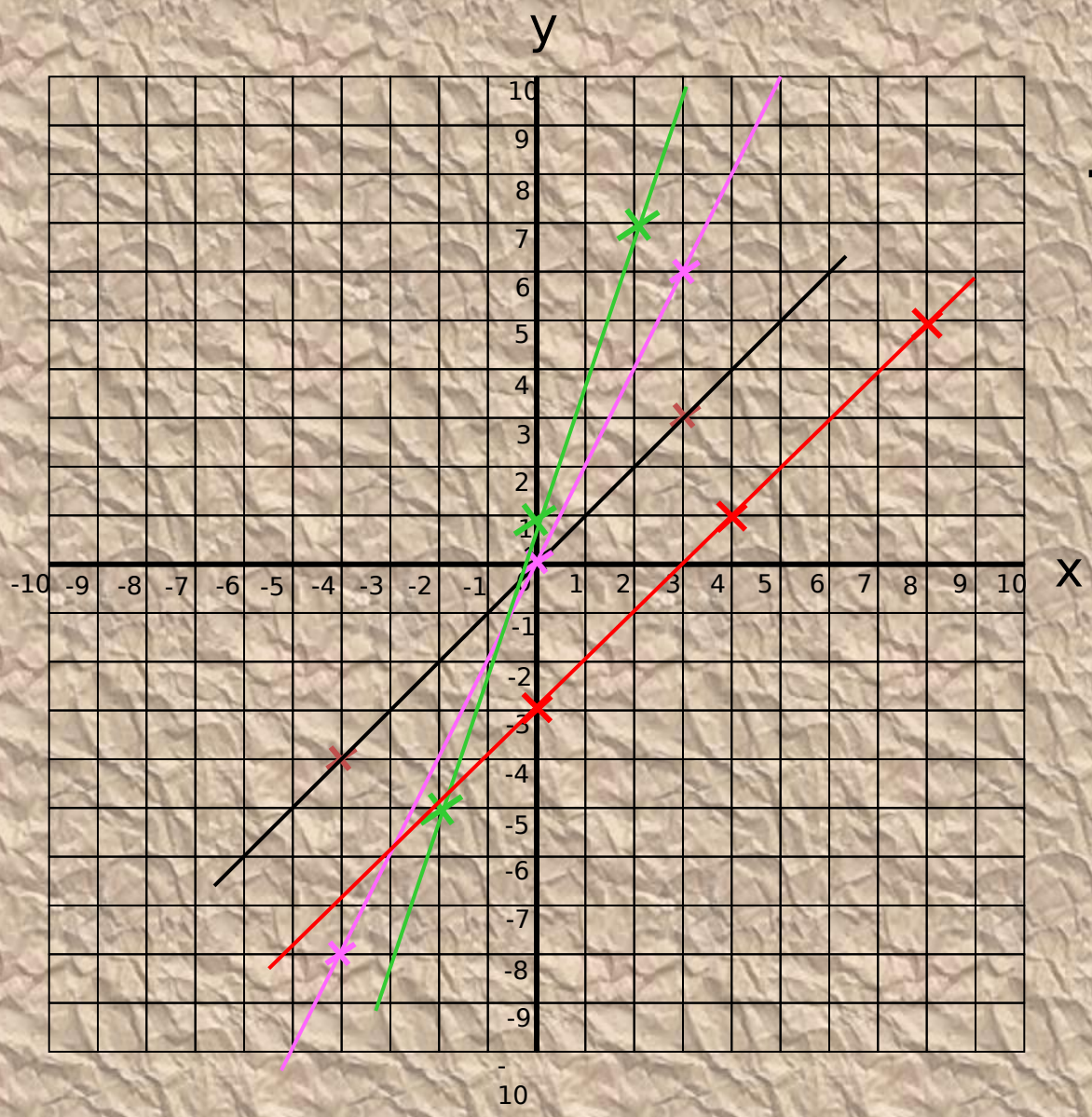
Learning Intention

1. To draw graphs by using a coordinate table

Success Criteria

1. Understand the key points of drawing a straight line graph
2. Be able to plot a straight line graph

Drawing Straight Line Graphs y = mx + c



$y = 3x+1$

x	-2	0	2
y	-5	1	7

$y = x$

x	0	3	-4
y	0	3	-4

$y = x - 3$

x	0	4	8
y	-3	1	5

$y = 2x$

x	0	3	-4
y	0	6	-8

Straight Line Graphs

Key Points

1. Make a table

2. Calculate and plot 3 coordinates

3. Draw a line through points

The Gradient of a Line

Learning Intention

1. To explain how to calculate the gradient using right angled triangles

Success Criteria

1. Gradient is :
   change in vertical height
   divided by
   change in horizontal distance
2. Calculate simple gradients.

The Gradient

Difference in y -coordinates

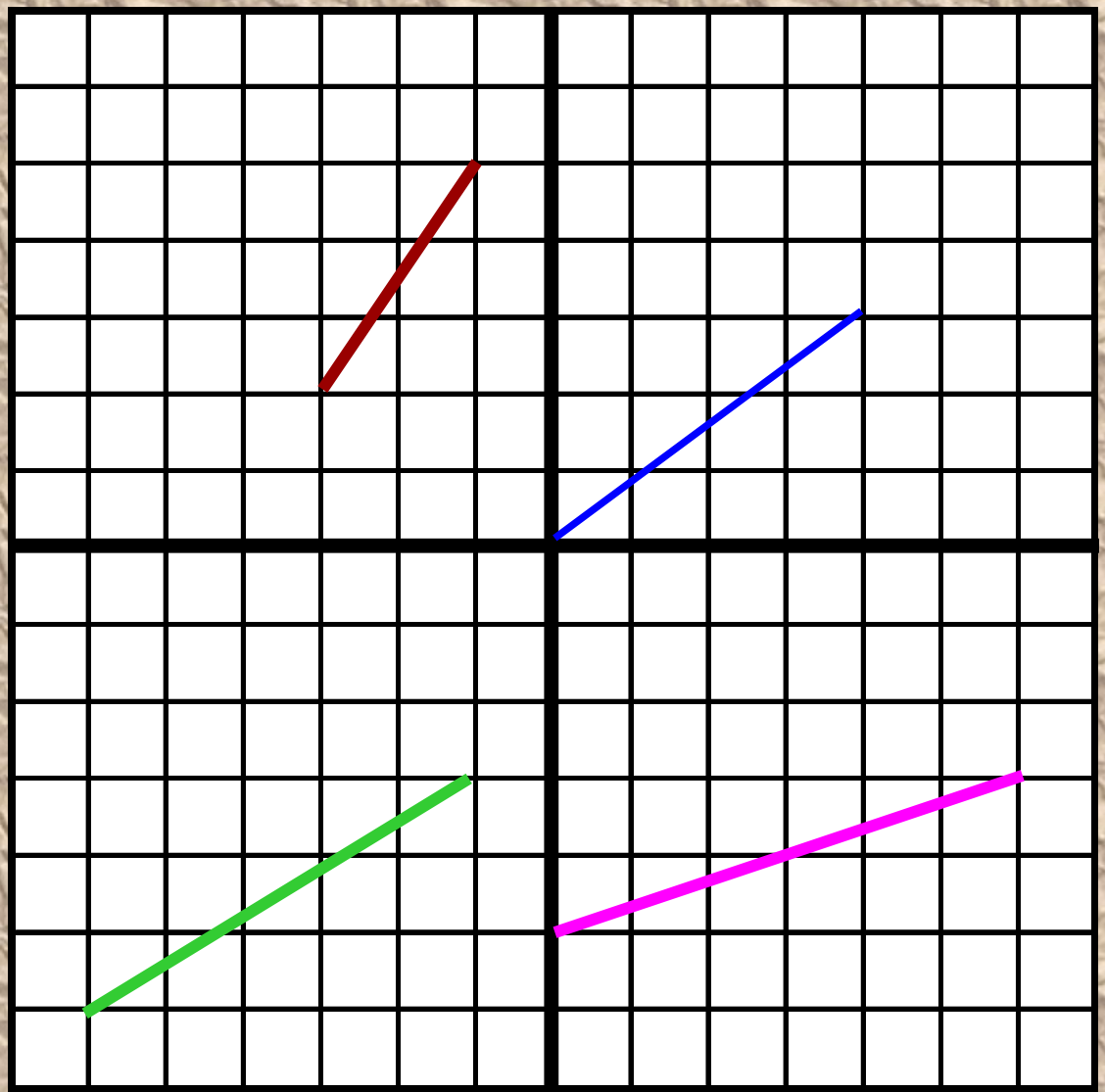
The gradient is the measure of steepness of a line

$$\frac{\text{Change in vertical height}}{\text{Change in horizontal distance}} = \frac{V}{H}$$

The steeper a line the bigge

Difference in x -coordinates

The Gradient



$$m = \frac{V}{H} = \frac{3}{4}$$

$$m = \frac{V}{H} = \frac{3}{2}$$

$$m = \frac{V}{H} = \frac{3}{5}$$

$$m = \frac{V}{H} = \frac{2}{6} = \frac{1}{3}$$

The Gradient of a Line

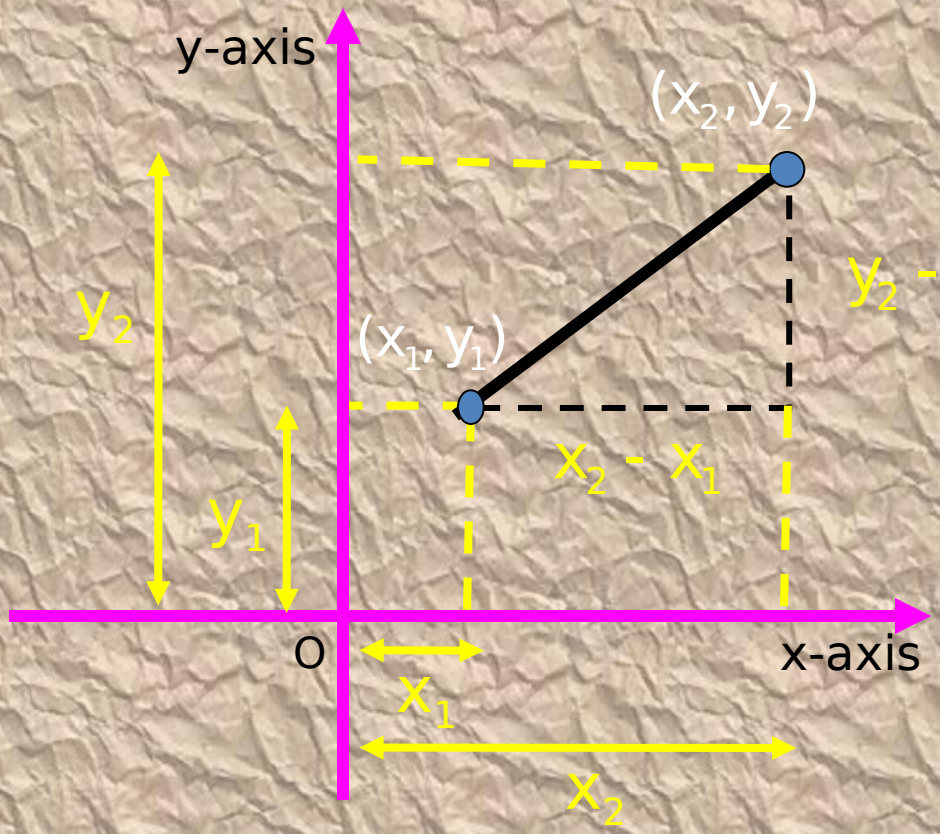
Learning Intention

1. To explain positive and negative gradients using coordinates.

Success Criteria

1. Know gradient formula.
2. Calculate gradients given two coordinates.

The gradient using coordinates

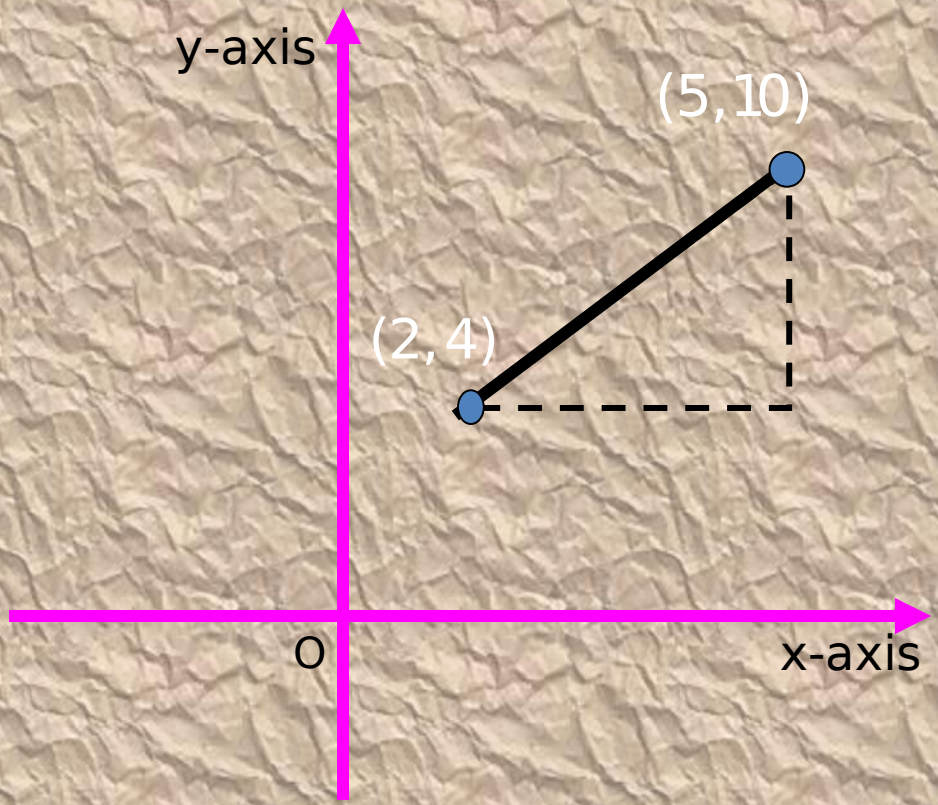


m = gradient

$$m = \frac{Y_2 - Y_1}{X_2 - X_1}$$

The gradient using coordinates

Find the gradient of the line.



m = gradient

$m = \frac{Y_2 - Y_1}{X_2 - X_1}$

$m = \frac{10 - 4}{5 - 2}$

$m = \frac{6}{2} = 2$

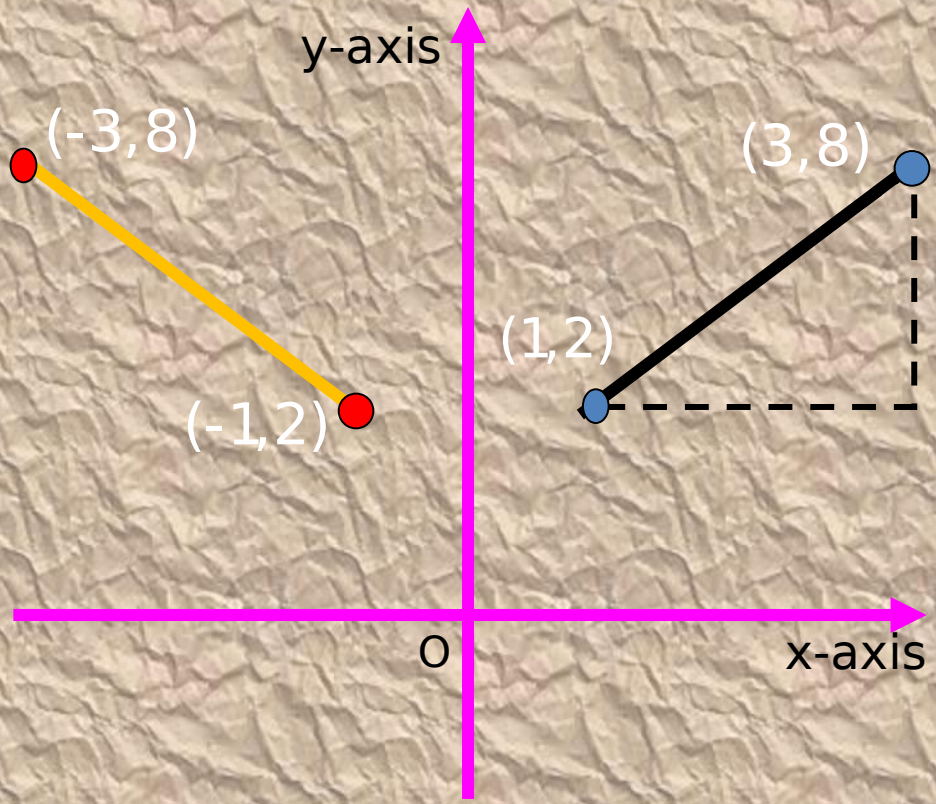
The gradient using coordinates

Find the gradient of the two lines.

$m = \frac{Y_2 - Y_1}{X_2 - X_1}$

$m = \frac{8 - 2}{-3 - (-1)}$

$m = \frac{6}{-2} = -3$



$m = \frac{Y_2 - Y_1}{X_2 - X_1}$

$m = \frac{8 - 2}{3 - 1}$

$m = \frac{6}{3} = 2$

The gradient using coordinates

The gradient formula is :

$$\text{Gradient} = m = \frac{(y_2 - y_1)}{(x_2 - x_1)}$$

It is a measure of how steep a line is

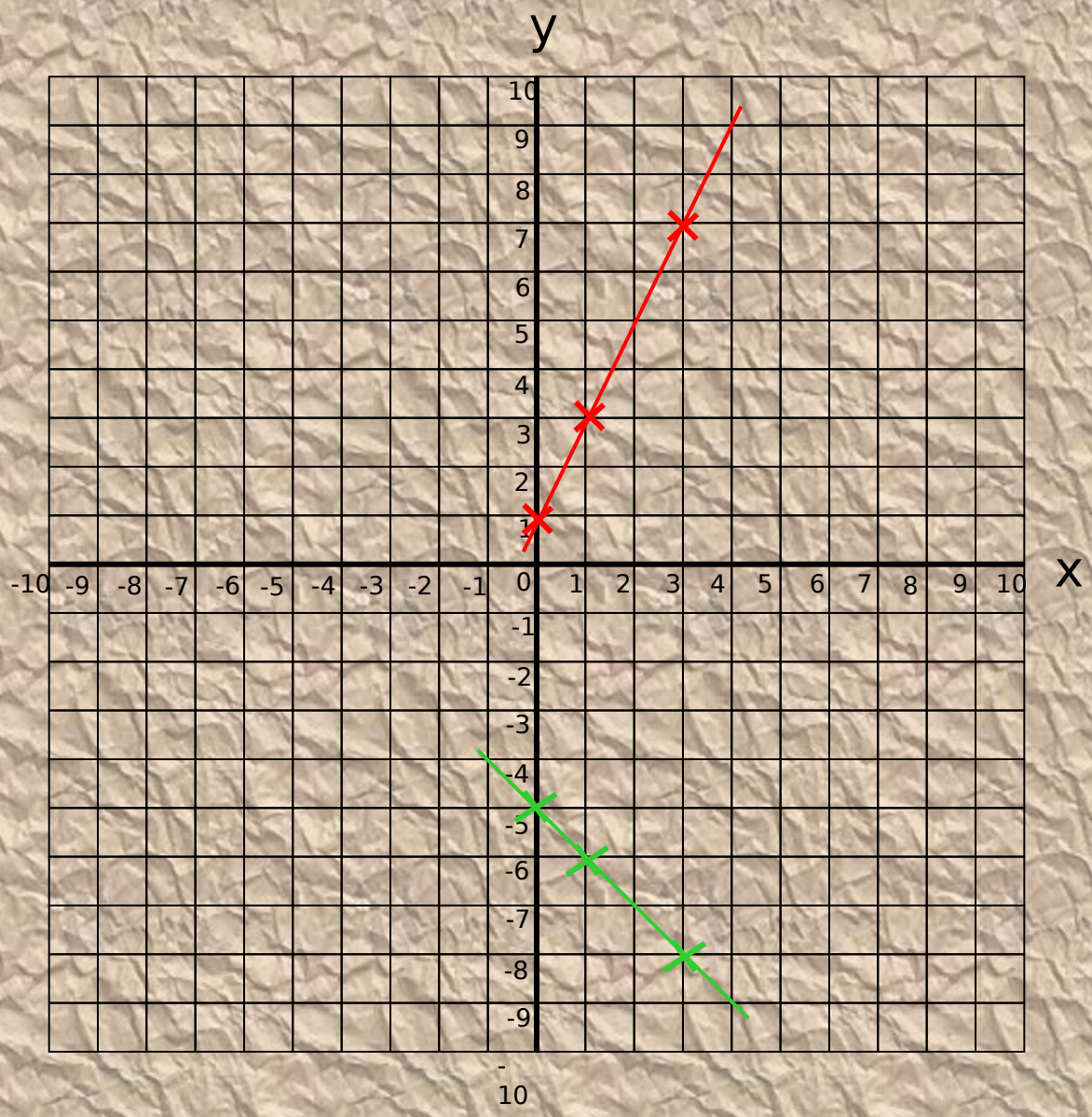
A line sloping up from left to right is a positive gradient

A line sloping down from left to right is a negative gradient





Straight line equation and the gradient connection



$y = -x - 5$

x	0	1	3
y	-5	-6	-8

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

m = -1

$y = 2x + 1$

x	0	1	3
y	1	3	7

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

m = 2

Straight Line Equation

All straight lines have the equation of the form

$$y = mx + c$$

Let's investigate properties

(You need GeoGebra to run link)

Straight Line Equation

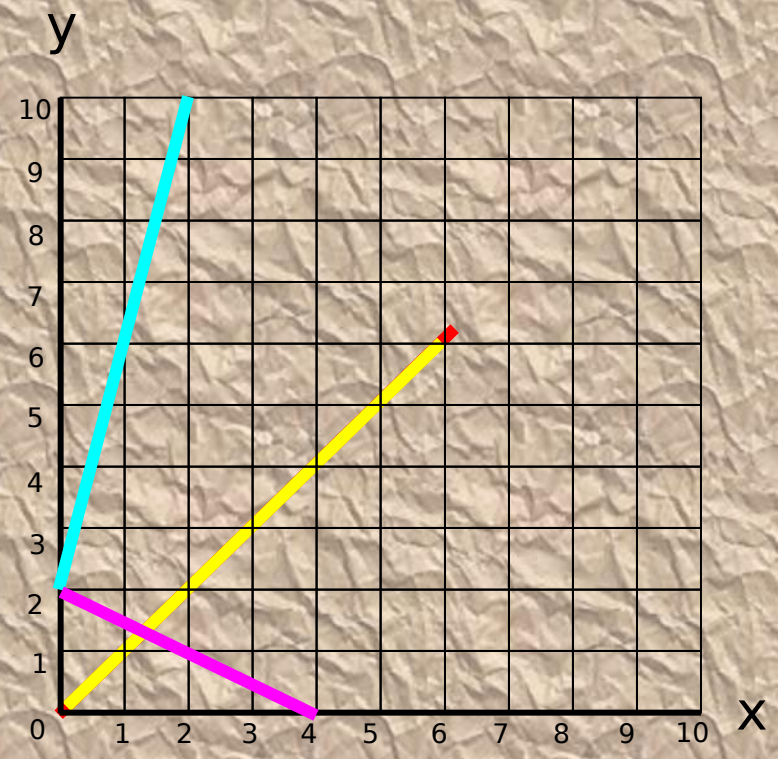
lines are parallel if they have the same gradient

t lines have
n of the form

$mx + c$

ient

Where line meets y-axis



Find the equations of the following lines

y = x **y = x+4** **y = 4x+2** **y = -0.5x+2**

Straight Line Equation

lines are parallel if same gradient

All straight lines have the equation of the form

$y = mx + c$

Slope left to right upwards positive gradient

Gradient

y - intercept

Slope left to right downwards negative gradient

y intercept is were line cuts y axis

Starter Questions

Q1. The points (1, 4) and (3, 11) lie on a line.
Find the gradient of the line.

Q2. Complete the table given : $y = 3x+1$

x	-3	0	3
y			

Q3. Are the two lines parallel. Explain answer

$y = x + 2$ and $y = 2x + 2$

Just a bit of algebra

ight Line
quation

Rearrange the following straight line equations into standard form and identify the gradient and y-intercept.

	Standard form	m	c
$y - 3x = 4$	$y = 3x + 4$	3	4
$2y - 2x = 6$	$y = x + 3$	1	3
$y - x + 5 = 0$	$y = x - 5$	1	-5
$4y - 8 = 0$	$y = 2$	0	2

Straight Line Equation

Find the a line parallel to $y - x = 0$ and passing through (0,3).

	Standard form	m	c
$x - y = 0$	$y = x$	1	0

A line parallel to $y = x$ has same gradient therefore $m = 1$

Since it passes through (0,3) then $c = 3$

Using standard form line is $y = x + 3$