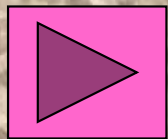
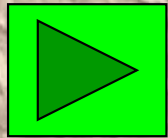


# Straight Line Graphs



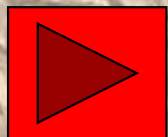
Drawing Straight line graphs



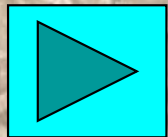
The gradient



The gradient from coordinates



The  $y$  intercept  $y = mx + c$



Other forms / rearranging equation

# 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

$$y = x - 3$$

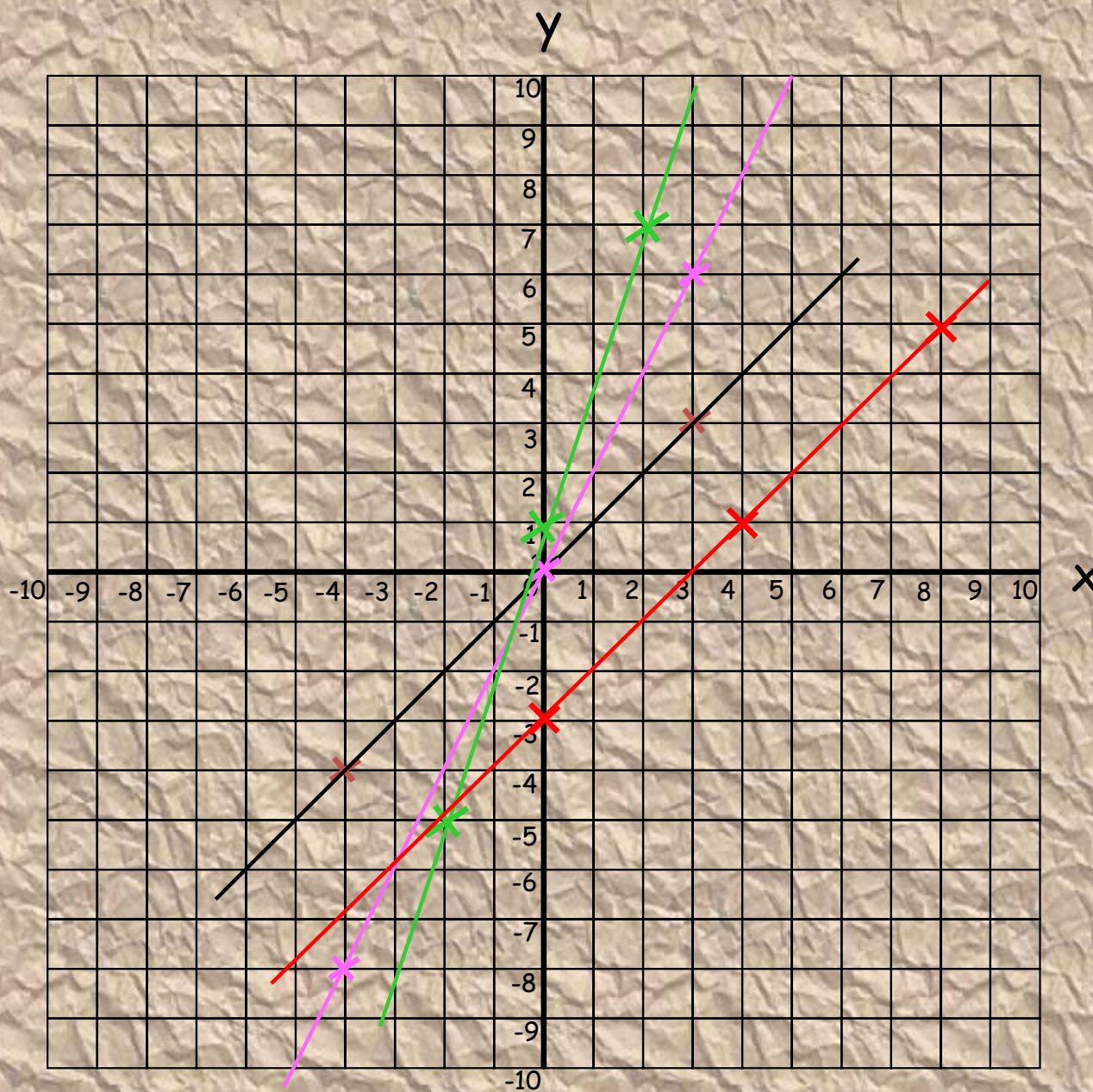
x	0	4	8
y	-3	1	5

$$y = x$$

x	0	3	-4
y	0	3	-4

$$y = 2x$$

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

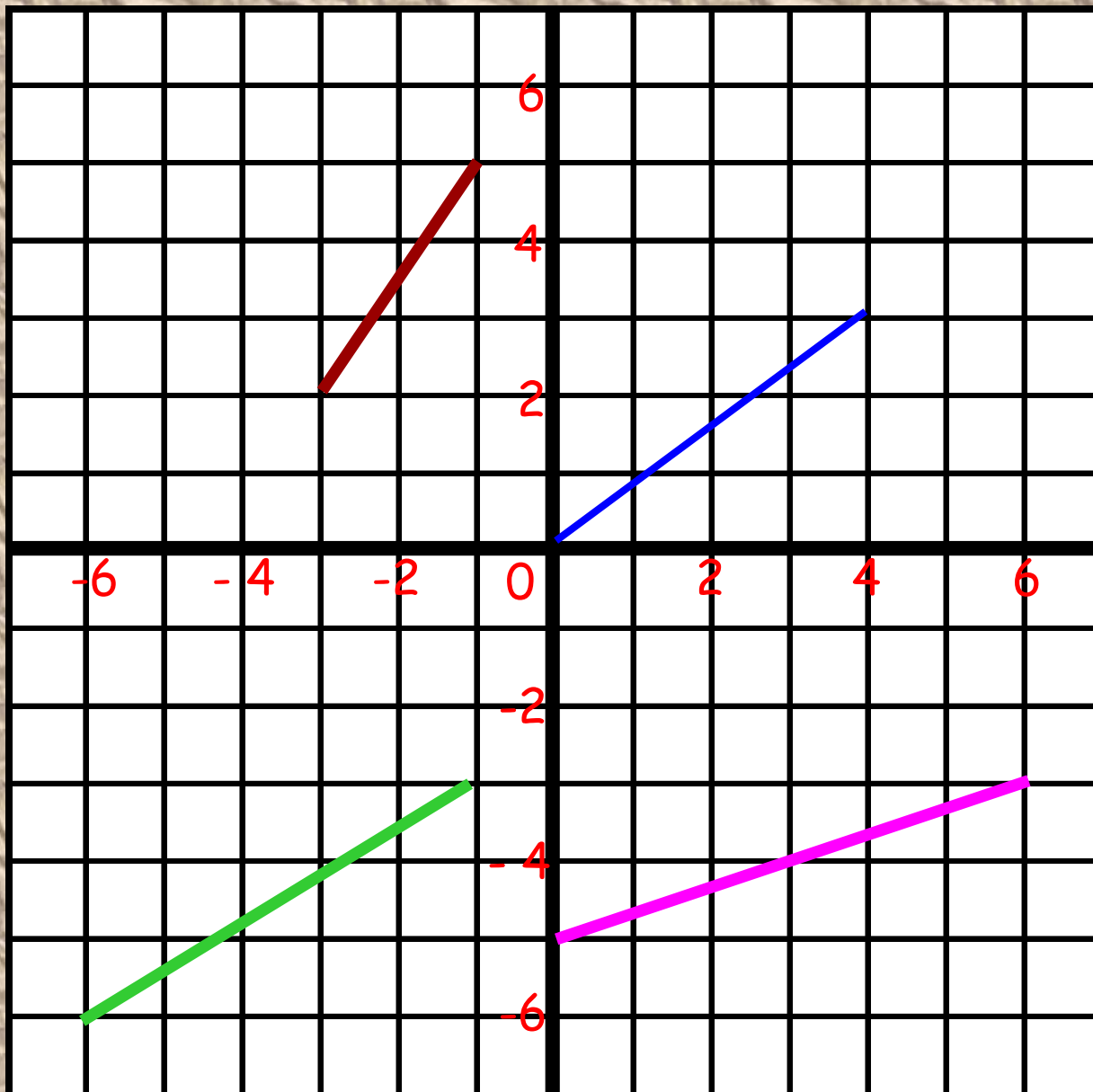
The gradient is the measure of steepness of a line

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

The steeper a line the bigger

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

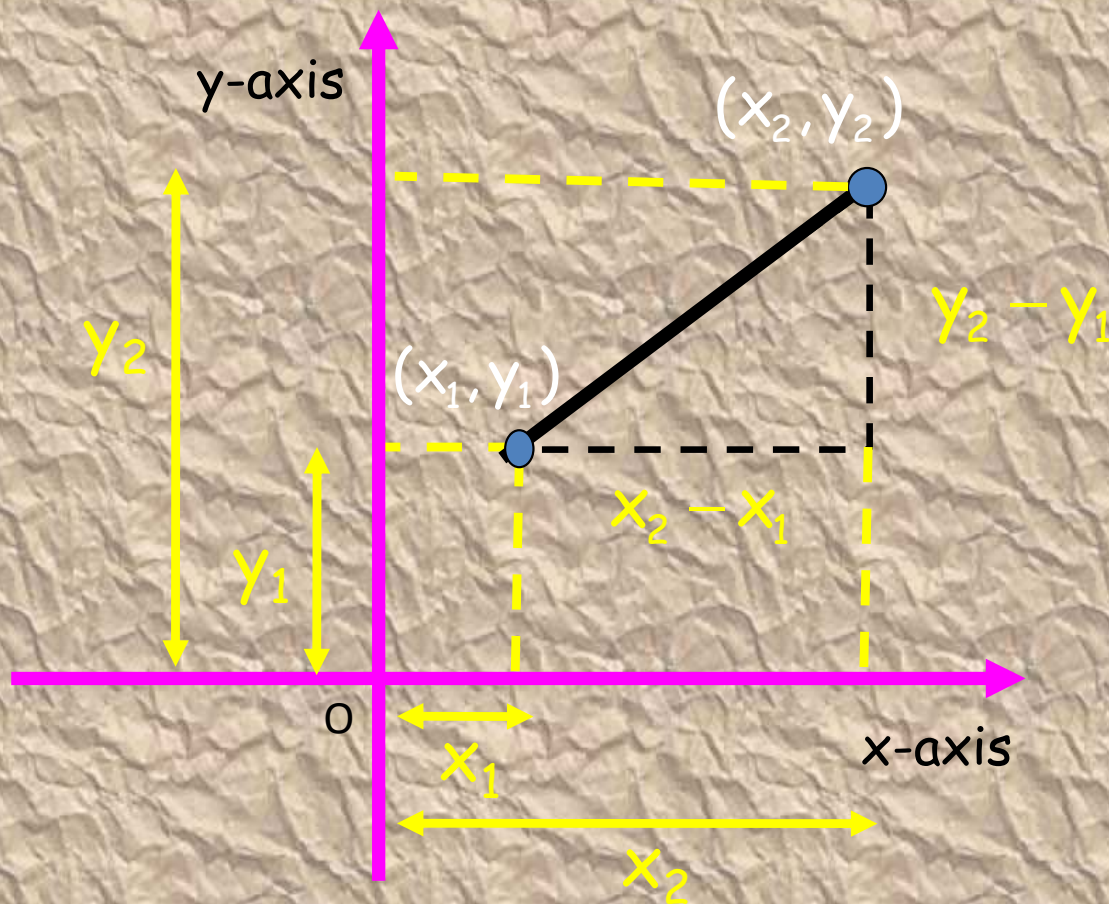
1. To explain positive and negative gradients using coordinates.

## Success Criteria

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



# The gradient using coordinates

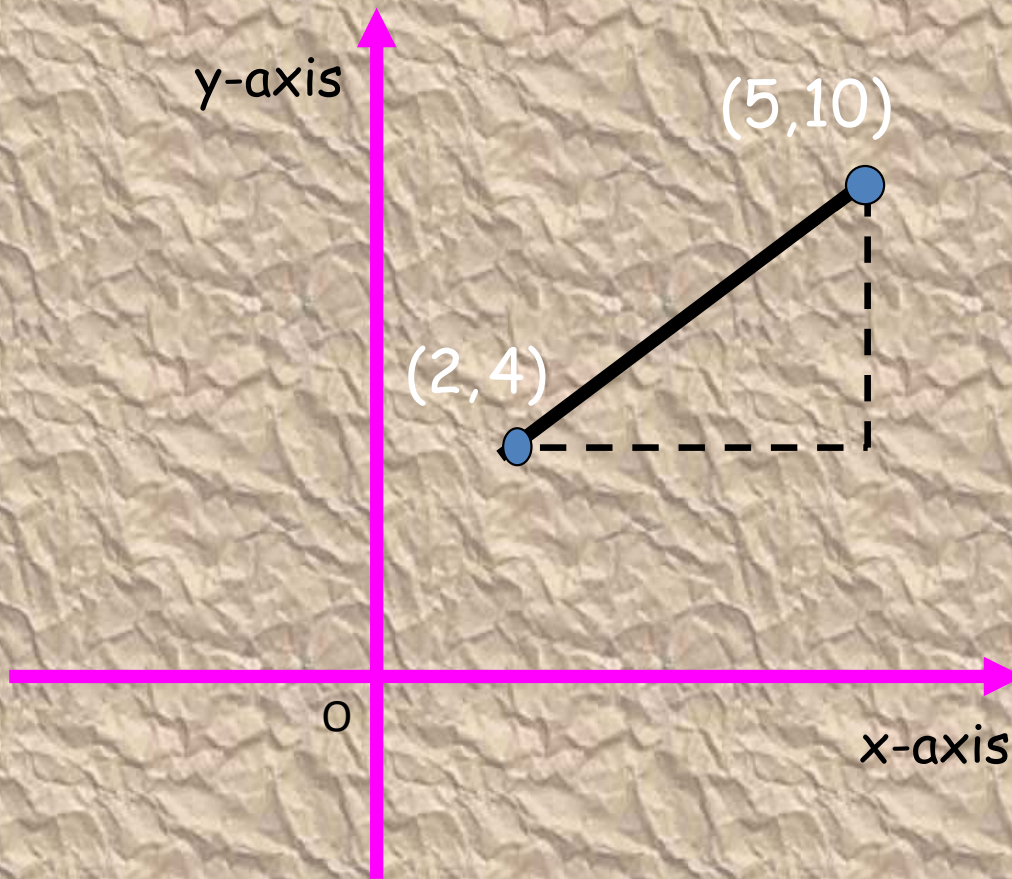


$m = \text{gradient}$

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

# The gradient using coordinates

Find the gradient of the line.



$$m = \text{gradient}$$

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

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

$$m = 6 \div 3 = 2$$

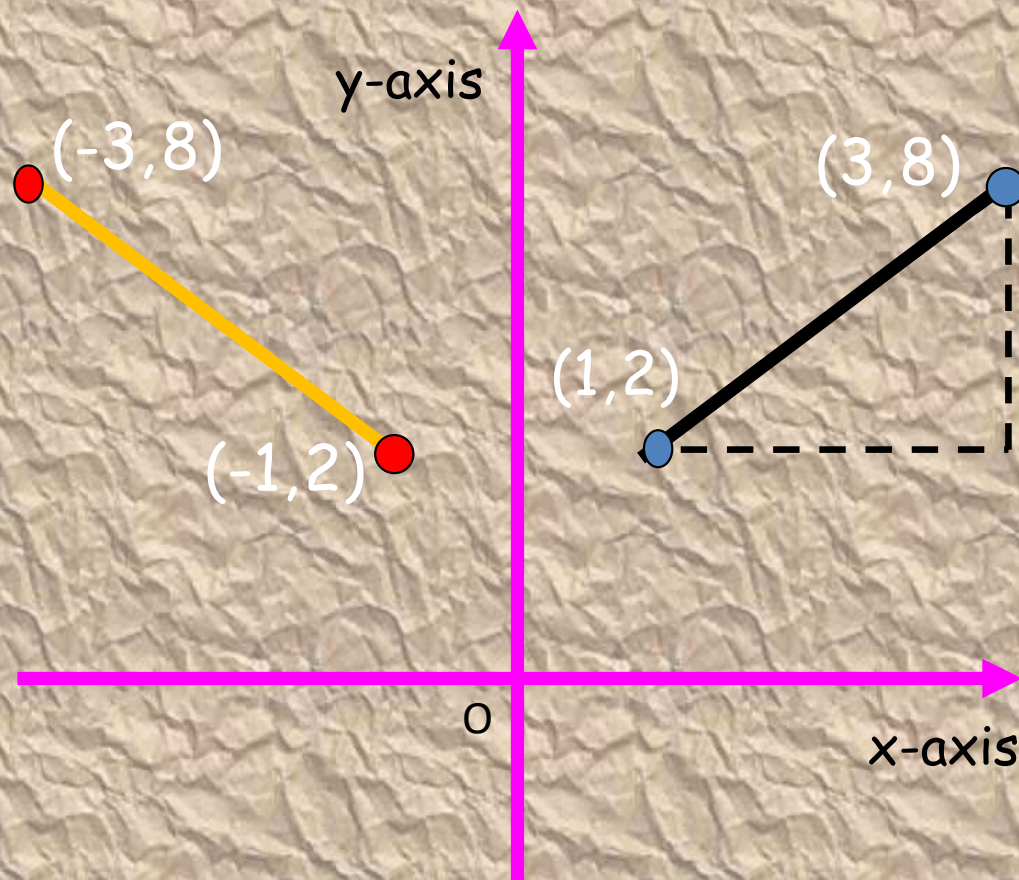
# The gradient using coordinates

Find the gradient of the two lines.

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

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

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



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

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

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

# 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

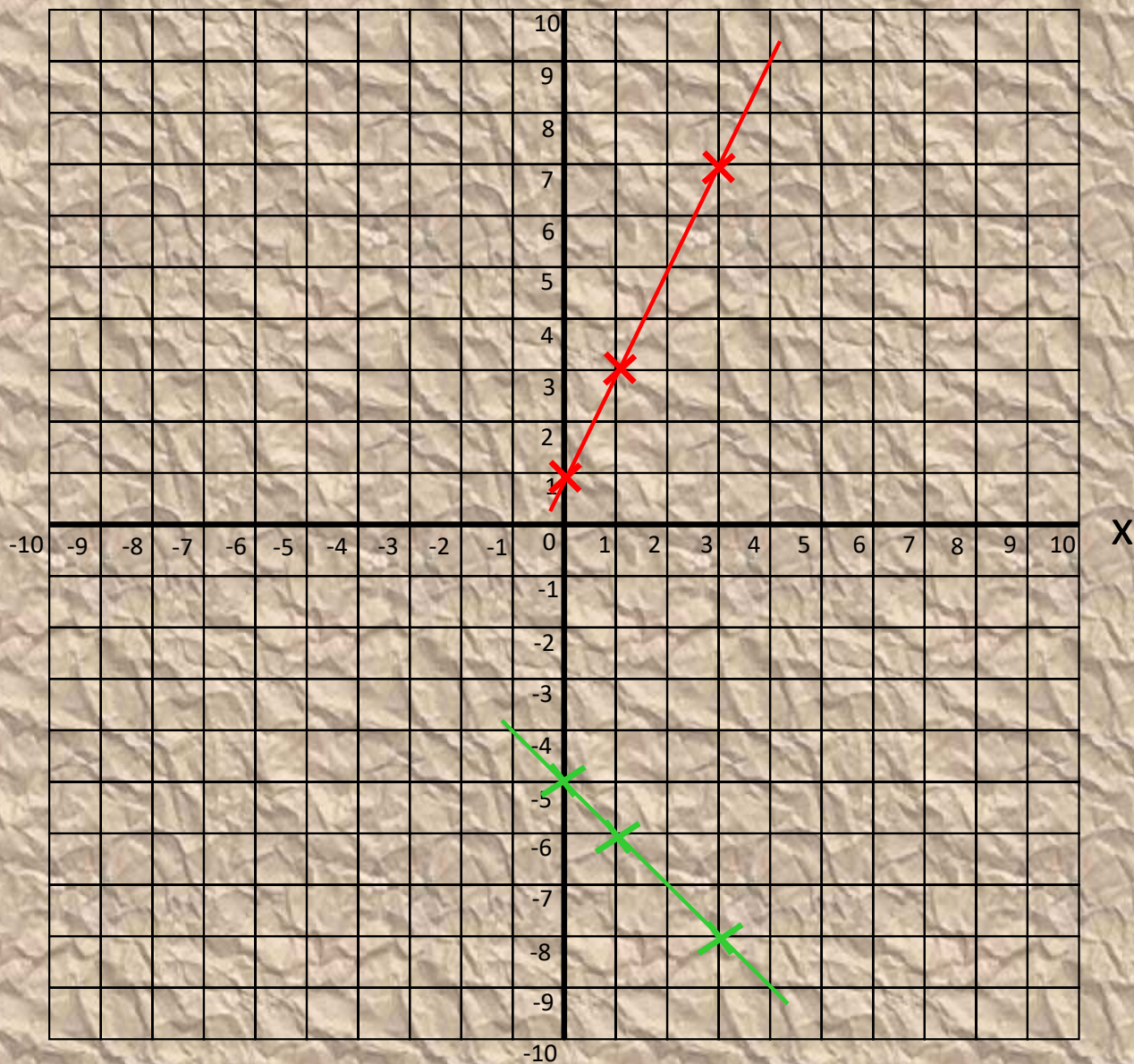
$$y = -x - 5$$

<b>x</b>	0	1	3
<b>y</b>	-5	-6	-8

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

$$m = -1$$

y



$$y = 2x + 1$$

<b>x</b>	0	1	3
<b>y</b>	1	3	7

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

$$m = 2$$

x

-10

# 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)

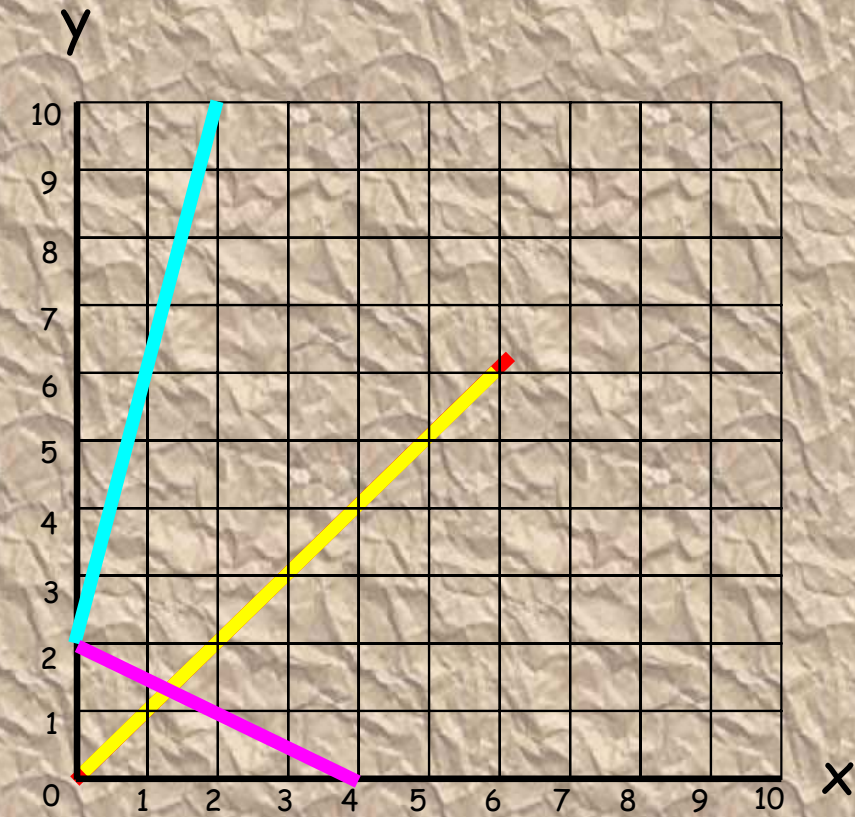
# Straight Line Equation

lines are parallel if they have the same gradient

all straight lines have an equation of the form

$$y = mx + c$$

Where line meets y-axis



Find the equations of the following lines

$$y = x$$

$$y = x + 4$$

$$y = 4x + 2$$

$$y = -0.5x + 2$$

lines are parallel if  
same gradient

## Straight Line Equation

All straight lines have the equation of the form

Slope left to right  
upwards positive  
gradient

$$= m x + c$$

Gradient

y - intercept

Slope left to right  
downwards negative  
gradient

y intercept is where  
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

$$y = x + 2 \quad \text{and} \quad y = 2x + 2$$

Just a bit of  
algebra

## Line Equation

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  $y = x + 3$