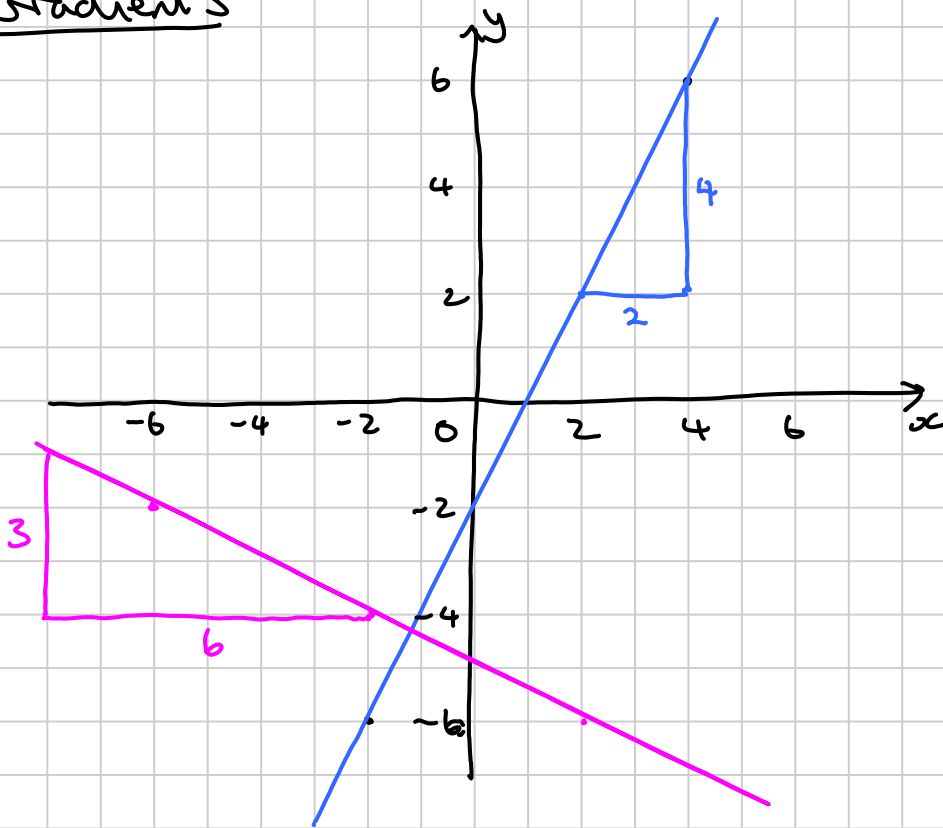


STRAIGHT LINE GRAPHS AND GRADIENTS

Note Title

01/03/2011

Gradients



The gradient of a line is the amount it travels up for each unit it travels along.

It is usually easier to draw a bigger triangle and work out:

$$\text{GRADIENT} = \frac{\text{no of units UP}}{\text{no of units ALONG}}$$

Examples

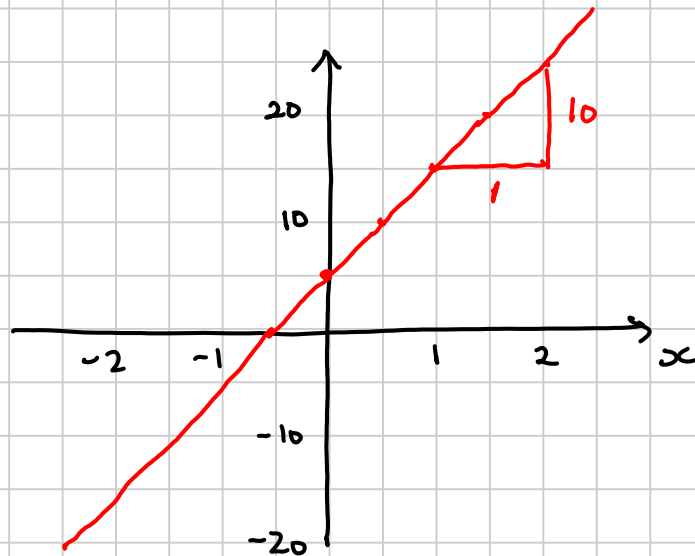
① (blue line) gradient = $\frac{4}{2} = 2$

② (purple line) gradient = $-\frac{3}{6} = -\frac{1}{2}$

Note

- ① • A line going UPHILL from left to right has a POSITIVE gradient
- A line going DOWNHILL from left to right has a NEGATIVE gradient.
- A horizontal line has a gradient of 0.

- ② We must use the SCALE on the axes, not just count squares eg.



$$\text{Gradient} = \frac{10}{1} = \underline{\underline{10}}$$

Straight line Graphs

Any equation of the form

$$y = mx + c$$

has a graph which is a straight line.

The number m is the gradient of the line
The number c is the y-intercept (ie where the line crosses the y-axis).

Examples Find the gradient and y-intercept of each of the following:-

① $y = 3x - 4$ $g = 3$, $y-i = -4$

② $y = 2 - \frac{1}{2}x$ $g = -\frac{1}{2}$, $y-i = 2$

③ $2x + 4y = 8$
 $(-2x)$ $(-2x)$
 $4y = 8 - 2x$
 $(\div 4)$ $(\div 4)$
 $y = 2 - \frac{1}{2}x$

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

(Note that ② and ③ are actually the same line even though the equations look different at first.)

If 2 lines have the same gradient, they are PARALLEL

④ Write down the equation of the line parallel to $y = 2x - 5$, passing through the point $(0, 3)$.

$$y = 2x + 3$$

⑤ Find the equation of the line with gradient -2 which passes through the point $(3, 4)$.

$$y = -2x + c$$

When $x = 3$, y must be 4:

$$-2 \times 3 + c = 4$$

$$-6 + c = 4$$

$$c = 10$$

Equation is $y = -2x + 10$