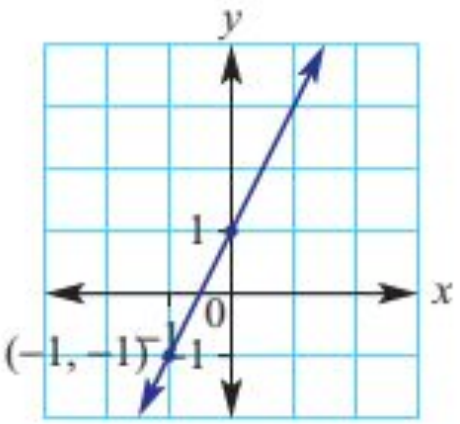
GRADIENT

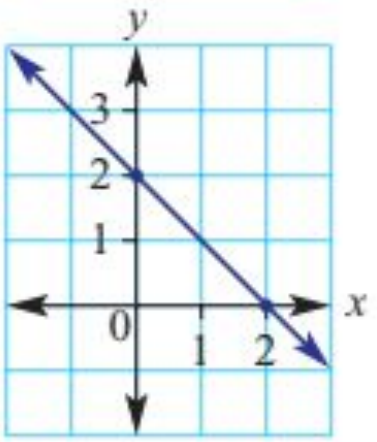
A linear relationship is of the form $y = mx + b$

m is called the gradient.

It is a measure of the slope of the line (i.e. how steep it is).

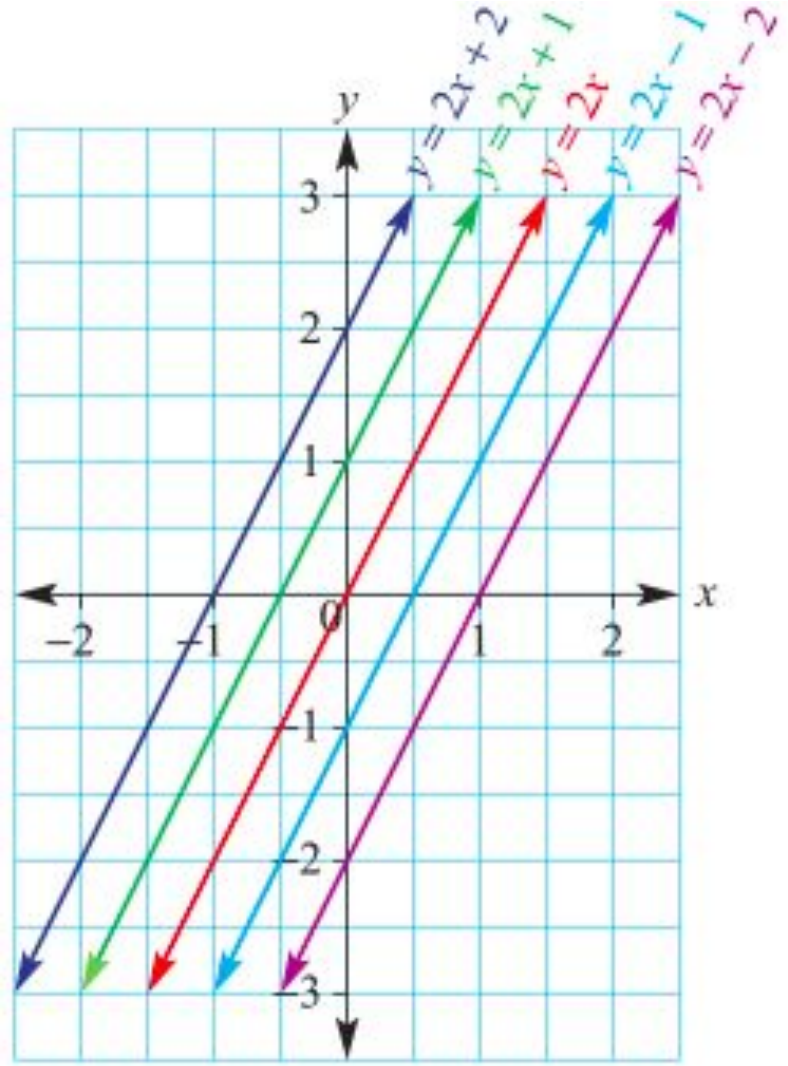
examples $y = 2x + 1$ $y = -x + 2$





DIFFERENT Y-INTERCEPTS AND SAME GRADIENT

Lines with same gradient are parallel.



GRADIENT

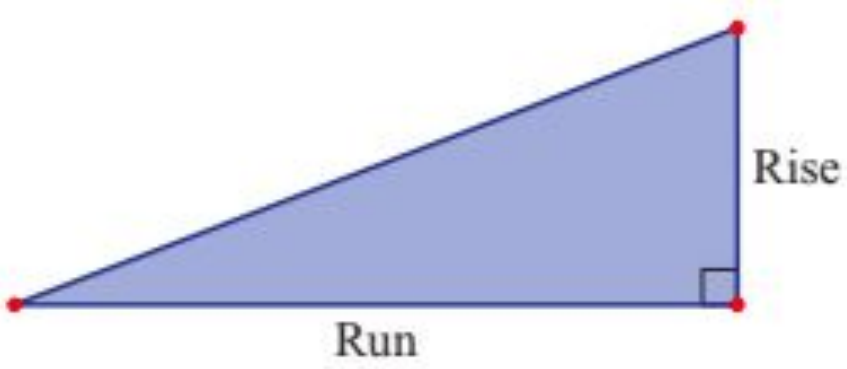
The gradient is often calculated as follows:

Let $A(x_A, y_A)$ and $B(x_B, y_B)$ be two points of a line.

$$y_A = m\,x_A + b \qquad y_B = m\,x_B + b$$

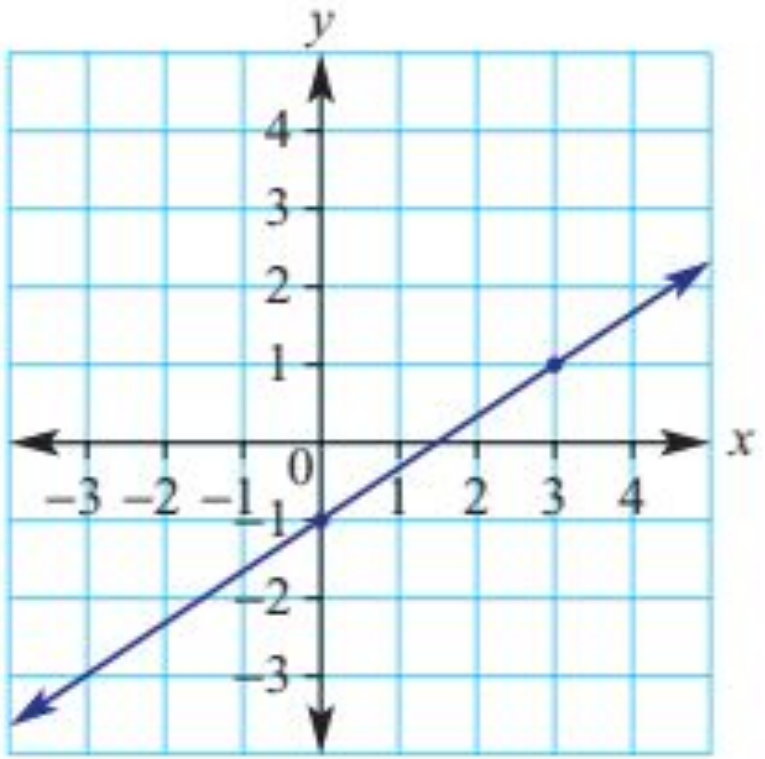
By subtracting the two equations, we get:

$$m = \frac{y_B - y_A}{x_B - x_A} = \frac{Rise}{Run}$$



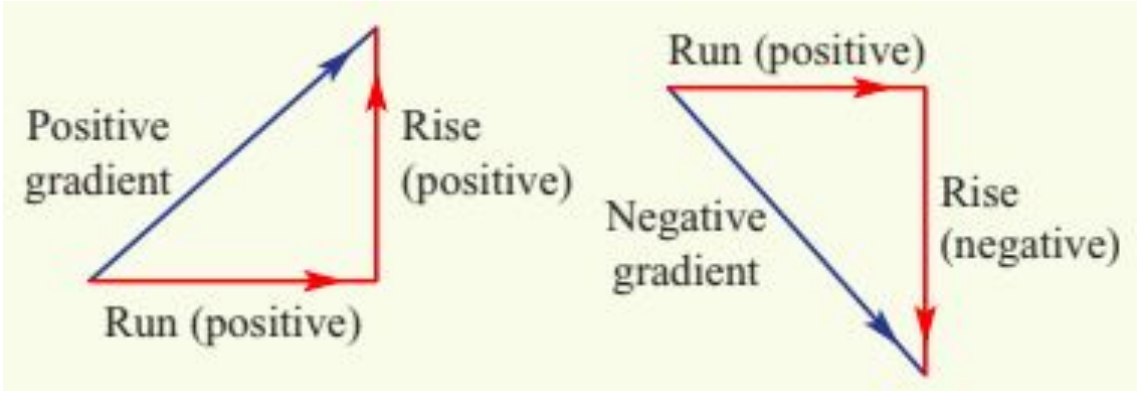
GRADIENT

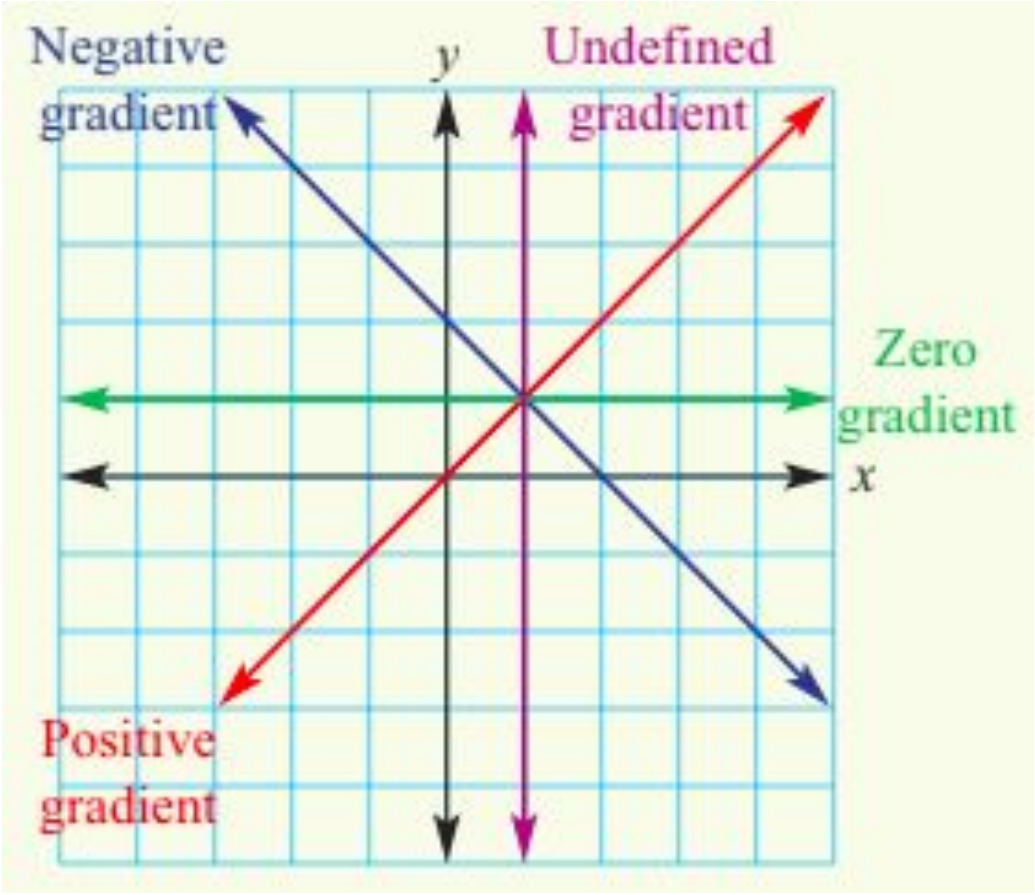
Example:



A(3,1) and B(0,-1)

$$m = \frac{1-(-1)}{3-0} = \frac{2}{3}$$


Positive
gradient
Rise
(positive)
Run (positive)
Run (positive)
Negative
gradient
Rise
(negative)


Negative
gradient
y
Undefined
gradient
Zero
gradient
x
Positive
gradient

FINDING THE EQUATION OF A PARALLEL LINE

Example 17 Finding the equation of a parallel line

Find the equation of a line which is parallel to $y = 3x - 1$ and passes through $(0, 4)$.

SOLUTION	EXPLANATION
$y = mx + b$	Since it's parallel to $y = 3x - 1$, the gradient is the same
$m = 3$	so $m = 3$.
$b = 4$	The y-intercept is given in the question so $b = 4$.
$\therefore y = 3x + 4$	