Y11 - Gradients & Lines (F) - KO

What do I need to be able to do?

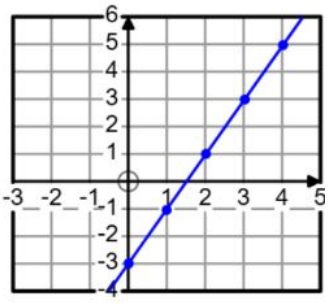
- Complete tables to plot straight line graphs
- Understand and find the equation of a straight line graph y = mx + c
- Work confidently with gradients and y intercepts
- Solve equations graphically

Keywords & definitions:

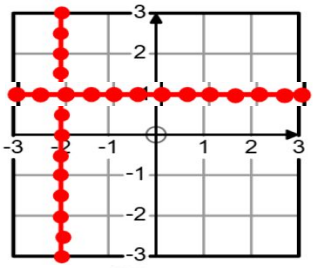
- **Gradient** - how steep a line is
- **Intercept**- the point where a graph crosses the y axis
- **Parallel** - Lines that have the same gradient
- **Perpendicular** - lines where the gradients are the negative reciprocal of each other
- **Horizontal** - lines that are in the format or y = a
- **Vertical** - lines that are in the format of x = b

Plot the graph of $y = 2x - 3$

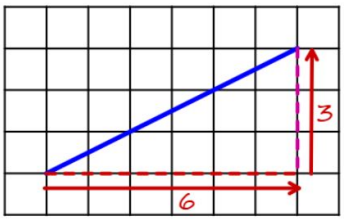
x	y
0	-3
1	-1
2	1
3	3
4	5



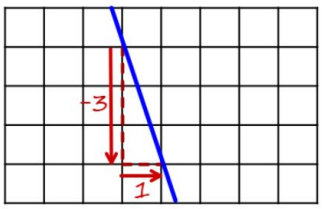
Horizontal and vertical lines



Gradient of a line = Change in y values / Change in x values



Gradient = $\frac{3}{6} = \frac{1}{2} = 0.5$

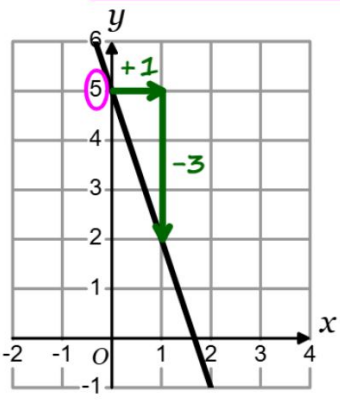


Gradient = $\frac{-3}{1} = -3$

The equation of a line can be written as:
$y = mx + c$

m is the **gradient** of the line

c is the **y-intercept**



y-intercept = 5

c = 5

gradient = $\frac{-3}{1}$

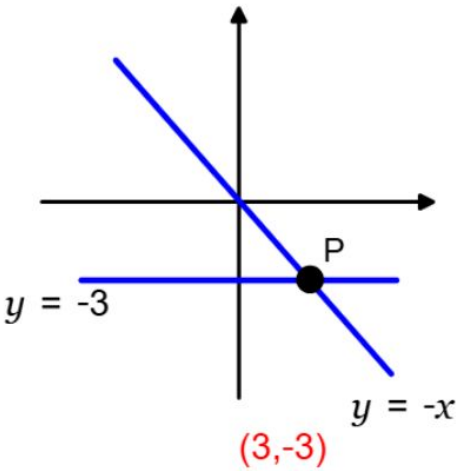
m = -3

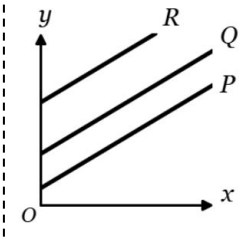
Equation of the line:

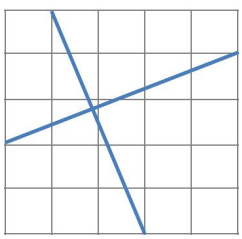
y = mx + c

y = -3x + 5

Solving equations graphically







Parallel lines have the same gradient.

The gradients of perpendicular lines are negative reciprocals of each other, e.g $\frac{1}{3}$ and -3

Y11 - Non-Linear Graphs (F) - KO

What do I need to be able to do?

- Plot and read from quadratic graphs
- Identify and interpret roots and intercepts of quadratics
- Plot and read from cubic graphs
- Plot and read from reciprocal graphs
- Recognise graph shapes

Keywords & definitions:

- **Root** - Where a function equals zero
- **Intercept** - the point of intersection of the line with the coordinate axes
- **Sketch** - drawing that represents the general shape and key features of a function
- **Function** - A special relationship where each input has a single output
- **Quadratic** - A special relationship where each input has a single output
- **Vertex** - turning point of the parabola. It's the minimum point for a U-shaped parabola and the maximum point for an upside-down U-shaped parabola
- **Parabola** - The shape of a quadratic graph

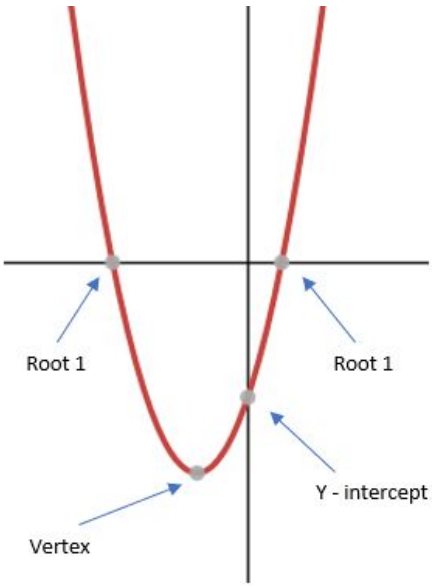
Using a table of values to plot a quadratic

$y = x^2 - 4x + 5$

$-1 \leq x \leq 3$

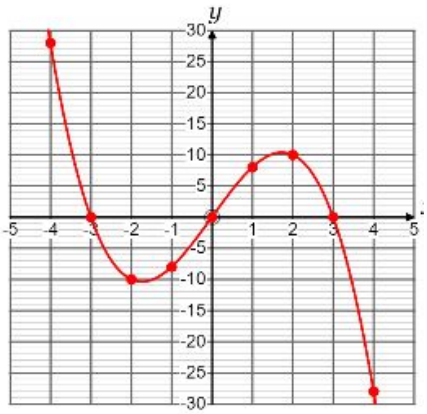
x	-1	0	1	2	3
x^2	1	0	1	4	9
$-4x$	4	0	-4	-8	-12
$+5$	+5	+5	+5	+5	+5
x^2-4x+5 y	1 + 4 + 5 10	0 + 0 + 5 5	1 − 4 + 5 2	4 − 8 + 5 1	9 − 12 + 5 2

Identify and interpret roots and intercepts of quadratics



Plot the graph of $y = 9x - x^3$

x	y
-4	28
-3	0
-2	-10
-1	-8
0	0
1	8
2	10
3	0
4	-28



A common form of a reciprocal graph is:

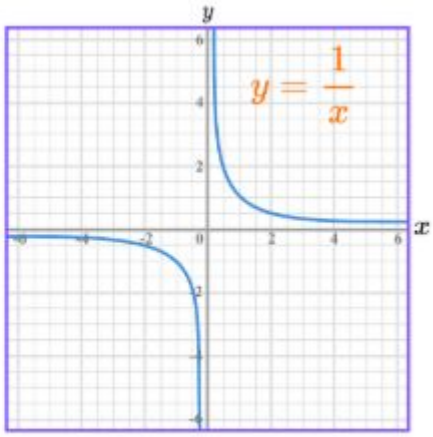
$$y = \frac{c}{x}$$ (c is a constant) or $xy = c$

This form of reciprocal graph is a smooth curve called a hyperbola. It has two branches.

Example $y = \frac{1}{x}$

Here, the curve gets very close to the x and y axes but never touches them.

This means that the x and y axes are **asymptotes** to the curve.



Retrieval Quiz

Answers