

Y11 - Gradients & Lines (H) - KO

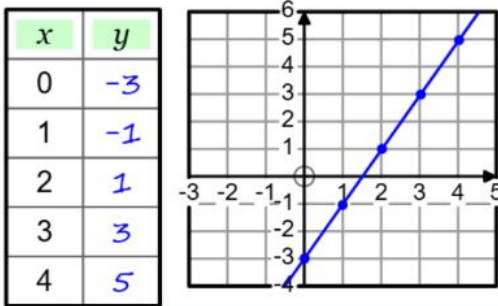
What do I need to be able to do?

- 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

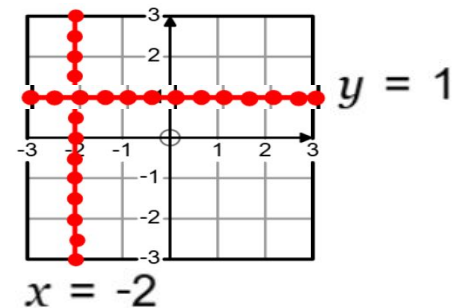
Keywords & definitions:

- **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 $y = a$
- **Vertical** - lines that are in the format $x = b$

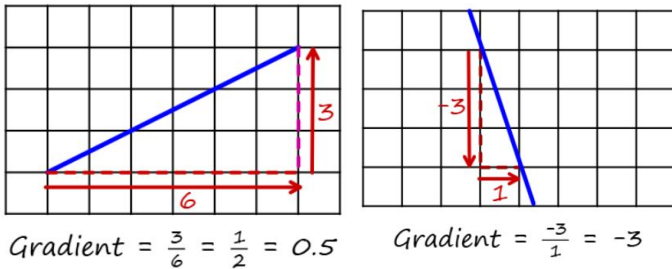
Plot the graph of $y = 2x - 3$



Horizontal and vertical lines



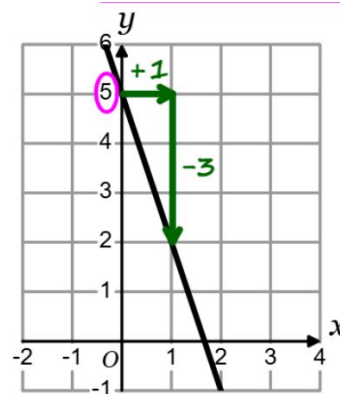
Gradient of a line = $\frac{\text{Change in } y \text{ values}}{\text{Change in } x \text{ values}}$



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

m is the gradient of the line

c is the y -intercept



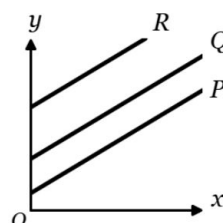
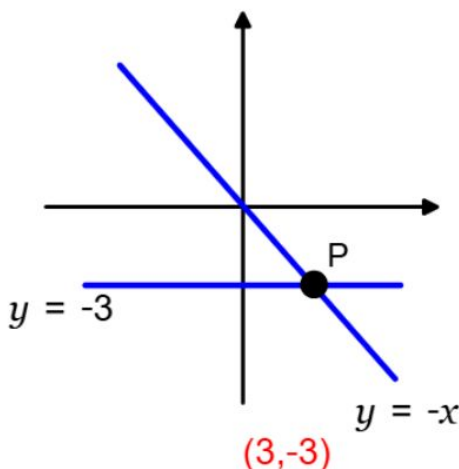
y -intercept = 5
 $c = 5$

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

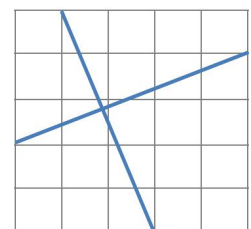
Equation of the line:

$y = mx + c$
 $y = -3x + 5$

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 (H) - 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
- Understand and use exponential graphs
- Find and use the equation of a circle centre (0, 0)
- Understand and use trigonometric graphs

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

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

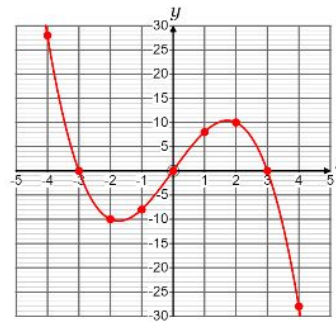
$$-1 \leq x \leq 3$$

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

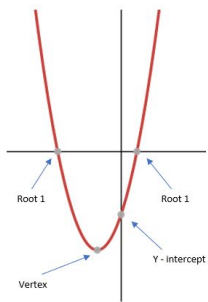
Plot the graph of

$$y = 9x - x^3$$

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



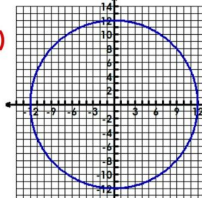
Identify and interpret roots and intercepts of quadratics



The center is (0, 0)

The radius is 12

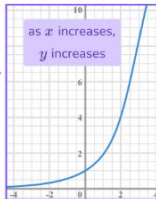
The equation is $x^2 + y^2 = 144$



An exponential graph represents an exponential function of the form $y = k^x$

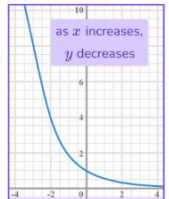
Examples

$$y = 2^x$$



Exponential growth
 $k > 1$

In these examples the y-intercept (at $x = 0$) is 1 since anything raised to the power 0 is 1



Exponential decay
 $k < 1$

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Reciprocal Graphs

A common form of a reciprocal graph is:

$$y = \frac{c}{x} \quad \text{or} \quad xy = c$$

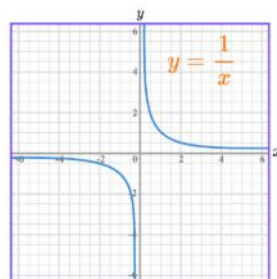
(c is a constant)

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

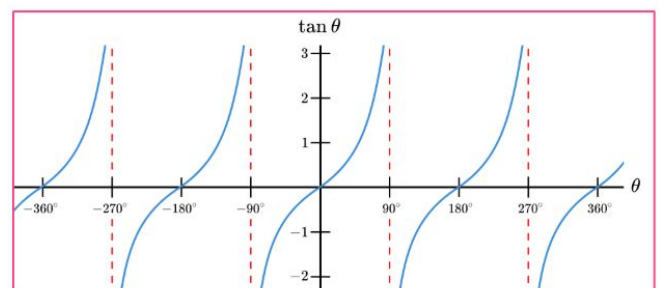
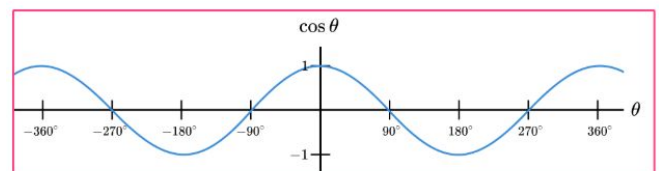
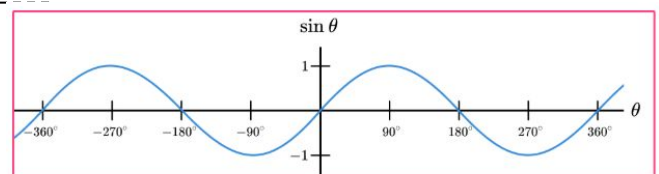
Example $y = \frac{1}{x}$

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.



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Retrieval Quiz

Answers

Retrieval Quiz

Answers