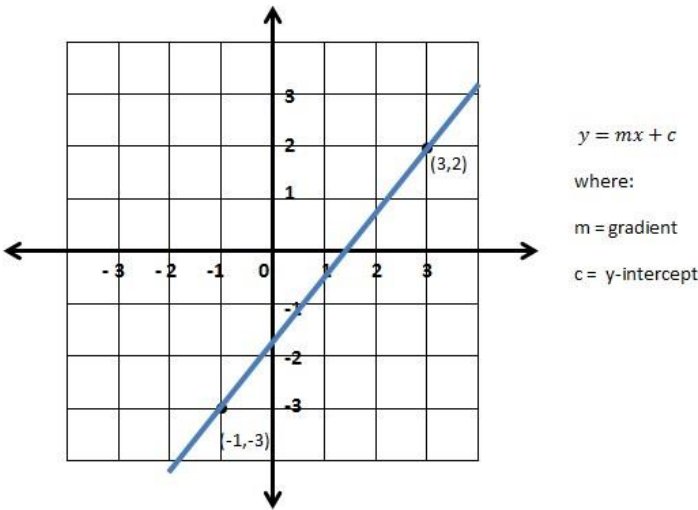


## Patterns and relationships

Term	Definition	Illustration
<p><b>Cubic numbers</b></p>	<p>When a whole number is multiplied by itself once, and then again, the result is a cubic number.</p> <p>This process is called <b>cubing</b> a number. It results in the number being <b>cubed</b>.</p> <p>To indicate this process, a power of 3 is used.</p>	<p>The first three cubic numbers are 1, 8, and 27 because:</p> $1^3 = 1 \times 1 \times 1 = 1$ $2^3 = 2 \times 2 \times 2 = 8$ $3^3 = 3 \times 3 \times 3 = 27$ <p>For this last example we would say “3 cubed is 27”.</p>
<p><b>Equation of a straight line</b></p>	<p>The relationship between a collection of points which can be plotted to make a straight line can generally be given as <math>y = mx + c</math>. This line will have a gradient equal to <math>m</math> and will cross the <math>y</math> axis at the point <math>(0, c)</math>.</p> <p>Vertical lines are collections of points that share the same <math>x</math> coordinate and so are given by the equation <math>x = a</math> where <math>(a, 0)</math> is the point at which the line crosses the <math>x</math> axis.</p> <p>Horizontal lines are collections of points that share the same <math>y</math> coordinate and so are given by the equation <math>y = a</math> where <math>(0, a)</math> is the point at which the line crosses the <math>y</math> axis.</p>	 <p><math>y = mx + c</math> where: <math>m = \text{gradient}</math> <math>c = \text{y-intercept}</math></p>

## Patterns and relationships

<p><b>Fibonacci sequence</b></p>	<p>Named after Italian mathematician Leonardo of Pisa.</p> <p>The first two terms in the sequence are 0 and 1. Each new term is found by adding the two previous terms.</p> <p>There are many places in nature where Fibonacci sequences occur.</p>	<p>The Fibonacci sequence begins</p> <p>0, 1, 1, 2, 3, 5, 8, 13, 21, ...</p>
<p><b>Gradient</b></p>	<p>The rate at which vertical height changes with respect to horizontal distance covered.</p> <p>Gradients can be recorded numerically as a fraction, decimal fraction or percentage.</p>	<p>The line opposite rises 5 units whilst moving a horizontal distance of 4 units.</p> <p>Its gradient can be written as <math>\frac{5}{4}</math>.</p>
<p><b>Sequence</b></p>	<p>A list of numbers that are linked by a rule.</p> <p>Learners should be able to spot simple patterns to continue a sequence.</p>	<p>3, 6, 12, 24, ... The numbers double</p> <p>14, 11, 8, 5, .... The numbers decrease by 3</p>

## Patterns and relationships

<p><b>Square numbers</b></p>	<p>When a whole number is multiplied by itself the result is a square number.</p> <p>This process is called <b>squaring</b> a number. It results in the number being <b>squared</b>.</p> <p>To indicate this process, a power of 2 is used.</p>	<p>The first three square numbers are 1, 4, and 9 because:</p> $1^2 = 1 \times 1 = 1$ $2^2 = 2 \times 2 = 4$ $3^2 = 3 \times 3 = 9$ <p>For this last example we would say “3 squared is 9”.</p>
<p><b>Triangular numbers</b></p>	<p>Numbers generated using the sequence</p> <p>1  <math>1 + 2</math>  <math>1 + 2 + 3</math>  <math>1 + 2 + 3 + 4</math> and so on.</p> <p>Triangular numbers of items can be arranged in a triangle.</p>	