

# Year 12 T5

## Maths Overview

### Number and Algebra

Learning Outcomes	Elaboration	Textbook
<p>Students should be able to:</p> <ul style="list-style-type: none"> <li>approximate to specified or appropriate degrees of accuracy including a given power of 10, number of decimal places and significant figures;</li> <li>understand and use number operators <math>),,(\div \times +</math> and the relationships between them, including inverse and reciprocal operations and hierarchy of operations (for example, BODMAS);</li> <li>divide a quantity in a given ratio;</li> </ul>	<p>Estimate that:</p> <p><math>1472 - 383</math> is about 1100</p> <p><math>278 \div 39</math> is about 7</p> <p><math>\frac{0.25 \times 83.4}{5.7}</math> is about 3 or 4</p> <p>Estimate <math>\sqrt{97}</math></p>	<p><b>3,11</b></p>
	<p>Multiply and divide mentally single-digit multiples of any power of ten, and realise that, when multiplying or dividing by a number less than one, multiplication has a decreasing effect, and division an increasing effect.</p> <p>Work out mentally <math>80 \times 0.2</math> and <math>600 \div 0.2</math></p> <p>Understand ‘reciprocal’ as multiplicative inverse, knowing that any non-zero number multiplied by its reciprocal is one and that zero has no reciprocal, because division by zero is not defined.</p>	<p><b>15</b></p>
	<p>Apply order of precedence, first without brackets and then with brackets; solve problems requiring application of order of precedence.</p> <p>Distinguish correctly between:</p> <p><math>3 + 2 \times 5</math> and <math>(3 + 2) \times 5</math></p> <p><math>\frac{7.2}{9.8 + 12.7}</math> and <math>\frac{7.2}{9.8} + 12.7</math></p>	<p><b>3</b></p>
	<p>Understand the use of a counter-example. Explain why <math>2n - 1</math> is always odd.</p>	<p><b>19</b></p>
	<p>Understand and use ratios in a variety of situations.</p> <p>Use the approximation of 5 miles to 8 km to find the equivalent of 12 miles.</p> <p>State the lengths 8 cm and 12 cm in a drawing are in the ratio 2:3</p> <p>Adapt a recipe for six people to one for eight people.</p> <p>Divide £10 between two people in the ratio 3:5</p>	<p><b>10</b></p>

Learning Outcomes	Elaboration	Textbook
<ul style="list-style-type: none"> <li>understand the meaning of the words <i>equation</i>, <i>formula</i> and <i>expression</i> and distinguish between them;</li> </ul>	<p>Distinguish the different roles played by letter symbols in algebra, knowing that letter symbols represent definite unknown numbers in equations [e.g. <math>5x + 1 = 16</math>], defined quantities or variables in formulae [e.g. <math>V = IR</math>], general unspecified and independent numbers in <b>expressions</b> [e.g. <math>3x + 2x = 5x</math> for all values of <math>x</math>] and in functions they define new expressions or quantities by referring to known quantities [e.g. <math>y = 2x</math>].</p>	
<ul style="list-style-type: none"> <li>derive a formula, substitute numbers into a formula and change the subject of a formula;</li> </ul>	<p>Understand, construct and evaluate formulae related to mathematics or other subjects or real-life situations. Evaluate expressions. Work out <math>s = ut + \frac{1}{2}at^2</math> where <math>u</math> or <math>a</math> may have negative values. Make <math>t</math> the subject of the formula. <math>v = u + at</math>.</p>	17
<ul style="list-style-type: none"> <li>solve linear inequalities in one variable, and represent the solution set on a number line;</li> </ul>	<p>List the values of the integer <math>n</math> such that <math>-10 &lt; 2n \leq 20</math> or solve the inequality <math>2n - 3 \geq 7</math> illustrating the solution on a number line. Solve <math>x \leq 3x - 5</math> where <math>x</math> is a real number.</p>	16
<ul style="list-style-type: none"> <li>construct linear functions from real-life problems and plot their corresponding graphs;</li> </ul>	<p>For example, conversion graphs.</p>	20
<ul style="list-style-type: none"> <li>discuss, plot and interpret graphs (which may be non-linear) modelling real situations;</li> </ul>	<p>For example, distance-time graphs including intersecting travel graphs.</p>	20
<ul style="list-style-type: none"> <li>generate points and plot graphs of simple quadratic functions, and use these to find approximate solutions;</li> </ul>	<p>To include drawing graphs of: <math>y = ax^2 + bx + c</math></p>	35
<ul style="list-style-type: none"> <li>use index laws in algebra for multiplication and division of integer powers; and</li> </ul>	<p>Simplify expressions involving positive indices only, such as: <math>x^6 \div x^4</math>, <math>x^2 \times x^3</math> and <math>(x^2)^3</math></p> $\frac{6x^2y}{8xy^3} \quad \frac{2x^2}{y} \times \frac{3x^2}{6x}$	12,17
<ul style="list-style-type: none"> <li>calculate with money to include hire purchase, VAT, taxation, wages and salaries.</li> </ul>	<p>Solve problems in the context of finance, e.g. currency exchange rates, loans, deposit accounts, credit cards, general bank accounts including overdrafts, interest rates and mortgages, simple interest, mail order sales, insurance and unemployment benefit.</p>	18

