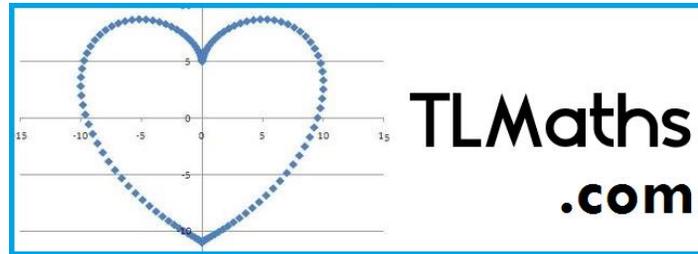


# A-Level Maths Videos



## Chapter 1: Algebra

### A: Proof

[Understand and use the structure of mathematical proof, proceeding from given assumptions through a series of logical steps to a conclusion; use methods of proof, including proof by deduction, proof by exhaustion]

[Disproof by counter example]

- [A1-01 \[Introduction to Proof\]](#)
- [A1-02 \[Introducing Consequence and Equivalence\]](#)
- [A1-03 \[Consequence and Equivalence Examples\]](#)
- [A1-04 \[Introducing Proof by Exhaustion\]](#)
- [A1-05 \[Proof by Exhaustion Examples\]](#)
- [A1-06 \[Introducing Proof by Deduction\]](#)
- [A1-07 \[Proof by Deduction Examples\]](#)
- [A1-08 \[Introducing Disproof by Counter Example\]](#)
- [A1-09 \[Disproof by Counter Example Examples\]](#)

### B: Algebra and Functions

[Understand and use the laws of indices for all rational exponents]

- [B1-00 \[Introducing Subsets of Real Numbers\]](#)
- [B1-01 \[Indices: The Laws of Indices\]](#)
- [B1-02 \[Indices: Examples of Negative Indices\]](#)
- [B1-03 \[Indices: Examples of Positive Rational Indices\]](#)
- [B1-04 \[Indices: Examples of Negative Rational Indices\]](#)
- [B1-05 \[Indices: More Complicated Examples\]](#)

[Use and manipulate surds, including rationalising the denominator]

- [B2-01 \[Surds: Introducing Surds and Simplifying Surds\]](#)
- [B2-02 \[Surds: Simplifying Surds Examples\]](#)
- [B2-03 \[Surds: Adding / Subtracting Surds\]](#)
- [B2-04 \[Surds: Introducing Expanding Single Brackets\]](#)
- [B2-05 \[Surds: Expanding Single Brackets Examples\]](#)
- [B2-06 \[Surds: Introducing Expanding Double Brackets\]](#)
- [B2-07 \[Surds: Expanding Double Brackets Examples\]](#)
- [B2-08 \[Surds: Introducing Rationalising the Denominator Part 1\]](#)
- [B2-09 \[Surds: Rationalising the Denominator Part 1 Examples\]](#)
- [B2-10 \[Surds: Introducing Rationalising the Denominator Part 2\]](#)
- [B2-11 \[Surds: Rationalising the Denominator Part 2 Examples\]](#)
- [B2-12 \[Surds: More Complicated Examples of Rationalising the Denominator\]](#)

[Work with quadratic functions and their graphs; the discriminant of a quadratic function, including the conditions for real and repeated roots; completing the square; solution of quadratic equations including solving quadratic equations in a function of the unknown]

- [B3-01 \[Quadratics: Factorising Quadratics using the Difference of Two Squares\]](#)
- [B3-02 \[Quadratics: Factorising Quadratics of the form  \$x^2 + bx + c\$ \]](#)
- [B3-03 \[Quadratics: Factorising Quadratics of the form  \$ax^2 + bx + c\$ \]](#)
- [B3-04 \[Quadratics: Introducing Parabolas\]](#)
- [B3-05 \[Quadratics: Introducing Sketching Quadratics from Factorised Form\]](#)
- [B3-06 \[Quadratics: Examples of Sketching Quadratics from Factorised Form\]](#)
- [B3-07 \[Quadratics: Introducing Completing the Square with the form  \$x^2 + bx + c\$ \]](#)
- [B3-08 \[Quadratics: Examples of Completing the Square with the form  \$x^2 + bx + c\$ \]](#)
- [B3-09 \[Quadratics: Introducing Completing the Square with the form  \$ax^2 + bx + c\$ \]](#)
- [B3-10 \[Quadratics: Examples of Completing the Square with the form  \$ax^2 + bx + c\$ \]](#)
- [B3-11 \[Quadratics: Introducing Sketching Quadratics from Completed Square Form\]](#)
- [B3-12 \[Quadratics: Examples of Sketching Quadratics from Completed Square Form\]](#)
- [B3-13 \[Quadratics: Three Ways to Solve a Quadratic Equation\]](#)

	<ul style="list-style-type: none"> <li>• <a href="#">B3-14 [Quadratics: Where the Quadratic Formula Comes From]</a></li> <li>• <a href="#">B3-15 [Quadratics: Using the Discriminant to Find How Many Roots a Quadratic Has]</a></li> <li>• <a href="#">B3-16 [Quadratics: Examples of Using the Discriminant to Find How Many Roots a Quadratic Has]</a></li> <li>• <a href="#">B3-17 [Quadratics: Examples of Using the Quadratic Formula]</a></li> <li>• <a href="#">B3-18 [Quadratics: Examples of Sketching Quadratics using the Quadratic Formula]</a></li> <li>• <a href="#">B3-19 [Quadratics: Solving More Complicated Equations Using Quadratic Methods]</a></li> </ul>
<p><b>[Solve simultaneous equations in two variables by elimination and by substitution, including one linear and one quadratic equation]</b></p>	<ul style="list-style-type: none"> <li>• <a href="#">B4-01 [Simultaneous Equations: Examples of Using the Elimination Method]</a></li> <li>• <a href="#">B4-02 [Simultaneous Equations: Examples of Using the Substitution Method]</a></li> <li>• <a href="#">B4-03 [Simultaneous Equations: Examples of One Linear Equation and One Quadratic Equation]</a></li> <li>• <a href="#">B4-04 [Simultaneous Equations: More Complicated Examples]</a></li> </ul>
<p><b>[Solve linear and quadratic inequalities in a single variable and interpret such inequalities graphically, including inequalities with brackets and fractions]</b></p> <p><b>[Express solutions through correct use of ‘and’ and ‘or’, or through set notation]</b></p> <p><b>[Represent linear and quadratic inequalities such as <math>y &gt; x + 1</math> and <math>y &gt; ax^2 + bx + c</math> graphically]</b></p>	<ul style="list-style-type: none"> <li>• <a href="#">B5-01 [Inequalities: Solving Basic Linear Inequalities]</a></li> <li>• <a href="#">B5-02 [Inequalities: Solving More Complicated Linear Inequalities]</a></li> <li>• <a href="#">B5-03 [Inequalities: Solving Linear Inequalities Graphically]</a></li> <li>• <a href="#">B5-04 [Inequalities: Solving General Inequalities (the BIG IDEA)]</a></li> <li>• <a href="#">B5-05 [Inequalities: Introducing Solving Quadratic Inequalities]</a></li> <li>• <a href="#">B5-06 [Inequalities: Examples of Solving Basic Quadratic Inequalities]</a></li> <li>• <a href="#">B5-07 [Inequalities: Solving More Complicated Quadratic Inequalities]</a></li> <li>• <a href="#">B5-08 [Inequalities: Introducing Discriminant Inequalities]</a></li> <li>• <a href="#">B5-09 [Inequalities: Examples of Discriminant Inequalities Part 1]</a></li> <li>• <a href="#">B5-10 [Inequalities: Examples of Discriminant Inequalities Part 2]</a></li> <li>• <a href="#">B5-11 [Inequalities: EXTENSION Tricky Example of a Discriminant Inequality]</a></li> <li>• <a href="#">B5-12 [Inequalities: Finding where Curves Intersect]</a></li> <li>• <a href="#">B5-13 [Inequalities: Notes on Notation]</a></li> <li>• <a href="#">B5-14 [Inequalities: Solving Inequalities with Set Notation]</a></li> </ul>

- [B5-15 \[Inequalities: EXTENSION Double & Triple Inequalities\]](#)
- [B5-16 \[Inequalities: Representing Linear Inequalities Graphically\]](#)
- [B5-17 \[Inequalities: Representing Quadratic Inequalities Graphically\]](#)
- [B5-18 \[Inequalities: Identifying Regions Graphically\]](#)

## C: Coordinate Geometry in the (x,y) plane

[Understand and use the equation of a straight line, including the forms  $y - y_1 = m(x - x_1)$  and  $ax + by + c = 0$ ; gradient conditions for two straight lines to be parallel or perpendicular]

[Be able to use straight line models in a variety of contexts]

- [C1-00 \[Introducing Coordinate Geometry\]](#)
- [C1-01 \[Coordinate Geometry: Introducing Finding the Midpoint between Two Points\]](#)
- [C1-02 \[Coordinate Geometry: Examples of Finding the Midpoint between Two Points\]](#)
- [C1-03 \[Coordinate Geometry: Introducing Finding the Distance between Two Points\]](#)
- [C1-04 \[Coordinate Geometry: Examples of Finding the Distance between Two Points\]](#)
- [C1-05 \[Coordinate Geometry: Finding the Gradient of a Chord between Two Points\]](#)
- [C1-06 \[Coordinate Geometry: Examples of Finding the Gradient of a Chord\]](#)
- [C1-07 \[Coordinate Geometry: The Equation of a Line in the form  \$y = mx + c\$ \]](#)
- [C1-08 \[Coordinate Geometry: The Equation of a Line in the form  \$y - y\_1 = m\(x - x\_1\)\$ \]](#)
- [C1-09 \[Coordinate Geometry: Examples of Finding the Equation of a Line\]](#)
- [C1-10 \[Coordinate Geometry: Finding the Equation of a Line in the form  \$ax + by + c = 0\$ \]](#)
- [C1-11 \[Coordinate Geometry: Parallel and Perpendicular Lines\]](#)
- [C1-12 \[Coordinate Geometry: Finding the Negative Reciprocal\]](#)
- [C1-13 \[Coordinate Geometry: Find a Parallel & Perpendicular Line\]](#)
- [C1-14 \[Coordinate Geometry: Introducing Sketching Linear Graphs\]](#)
- [C1-15 \[Coordinate Geometry: Examples of Sketching Linear Graphs\]](#)

	<ul style="list-style-type: none"> <li>• <a href="#">C1-16 [Coordinate Geometry: Finding the Perpendicular Bisector of Two Points]</a></li> <li>• <a href="#">C1-17 [Coordinate Geometry: Examples of Finding the Perpendicular Bisector]</a></li> <li>• <a href="#">C1-18 [Coordinate Geometry: Finding where Two Lines Intersect]</a></li> <li>• <a href="#">C1-19 [Coordinate Geometry: Using a Speed / Time Graph]</a></li> </ul>
<p><b>[Understand and use the coordinate geometry of the circle including using the equation of a circle in the form <math>(x - a)^2 + (y - b)^2 = r^2</math>;</b></p> <p><b>Completing the square to find the centre and radius of a circle; use of the following properties:</b></p> <ul style="list-style-type: none"> <li>• the angle in a semicircle is a right angle</li> <li>• the perpendicular from the centre to a chord bisects the chord</li> <li>• the radius of a circle at a given point on its circumference is perpendicular to the tangent to the circle at that point</li> </ul>	<ul style="list-style-type: none"> <li>• <a href="#">C2-01 [Circles: Introducing the Equation of the Circle]</a></li> <li>• <a href="#">C2-02 [Circles: Identifying the Centre &amp; Radius]</a></li> <li>• <a href="#">C2-03 [Circles: Sketching Circles]</a></li> <li>• <a href="#">C2-04 [Circles: Different Forms of the Equation of a Circle]</a></li> <li>• <a href="#">C2-05 [Circles: Using Completing the Square to find the Centre &amp; Radius]</a></li> <li>• <a href="#">C2-06 [Circles: Finding where a Line Intersects a Circle]</a></li> <li>• <a href="#">C2-07 [Circles: EXTENSION Finding where Two Circles Intersect]</a></li> <li>• <a href="#">C2-08 [Circles: The Angle in a Semicircle is a Right Angle]</a></li> <li>• <a href="#">C2-09 [Circles: Proving the Chord joining A and B is a Diameter]</a></li> <li>• <a href="#">C2-10 [Circles: Perpendicular Bisector of Two Points on a Circle]</a></li> <li>• <a href="#">C2-11 [Circles: Given 3 Points, Find the Centre &amp; Radius - Example 1]</a></li> <li>• <a href="#">C2-12 [Circles: Given 3 Points, Find the Centre &amp; Radius - Example 2]</a></li> <li>• <a href="#">C2-13 [Circles: Tangents &amp; Normals]</a></li> <li>• <a href="#">C2-14 [Circles: Finding Tangents &amp; Normals]</a></li> <li>• <a href="#">C2-15 [Circles: Determining whether Two Circles Intersect or Not]</a></li> </ul>

## Chapter 2: Polynomials and the Binomial Theorem

### B: Algebra and Functions

<p><b>[Manipulate polynomials algebraically, including expanding brackets and collecting like terms,</b></p>	<ul style="list-style-type: none"> <li>• <a href="#">B6-01 [Polynomials: Introducing Polynomials]</a></li> <li>• <a href="#">B6-02 [Polynomials: Adding and Subtracting Polynomials]</a></li> </ul>
--	---

factorisation and simple algebraic division; use of the factor theorem]

- [B6-03 \[Polynomials: Multiplying Polynomials\]](#)
- [B6-04 \[Polynomials: Expanding Three or More Brackets\]](#)
- [B6-05 \[Polynomials: Polynomial Division using the Grid Method\]](#)
- [B6-06 \[Polynomials: Polynomial Division using the Long Division Method\]](#)
- [B6-07 \[Polynomials: Polynomial Division using the Inspection Method\]](#)
- [B6-08 \[Polynomials: Polynomial Division using the Synthetic Method\]](#)
- [B6-09 \[Polynomials: Examples of Polynomial Division\]](#)
- [B6-10 \[Polynomials: EXTENSION Harder Examples of Polynomial Division\]](#)
- [B6-11 \[Polynomials: Introducing the Factor Theorem\]](#)
- [B6-12 \[Polynomials: An Example of Using the Factor Theorem\]](#)
- [B6-13 \[Polynomials: Solving Problems and Extending the Factor Theorem\]](#)
- [B6-14 \[Polynomials: EXTENSION Proof of the Factor Theorem\]](#)

[Understand and use graphs of functions; sketch curves defined by simple equations including polynomials],

[  $y = \frac{a}{x}$  and  $y = \frac{a}{x^2}$  (including their vertical and horizontal asymptotes);

interpret algebraic solution of equations graphically; use intersection points of graphs to solve equations]

[Understand and use proportional relationships and their graphs]

- [B7-01 \[Graphs: Introducing Cubic Graphs\]](#)
- [B7-02 \[Graphs: Sketching Quadratics, Cubics, Quartics and Quintics\]](#)
- [B7-03 \[Graphs: Examples of Sketching Cubics from Factorised Form\]](#)
- [B7-04 \[Graphs: Examples of Sketching Quartics from Factorised Form\]](#)
- [B7-18 \[Graphs: Introducing Reciprocal Graphs of the form  \$y = \frac{a}{x}\$ \]](#)
- [B7-19 \[Graphs: Examples of Sketching Reciprocal Graphs of the form  \$y = \frac{a}{x}\$ \]](#)
- [B7-20 \[Graphs: Introducing Reciprocal Graphs of the form  \$y = \frac{a}{x^2}\$ \]](#)
- [B7-21 \[Graphs: Examples of Sketching Reciprocal Graphs of the form  \$y = \frac{a}{x^2}\$ \]](#)
- [B7-22 \[Graphs: Examples of Sketching Translated Reciprocal Graphs\]](#)
- [B7-23 \[Graphs: Introducing finding Points of Intersection\]](#)
- [B7-24 \[Graphs: Examples of finding Points of Intersection between Lines and Curves\]](#)
- [B7-25 \[Graphs: Examples of finding Points of Intersection between Two Curves\]](#)
- [B7-26 \[Proportion: Introducing Direct Proportion and Inverse](#)

	<p><a href="#">Proportion</a></p> <ul style="list-style-type: none"> <li>• <a href="#">B7-27 [Proportion: Determining if Two Variables are Proportional]</a></li> <li>• <a href="#">B7-28 [Proportion: Examples of Finding the Constant of Proportionality]</a></li> <li>• <a href="#">B7-29 [Proportion: Graphing an Inverse Proportion]</a></li> </ul>
<p>[Understand the effect of simple transformations on the graph of</p> <p><math>y = f(x)</math> including sketching associated graphs:</p> <p><math>y = af(x)</math>, <math>y = f(x) + a</math>, <math>y = f(x + a)</math>, <math>y = f(ax)</math>,</p>	<ul style="list-style-type: none"> <li>• <a href="#">B9-01 [Graph Transformations: Beginning an Investigation into Transformations]</a></li> <li>• <a href="#">B9-02 [Graph Transformations: Investigating <math>y = f(x) + a</math>]</a></li> <li>• <a href="#">B9-03 [Graph Transformations: Investigating <math>y = f(x - a)</math>]</a></li> <li>• <a href="#">B9-04 [Graph Transformations: Translations Overview]</a></li> <li>• <a href="#">B9-05 [Graph Transformations: Investigating <math>y = kf(x)</math>]</a></li> <li>• <a href="#">B9-06 [Graph Transformations: Investigating <math>y = f(kx)</math>]</a></li> <li>• <a href="#">B9-07 [Graph Transformations: Stretches Overview]</a></li> <li>• <a href="#">B9-08 [Graph Transformations: Investigating <math>y = -f(x)</math>]</a></li> <li>• <a href="#">B9-09 [Graph Transformations: Investigating <math>y = f(-x)</math>]</a></li> <li>• <a href="#">B9-10 [Graph Transformations: Reflections Overview]</a></li> <li>• <a href="#">B9-11 [Graph Transformations: Examples of Describing Single Transformations]</a></li> <li>• <a href="#">B9-12 [Graph Transformations: Examples of Transforming Coordinates]</a></li> <li>• <a href="#">B9-13 [Graph Transformations: Examples of Transforming <math>y = x^2</math>]</a></li> <li>• <a href="#">B9-14 [Graph Transformations: Examples of Transforming <math>y = x^3</math>]</a></li> <li>• <a href="#">B9-15 [Graph Transformations: Examples of Transforming <math>y = (x + 2)(x - 1)(x - 3)</math>]</a></li> <li>• <a href="#">B9-16 [Graph Transformations: Examples of Transforming <math>y = 1/x</math>]</a></li> <li>• <a href="#">B9-17 [Graph Transformations: Examples of Transforming <math>y = e^x</math>]</a></li> <li>• <a href="#">B9-18 [Graph Transformations: Examples of Transforming <math>y = \ln(x)</math>]</a></li> <li>• <a href="#">B9-19 [Graph Transformations: Examples of Transforming a Piecewise Function]</a></li> <li>• <a href="#">B9-20 [Graph Transformations: Transforming Graphs via 'Replacing']</a></li> </ul>

## D: Sequences and Series

[Understand and use the binomial expansion of  $(a + bx)^n$  for positive integer  $n$ ; the notations  $n!$  and  $nCr$ ; link to binomial probabilities]

- [D1-00 \[Binomial Expansion: Introducing Factorials n!\]](#)
- [D1-01 \[Binomial Expansion: Introducing and Linking Pascal's Triangle and nCr\]](#)
- [D1-02 \[Binomial Expansion: Explaining where nCr comes from\]](#)
- [D1-03 \[Binomial Expansion: Expanding  \$\(1+x\)^n\$ \]](#)
- [D1-04 \[Binomial Expansion: Expanding  \$\(a+b\)^n\$ \]](#)
- [D1-05 \[Binomial Expansion: Fully Expand  \$\(1 + 3x\)^4\$ \]](#)
- [D1-06 \[Binomial Expansion: Fully Expand  \$\(3 - 2x\)^5\$ \]](#)
- [D1-07 \[Binomial Expansion: Fully Expand  \$\(x + 4/x\)^6\$ \]](#)
- [D1-08 \[Binomial Expansion: Fully Expand  \$\(3x^2y - 4xy\)^4\$ \]](#)
- [D1-09 \[Binomial Expansion: Find the coefficient of  \$x^6\$  in  \$\(2 + x\)^8\$ \]](#)
- [D1-10 \[Binomial Expansion: Find the coefficient of  \$x^2\$  in  \$\(1 + 3x\)^{16}\$ \]](#)
- [D1-11 \[Binomial Expansion: Find the coefficient of  \$x^3\$  in  \$\(2 - 5x\)^{14}\$ \]](#)
- [D1-12 \[Binomial Expansion: Find the coefficient of  \$x^{10}\$  in  \$\(1 - 2x\)^5\(2+x\)^7\$ \]](#)
- [D1-13 \[Binomial Expansion: Approximating  \$1.03^8\$  WITHOUT a calculator\]](#)

## Chapter 3 : Trigonometry

### E: Trigonometry

[Understand and use the definitions of sine, cosine and tangent for all arguments; the sine and cosine rules; the area of a triangle in the form  $\frac{1}{2} ab \sin C$ ]

- [E1-01 \[Trigonometry: Introducing  \$\sin\(x\)\$ ,  \$\cos\(x\)\$  &  \$\tan\(x\)\$ \]](#)
- [E1-02 \[Trigonometry: Two Triangles to Learn\]](#)
- [E1-03 \[Trigonometry: Using the Two Triangles\]](#)
- [E1-04 \[Trigonometry: Examples of Finding Missing Angles\]](#)
- [E1-05 \[Trigonometry: Examples of Finding Missing Sides\]](#)
- [E1-06 \[Trigonometry: Finding Exact Values of  \$\sin\(x\)\$ ,  \$\cos\(x\)\$  &  \$\tan\(x\)\$ \]](#)
- [E1-07 \[Trigonometry: EXTENSION Proof of the Sine Rule\]](#)

	<ul style="list-style-type: none"> <li>• <a href="#">E1-08 [Trigonometry: Using the Sine Rule]</a></li> <li>• <a href="#">E1-09 [Trigonometry: When the Sine Rule can lead to Two Triangles]</a></li> <li>• <a href="#">E1-10 [Trigonometry: EXTENSION Proof of the Cosine Rule]</a></li> <li>• <a href="#">E1-11 [Trigonometry: Using the Cosine Rule]</a></li> <li>• <a href="#">E1-12 [Trigonometry: Find all the Missing Sides and Angles of a Triangle]</a></li> <li>• <a href="#">E1-13 [Trigonometry: EXTENSION Proof of Area of a Triangle <math>\frac{1}{2} ab\sin C</math>]</a></li> <li>• <a href="#">E1-14 [Trigonometry: Finding the Area of Triangles]</a></li> </ul>
<p><b>[Understand and use the sine, cosine and tangent functions; their graphs, symmetries and periodicity]</b></p>	<ul style="list-style-type: none"> <li>• <a href="#">E3-01 [Trig Graphs: Sketching <math>\sin(x)</math>, <math>\cos(x)</math> &amp; <math>\tan(x)</math> from the Unit Circle]</a></li> <li>• <a href="#">E3-02 [Trig Graphs: The Period of <math>y = \sin(x)</math>, <math>y = \cos(x)</math> and <math>y = \tan(x)</math>]</a></li> <li>• <a href="#">E3-03 [Trig Graphs: The Period of Transformed Trig Graphs]</a></li> <li>• <a href="#">E3-04 [Trig Graphs: State the Period of the Transformed Trig Graph]</a></li> <li>• <a href="#">E3-05 [Trig Graphs: Quickly Sketching <math>y = \sin(x)</math> in degrees]</a></li> <li>• <a href="#">E3-06 [Trig Graphs: Quickly Sketching <math>y = \cos(x)</math> in degrees]</a></li> <li>• <a href="#">E3-07 [Trig Graphs: Quickly Sketching <math>y = \tan(x)</math> in degrees]</a></li> </ul>
<p><b>[Understand and use <math>\tan\theta = \sin\theta/\cos\theta</math>]</b></p>	<ul style="list-style-type: none"> <li>• <a href="#">E5-01 [Trigonometric Identities: Proving <math>\tan\theta = \sin\theta / \cos\theta</math>]</a></li> <li>• <a href="#">E5-02 [Trigonometric Identities: Proving <math>\sin^2\theta + \cos^2\theta = 1</math>]</a></li> <li>• <a href="#">E5-03 [Trigonometric Identities: Simplifying Expressions]</a></li> <li>• <a href="#">E5-04 [Trigonometric Identities: <math>\arcsin(x) = \arccos(y)</math>]</a></li> </ul>
<p><b>[Solve simple trigonometric equations in a given interval, including quadratic equations in <math>\sin</math>, <math>\cos</math> and <math>\tan</math> and equations involving multiples of the unknown angle]</b></p>	<ul style="list-style-type: none"> <li>• <a href="#">E7-00 [Trig Equations: Introduction to this Section]</a></li> <li>• <a href="#">E7-01 [Trig Equations: Solve <math>\sin(x) = 1/2</math> between 0 and 360 degrees]</a></li> <li>• <a href="#">E7-03 [Trig Equations: Solve <math>\cos(x) = 1/2</math> between 0 and 360 degrees]</a></li> <li>• <a href="#">E7-05 [Trig Equations: Solve <math>\tan(x) = 1</math> between 0 and 360 degrees]</a></li> <li>• <a href="#">E7-07 [Trig Equations: Solving Basic Trigonometric Equations in degrees]</a></li> <li>• <a href="#">E7-09 [Trig Equations: Solve <math>1/\cos(x) = 5</math> between 0 and 360 degrees]</a></li> <li>• <a href="#">E7-10 [Trig Equations: Solve <math>1/\cos(x) = 5</math> between 360 and 720 degrees]</a></li> </ul>

- [E7-13 \[Trig Equations: Solve  \$\sin^2\(x\) = 1/16\$  between 0 and 360 degrees\]](#)
- [E7-15 \[Trig Equations: Solve  \$4x^2 = x\$ \]](#)
- [E7-16 \[Trig Equations: Solve  \$4\sin^2\(x\) = \sin\(x\)\$  between 0 and 360 degrees\]](#)
- [E7-18 \[Trig Equations: Solve  \$4\sin\(x\) + 5\cos\(x\) = 0\$  between 0 and 360 degrees\]](#)
- [E7-20 \[Trig Equations: Solving Equations that Involve Transformations\]](#)
- [E7-21 \[Trig Equations: Solve  \$\sin\(x + 65\) = 0.7\$  between 0 and 360 degrees\]](#)
- [E7-23 \[Trig Equations: Solve  \$\cos\(x - 35\) = -0.3\$  between 0 and 360 degrees\]](#)
- [E7-25 \[Trig Equations: Solve  \$\tan\(x + 280\) = 4.1\$  between 0 and 360 degrees\]](#)
- [E7-27 \[Trig Equations: Solve  \$\sin\(2x\) = 0.8\$  between 0 and 360 degrees\]](#)
- [E7-29 \[Trig Equations: Solve  \$\cos\(3x\) = 0.7\$  between 0 and 360 degrees\]](#)
- [E7-31 \[Trig Equations: Solve  \$\tan\(4x\) = 3.3\$  between 0 and 360 degrees\]](#)
- [E7-33 \[Trig Equations: Solve  \$\sin\(3x-54\) = 0.25\$  between 180 and 540 degrees\]](#)
- [E7-35 \[Trig Equations: Solve  \$\sin^2\(x\) + 2\sin\(x\) - 3 = 0\$ , 0-360 degrees\]](#)
- [E7-37 \[Trig Equations: Solve  \$5\tan^2\(x\) - 38\tan\(x\) - 16 = 0\$ , 0-360 degrees\]](#)
- [E7-39 \[Trig Equations: Solve  \$3\sin^2\(x\) = 3 - 2\cos\(x\)\$  between 0 and 360 degrees\]](#)
- [E7-41 \[Trig Equations: Solve  \$3\sin\(x\) = 2\cos^2\(x\)\$  between 0 and 360 degrees\]](#)
- [E7-43 \[Trig Equations: Solve  \$7\sin^2\(x\) - 5\sin\(x\) + \cos^2\(x\) = 0\$ , 0-360 degrees\]](#)
- [E7-45 \[Trig Equations: Things to Remember about  \$y = \sin\(x\)\$  and  \$y = \cos\(x\)\$ \]](#)
- [E7-46 \[Trig Equations: Solve  \$\cos\(x + 60\) = \sin\(x\)\$  between 0 and 360 degrees\]](#)
- [E7-48 \[Trig Equations: Solve  \$\sin\(x - 35\) = \cos\(x\)\$  between 0 and 360 degrees\]](#)

## Chapter 4: Differentiation and Integration

### G: Differentiation

<p>[Understand and use the derivative of <math>f(x)</math> as the gradient of the tangent to the graph of <math>y = f(x)</math> at a general point <math>(x, y)</math>; the gradient of the tangent as a limit; interpretation as a rate of change; sketching the gradient function for a given curve; second derivatives; differentiation from first principles for small positive integer powers of <math>x</math>] and for <math>\sin x</math> and <math>\cos x</math></p> <p>[Understand and use the second derivative as the rate of change of gradient];</p>	<ul style="list-style-type: none"><li>• <a href="#">G1-01 [Differentiation: Gradient of a Straight Line]</a></li><li>• <a href="#">G1-02 [Differentiation: Gradient Functions of Straight Lines]</a></li><li>• <a href="#">G1-03 [Differentiation: Gradient of a Curve]</a></li><li>• <a href="#">G1-04 [Differentiation: Differentiating Polynomials]</a></li><li>• <a href="#">G1-05 [Differentiation: Graphs of Functions and Gradient Functions]</a></li><li>• <a href="#">G1-06 [Differentiation: Second Derivatives]</a></li><li>• <a href="#">G1-07 [Differentiation: Graphing the Second Derivative]</a></li><li>• <a href="#">G1-08 [Differentiation: Graphing <math>f'(x)</math> and <math>f''(x)</math> Example 1]</a></li><li>• <a href="#">G1-09 [Differentiation: Graphing <math>f'(x)</math> and <math>f''(x)</math> Example 2]</a></li><li>• <a href="#">G1-10 [Differentiation: Graphing <math>f'(x)</math> and <math>f''(x)</math> Example 3]</a></li><li>• <a href="#">G1-11 [Differentiation: Differentiation From First Principles]</a></li><li>• <a href="#">G1-12 [Differentiation: Differentiate <math>x^2</math> from First Principles]</a></li><li>• <a href="#">G1-13 [Differentiation: Differentiate <math>x^2 + 2x + 1</math> from First Principles]</a></li><li>• <a href="#">G1-14 [Differentiation: Differentiate <math>x^3</math> from First Principles]</a></li><li>• <a href="#">G1-15 [Differentiation: Differentiate <math>4x^3 - 3x^2</math> from First Principles]</a></li></ul>
<p>[Differentiate <math>x_n</math>, for rational values of <math>n</math>, and related constant multiples, sums and differences]</p>	<ul style="list-style-type: none"><li>• <a href="#">G2-01 [Differentiation: Differentiate <math>x^n</math>, <math>n</math> a positive integer]</a></li><li>• <a href="#">G2-02 [Differentiation: Proof of the Sum Rule for Differentiation]</a></li><li>• <a href="#">G2-03 [Differentiation: Differentiating Polynomials]</a></li><li>• <a href="#">G2-04 [Differentiation: Differentiating with Fractional and Negative Indices]</a></li><li>• <a href="#">G2-05 [Differentiation: Dealing with Indices]</a></li></ul>
<p>[Apply differentiation to find gradients, tangents and normals, maxima and minima and stationary points],</p> <p>[Identify where functions are increasing or decreasing]</p>	<ul style="list-style-type: none"><li>• <a href="#">G3-01 [Gradients: Gradients of Functions]</a></li><li>• <a href="#">G3-02 [Gradients: Introducing Tangents and Normals]</a></li><li>• <a href="#">G3-03 [Gradients: Equations of Tangents]</a></li><li>• <a href="#">G3-05 [Gradients: Equations of Normals]</a></li><li>• <a href="#">G3-07 [Gradients: Introducing Stationary Points]</a></li></ul>

	<ul style="list-style-type: none"> <li>● <a href="#">G3-08 [Gradients: Examples of Finding Stationary Points]</a></li> <li>● <a href="#">G3-10 [Gradients: Where Functions are Increasing and Decreasing]</a></li> <li>● <a href="#">G3-11 [Gradients: The Second Derivative Test Part 1]</a></li> <li>● <a href="#">G3-13 [Gradients: Examples of Determining Types of Stationary Points Part 1]</a></li> <li>● <a href="#">G3-14 [Gradients: Examples of Determining Types of Stationary Points Part 2]</a></li> <li>● <a href="#">G3-24 [Optimisation: Rectangular Fence Problem]</a></li> <li>● <a href="#">G3-25 [Optimisation: Maximising Volume of a Box]</a></li> <li>● <a href="#">G3-26 [Optimisation: Minimising Surface Area of a Box]</a></li> <li>● <a href="#">G3-27 [Optimisation: Maximising Volume of a Prism]</a></li> </ul>
--	---

## H: Integration

<p><b>[Know and use the Fundamental Theorem of Calculus]</b></p>	<ul style="list-style-type: none"> <li>● <a href="#">H1-01 [Integration: Introducing the Fundamental Theorem of Calculus]</a></li> </ul>
<p><b>[Integrate <math>x^n</math> (excluding <math>n = -1</math>), and related sums, differences and constant multiples ]</b></p>	<ul style="list-style-type: none"> <li>● <a href="#">H2-01 [Integration: Integrating <math>ax^n</math>]</a></li> <li>● <a href="#">H2-02 [Integration: Examples of Integrating <math>ax^n</math>]</a></li> <li>● <a href="#">H2-03 [Integration: Examples of Integrating <math>dy/dx</math>]</a></li> <li>● <a href="#">H2-04 [Integration: Finding the Constant of Integration]</a></li> <li>● <a href="#">H2-05 [Integration: Examples of Finding the Constant of Integration]</a></li> </ul>
<p><b>[Evaluate definite integrals; use a definite integral to find the area under a curve]</b></p>	<ul style="list-style-type: none"> <li>● <a href="#">H3-01 [Integration: Finding the Exact Area under a Line]</a></li> <li>● <a href="#">H3-02 [Integration: Finding the Exact Area under a Curve]</a></li> <li>● <a href="#">H3-03 [Integration: Indefinite vs Definite Integrals]</a></li> <li>● <a href="#">H3-04 [Integration: Examples of Definite Integrals 1]</a></li> <li>● <a href="#">H3-05 [Integration: Examples of Definite Integrals 2]</a></li> <li>● <a href="#">H3-06 [Integration: A Definite Integral Problem]</a></li> <li>● <a href="#">H3-07 [Integration: Areas Under the x-axis]</a></li> <li>● <a href="#">H3-08 [Integration: Examples of Finding Areas 1]</a></li> <li>● <a href="#">H3-09 [Integration: Examples of Finding Areas 2]</a></li> <li>● <a href="#">H3-10 [Integration: EXTENSION: Definite Integrals Across Asymptotes]</a></li> </ul>

## Chapter 5: Exponentials and Logarithms

### F: Exponentials and Logarithms

<p>[Know and use the function <math>a^x</math> and its graph, where <math>a</math> is positive]</p> <p>[Know and use the function <math>e^x</math> and its graph]</p>	<ul style="list-style-type: none"> <li>• <a href="#">F1-01 [Exponentials: Introducing the function <math>a^x</math>]</a></li> <li>• <a href="#">F1-02 [Exponentials: Examples of Sketching functions of the form <math>a^x</math>]</a></li> <li>• <a href="#">F1-03 [Exponentials: Sketching Transformations of <math>y = 2^x</math>]</a></li> <li>• <a href="#">F1-04 [Exponentials: Introducing Asymptotes]</a></li> <li>• <a href="#">F1-05 [Exponentials: Sketching <math>y = a^x + b</math>]</a></li> <li>• <a href="#">F1-06 [Exponentials: Sketching <math>y = a^{(x+c)} + b</math>]</a></li> <li>• <a href="#">F1-07 [Exponentials: Maximise <math>(20/x)^x</math>]</a></li> <li>• <a href="#">F1-09 [Exponentials: Introducing <math>e</math> via Compound Interest]</a></li> <li>• <a href="#">F1-11 [Exponentials: Sketching <math>y = e^x</math>]</a></li> </ul>
<p>[Know that the gradient of <math>e^{kx}</math> is equal to <math>ke^{kx}</math> and hence understand why the exponential model is suitable in many applications]</p>	<ul style="list-style-type: none"> <li>• <a href="#">F2-01 [Exponential Model: Another way of deriving <math>e</math>]</a></li> <li>• <a href="#">F2-02 [Exponential Model: The Gradient of <math>e^{kx}</math>]</a></li> <li>• <a href="#">F2-03 [Exponential Model: Examples of Gradient Functions of <math>e^{kx}</math>]</a></li> <li>• <a href="#">F2-04 [Exponential Model: Finding a Gradient]</a></li> <li>• <a href="#">F2-05 [Exponential Model: The Insect Problem]</a></li> </ul>
<p>[Know and use the definition of <math>\log_a x</math> as the inverse of <math>a^x</math>, where <math>a</math> is positive and <math>x \geq 0</math>]</p> <p>[Know and use the function <math>\ln x</math> and its graph]</p> <p>[Know and use <math>\ln x</math> as the inverse function of <math>e^x</math>]</p>	<ul style="list-style-type: none"> <li>• <a href="#">F3-01 [Logarithms: Introducing Logarithms]</a></li> <li>• <a href="#">F3-02 [Logarithms: Converting between Exponential and Logarithmic Form]</a></li> <li>• <a href="#">F3-03 [Logarithms: Graphing Logarithmic Functions]</a></li> <li>• <a href="#">F3-04 [Logarithms: The Natural Logarithm <math>\ln(x)</math>]</a></li> <li>• <a href="#">F3-05 [Logarithms: Sketching Transformations of <math>y = \ln(x)</math>]</a></li> </ul>
<p>[Understand and use the laws of logarithms: <math>\log x + \log y = \log(xy)</math>; <math>\log x - \log y = \log x/y</math>; <math>k \log x = \log x^k</math> (including, for example, <math>k = -1</math> and <math>k = -1/2</math> )]</p>	<ul style="list-style-type: none"> <li>• <a href="#">F4-01 [Laws of Logarithms: Introducing the Laws of Logarithms]</a></li> <li>• <a href="#">F4-02 [Laws of Logarithms: Key Examples]</a></li> <li>• <a href="#">F4-03 [Laws of Logarithms: Further Examples]</a></li> <li>• <a href="#">F4-04 [Laws of Logarithms: Writing Expressions in terms of <math>\ln(x)</math>]</a></li> </ul>
<p>[Solve equations of the form <math>a^x = b</math>]</p>	<ul style="list-style-type: none"> <li>• <a href="#">F5-01 [Exponential Equations: Solve <math>2^x = 5</math>]</a></li> <li>• <a href="#">F5-02 [Exponential Equations: Examples]</a></li> </ul>

	<ul style="list-style-type: none"> <li>• <a href="#">F5-03 [Exponential Equations: Hidden Quadratics]</a></li> <li>• <a href="#">F5-04 [Exponential Equations: Solving an Inequality]</a></li> <li>• <a href="#">F5-05 [Exponential Equations: EXTENSION Solve <math>5^{(x+3)} = 3^{(9-x)}</math>]</a></li> <li>• <a href="#">F5-06 [Exponential Equations: Solve <math>e^x = 5</math>]</a></li> <li>• <a href="#">F5-07 [Exponential Equations: Examples involving e and ln]</a></li> <li>• <a href="#">F5-08 [Logarithmic Equations: Examples]</a></li> </ul>
[Use logarithmic graphs to estimate parameters in relationships of the form $y=ax^n$ and $y=kb^x$ , given data for $x$ and $y$ ]	<ul style="list-style-type: none"> <li>• <a href="#">F6-01 [Reduction to Linear Form: The Basic Idea]</a></li> <li>• <a href="#">F6-02 [Reduction to Linear Form: Reducing <math>y = ax^n</math> to Linear Form]</a></li> <li>• <a href="#">F6-03 [Reduction to Linear Form: Straight Line to Curve Example 1]</a></li> <li>• <a href="#">F6-04 [Reduction to Linear Form: Reducing <math>y = kb^x</math> to Linear Form]</a></li> <li>• <a href="#">F6-05 [Reduction to Linear Form: Straight Line to Curve Example 2]</a></li> <li>• <a href="#">F6-06 [Reduction to Linear Form: The Whole Process Example 1]</a></li> <li>• <a href="#">F6-07 [Reduction to Linear Form: The Whole Process Example 2]</a></li> </ul>
[Understand and use exponential growth and decay; use in modelling (examples may include the use of e in continuous compound interest, radioactive decay, drug concentration decay, exponential growth as a model for population growth); consideration of limitations and refinements of exponential models]	<ul style="list-style-type: none"> <li>• <a href="#">F7-01 [Exponential Growth &amp; Decay: The Investment Problem]</a></li> <li>• <a href="#">F7-02 [Exponential Growth &amp; Decay: The Rabbits Problem]</a></li> <li>• <a href="#">F7-03 [Exponential Growth &amp; Decay: The Dosage Problem]</a></li> <li>• <a href="#">F7-04 [Exponential Growth &amp; Decay: The Metal Ball Problem]</a></li> </ul>

## Chapter 6: Vectors

### J: Vectors

[Use vectors in two dimensions]	<ul style="list-style-type: none"> <li>• <a href="#">J1-01 [Vectors: What is a Vector?]</a></li> <li>• <a href="#">J1-02 [Vectors: Notation]</a></li> <li>• <a href="#">J1-03 [Vectors: Finding the Vector between Two Points in 2D]</a></li> </ul>
---------------------------------	---

	<ul style="list-style-type: none"> <li>• <a href="#">J1-04 [Vectors: Examples of Finding the Vector between Two Points]</a></li> </ul>
[Calculate the magnitude and direction of a vector and convert between component form and magnitude/direction form]	<ul style="list-style-type: none"> <li>• <a href="#">J2-01 [Vectors: The Magnitude / Length of a 2D Vector]</a></li> <li>• <a href="#">J2-02 [Vectors: The Direction of a Vector]</a></li> <li>• <a href="#">J2-03 [Vectors: From Component Form to Magnitude - Direction Form]</a></li> <li>• <a href="#">J2-04 [Vectors: Examples of Component to Magnitude - Direction Form]</a></li> <li>• <a href="#">J2-05 [Vectors: From Magnitude - Direction Form to Component Form]</a></li> <li>• <a href="#">J2-06 [Vectors: Examples of Magnitude - Direction to Component Form]</a></li> <li>• <a href="#">J2-07 [Vectors: Finding the Angle between Two Vectors]</a></li> <li>• <a href="#">J2-08 [Vectors: Examples of Angles between Vectors]</a></li> </ul>
[Add vectors diagrammatically and perform the algebraic operations of vector addition and multiplication by scalars, and understand their geometrical interpretations]	<ul style="list-style-type: none"> <li>• <a href="#">J3-01 [Vectors: Introducing Resultant Vectors]</a></li> <li>• <a href="#">J3-02 [Vectors: Examples of finding Resultant Vectors]</a></li> <li>• <a href="#">J3-03 [Vectors: Parallel Vectors]</a></li> <li>• <a href="#">J3-04 [Vectors: Unit Vectors]</a></li> <li>• <a href="#">J3-05 [Vectors: Show that Three Points are Collinear]</a></li> </ul>
[Understand and use position vectors; calculate the distance between two points represented by position vectors]	<ul style="list-style-type: none"> <li>• <a href="#">J4-01 [Vectors: Introducing Position Vectors]</a></li> <li>• <a href="#">J4-02 [Vectors: Finding the Distance between Two Points]</a></li> </ul>
[Use vectors to solve problems in pure mathematics and in context, including forces]	<ul style="list-style-type: none"> <li>• <a href="#">J5-01 [Vectors: Vectors Problem 1]</a></li> <li>• <a href="#">J5-02 [Vectors: Vectors Problem 2]</a></li> <li>• <a href="#">J5-03 [Vectors: Vectors Problem 3]</a></li> <li>• <a href="#">J5-04 [Vectors: Forces in Equilibrium Problem]</a></li> </ul>

## Chapter 7: Units and Kinematics

### P: Quantities and Units in Mechanics

[Understand and use fundamental quantities and units]	<ul style="list-style-type: none"> <li>• <a href="#">P1-01 [S.I. Units: Length, Time, Mass and Derived Quantities]</a></li> <li>• <a href="#">P1-03 [S.I. Units: Conversions]</a></li> </ul>
---	--

<p>in the S.I. system: length, time, mass]</p> <p>[Understand and use derived quantities and units: velocity, acceleration, force, weight],</p>	
---	--

## Q: Kinematics

<p>[Understand and use the language of kinematics: position; displacement; distance travelled; velocity; speed; acceleration]</p>	<ul style="list-style-type: none"> <li>• <a href="#">Q1-01 [Kinematics: Position vs Displacement vs Distance]</a></li> <li>• <a href="#">Q1-02 [Kinematics: Velocity vs Speed]</a></li> <li>• <a href="#">Q1-03 [Kinematics: Acceleration and Deceleration]</a></li> </ul>
<p>[Understand, use and interpret graphs in kinematics for motion in a straight line: displacement against time and interpretation of gradient; velocity against time and interpretation of gradient and area under the graph]</p>	<ul style="list-style-type: none"> <li>• <a href="#">Q2-01 [Kinematics: Displacement / Time Graphs]</a></li> <li>• <a href="#">Q2-02 [Kinematics: Displacement / Time Graph Example 1]</a></li> <li>• <a href="#">Q2-03 [Kinematics: Displacement / Time Graph Example 2]</a></li> <li>• <a href="#">Q2-04 [Kinematics: Velocity / Time Graphs]</a></li> <li>• <a href="#">Q2-05 [Kinematics: Velocity / Time Graph Example 1]</a></li> <li>• <a href="#">Q2-06 [Kinematics: Velocity / Time Graph Example 2]</a></li> <li>• <a href="#">Q2-07 [Kinematics: Acceleration / Time Graphs]</a></li> <li>• <a href="#">Q2-08 [Kinematics: Acceleration / Time Graph Example]</a></li> <li>• <a href="#">Q2-09 [Kinematics: Drawing Graphs Problem]</a></li> <li>• <a href="#">Q2-10 [Kinematics: A Tricky Problem]</a></li> </ul>
<p>[Understand, use and derive the formulae for constant acceleration for motion in a straight line];</p>	<ul style="list-style-type: none"> <li>• <a href="#">Q3-01 [SUVAT: Deriving the Constant Acceleration Formulae]</a></li> <li>• <a href="#">Q3-02 [SUVAT: Using the Formulae Example 1]</a></li> <li>• <a href="#">Q3-03 [SUVAT: Using the Formulae Example 2]</a></li> <li>• <a href="#">Q3-04 [SUVAT: Using the Formulae Example 3]</a></li> <li>• <a href="#">Q3-05 [SUVAT: Using the Formulae Example 4]</a></li> <li>• <a href="#">Q3-06 [SUVAT: Using the Formulae Example 5]</a></li> <li>• <a href="#">Q3-07 [SUVAT: Introducing Gravity]</a></li> <li>• <a href="#">Q3-08 [SUVAT: More Complicated Problem 1]</a></li> <li>• <a href="#">Q3-09 [SUVAT: More Complicated Problem 2]</a></li> <li>• <a href="#">Q3-10 [SUVAT: More Complicated Problem 3]</a></li> <li>• <a href="#">Q3-11 [SUVAT: More Complicated Problem 4]</a></li> <li>• <a href="#">Q3-12 [SUVAT: More Complicated Problem 5]</a></li> </ul>
<p>[Use calculus in kinematics for motion in a straight line:</p>	<ul style="list-style-type: none"> <li>• <a href="#">Q4-01 [Calculus in Kinematics: Introduction to General Motion]</a></li> <li>• <a href="#">Q4-02 [Calculus in Kinematics: Example 1]</a></li> <li>• <a href="#">Q4-03 [Calculus in Kinematics: Example 2]</a></li> </ul>

$$v = \frac{dr}{dt}, a = \frac{dv}{dt} = \frac{d^2r}{dt^2}, r = \int v dt, v = \int a dt$$

- [Q4-04 \[Calculus in Kinematics: Example 3\]](#)
- [Q4-05 \[Calculus in Kinematics: Example 4\]](#)
- [Q4-06 \[Calculus in Kinematics: Example 5\]](#)

## Chapter 8: Forces and Newton's Laws

### R: Forces and Newton's Laws

<p>[Understand the concept of a force; understand and use Newton's first law]</p>	<ul style="list-style-type: none"> <li>• <a href="#">R1-01 [Forces: What is a Force?]</a></li> <li>• <a href="#">R1-02 [Forces: Simplifying Assumptions]</a></li> <li>• <a href="#">R1-03 [Forces: Types of Force]</a></li> <li>• <a href="#">R1-04 [Forces: Drawing Force Diagrams]</a></li> <li>• <a href="#">R1-05 [Forces: Resultant Forces]</a></li> <li>• <a href="#">R1-06 [Forces: Newton's First Law]</a></li> <li>• <a href="#">R1-07 [Forces: Resultant Forces and Describing the Motion of Particles]</a></li> <li>• <a href="#">R1-08 [Forces: Particles in Equilibrium]</a></li> <li>• <a href="#">R1-09 [Forces: Resolving to get Simultaneous Equations]</a></li> </ul>
<p>[Understand and use Newton's second law for motion in a straight line (restricted to forces in two perpendicular directions or simple cases of forces given as 2-D vectors)];</p>	<ul style="list-style-type: none"> <li>• <a href="#">R2-01 [Forces: Newton's Second Law]</a></li> <li>• <a href="#">R2-02 [Forces: F=ma Example 1]</a></li> <li>• <a href="#">R2-03 [Forces: F=ma Example 2]</a></li> <li>• <a href="#">R2-04 [Forces: With SUVAT Example 1]</a></li> <li>• <a href="#">R2-05 [Forces: With SUVAT Example 2]</a></li> <li>• <a href="#">R2-06 [Forces: With SUVAT Example 3 Vectors]</a></li> </ul>
<p>[Understand and use weight and motion in a straight line under gravity; gravitational acceleration, <math>g</math>, and its value in S.I. units to varying degrees of accuracy]</p> <p>[(The inverse square law for gravitation is not required and <math>g</math> may be assumed to be constant, but students should be aware that <math>g</math> is not a universal constant but depends on location)]</p>	<ul style="list-style-type: none"> <li>• <a href="#">R3-01 [Forces: F=ma with Weight and Tension]</a></li> <li>• <a href="#">R3-02 [Forces: A Falling Bucket]</a></li> <li>• <a href="#">R3-03 [Forces: A Bucket Being Pulled Up]</a></li> <li>• <a href="#">R3-04 [Forces: Maximum Tension Problem]</a></li> <li>• <a href="#">R3-05 [Forces: Ball Dropped Off A Cliff Problem]</a></li> </ul>
<p>[Understand and use Newton's third law; equilibrium of</p>	<ul style="list-style-type: none"> <li>• <a href="#">R4-01 [Forces: Newton's Third Law]</a></li> </ul>

forces on a particle and motion in a straight line (restricted to forces in two perpendicular directions or simple cases of forces given as 2-D vectors); application to problems involving smooth pulleys and connected particles];

- [R4-02 \[Forces: Car and a Trailer Problem\]](#)
- [R4-03 \[Forces: Railway Engine and a Carriage Problem\]](#)
- [R4-04 \[Forces: Cable, Crate, Rope, Box Problem\]](#)
- [R4-05 \[Forces: Introducing Pulley Problems\]](#)
- [R4-06 \[Forces: Pulley Example 1\]](#)
- [R4-07 \[Forces: Pulley Example 2\]](#)
- [R4-08 \[Forces: Pulley Example 3 with SUVAT\]](#)
- [R4-09 \[Forces: Pulley Example 4\]](#)
- [R4-10 \[Forces: Pulley Example 5 with SUVAT\]](#)
- [R4-11 \[Forces: Pulley Example 6 with SUVAT\]](#)

## Chapter 9: Collecting, representing and interpreting data

### K: Statistical Sampling

[Understand and use the terms 'population' and 'sample']

[Use samples to make informal inferences about the population]

[Understand and use sampling techniques, including simple random sampling and opportunity sampling]

[Select or critique sampling techniques in the context of solving a statistical problem, including understanding that different samples can lead to different conclusions about the population]

- [K1-00 \[The Large Data Set: My Take\]](#)
- [K1-01 \[Sampling: Population vs Sample\]](#)
- [K1-02 \[Sampling: Discrete vs Continuous\]](#)
- [K1-03 \[Sampling: Quantitative vs Qualitative\]](#)
- [K1-04 \[Sampling Methods: Census\]](#)
- [K1-05 \[Sampling Methods: Simple Random Sampling\]](#)
- [K1-06 \[Sampling Methods: Systematic Sampling\]](#)
- [K1-07 \[Sampling Methods: Stratified Sampling\]](#)
- [K1-08 \[Sampling Methods: Quota Sampling\]](#)
- [K1-09 \[Sampling Methods: Opportunity Sampling\]](#)
- [K1-10 \[Sampling Methods: Cluster Sampling\]](#)
- [K1-11 \[Sampling Method: Self-Selection Sampling\]](#)

### L: Data Presentation and Interpolation

[Interpret diagrams for single-variable data, including understanding that area in a histogram represents

- [L1-01 \[Data: An Introduction to Data Presentation\]](#)
- [L1-02 \[Data: Box Plots / Box and Whisker Diagrams\]](#)

<p>frequency]</p> <p>[Connect to probability distributions]</p>	<ul style="list-style-type: none"> <li>• <a href="#">L1-03 [Data: Comparing Box Plots]</a></li> <li>• <a href="#">L1-04 [Data: Cumulative Frequency Curves]</a></li> <li>• <a href="#">L1-05 [Data: Median and Quartiles from Cumulative Frequency]</a></li> <li>• <a href="#">L1-06 [Data: Histograms]</a></li> <li>• <a href="#">L1-07 [Data: Median and Quartiles from Histograms]</a></li> <li>• <a href="#">L1-08 [Data: Histogram Problem]</a></li> </ul>
<p>[Interpret scatter diagrams and regression lines for bivariate data, including recognition of scatter diagrams which include distinct sections of the population (calculations involving regression lines are excluded)]</p> <p>[Understand informal interpretation of correlation]</p> <p>[Understand that correlation does not imply causation]</p>	<ul style="list-style-type: none"> <li>• <a href="#">L2-01 [Scatter Graphs: Bivariate Data]</a></li> <li>• <a href="#">L2-02 [Scatter Graphs: Correlation and Association]</a></li> <li>• <a href="#">L2-03 [Scatter Graphs: Correlation does not imply Causation]</a></li> <li>• <a href="#">L2-04 [Scatter Graphs: The Product Moment Correlation Coefficient]</a></li> <li>• <a href="#">L2-05 [Scatter Graphs: 'Guessing' the PMCC]</a></li> <li>• <a href="#">L2-06 [Scatter Graphs: EXTENSION Introducing Regression Lines]</a></li> <li>• <a href="#">L2-07 [Scatter Graphs: Interpolation vs Extrapolation]</a></li> </ul>
<p>[Interpret measures of central tendency and variation, extending to standard deviation]</p> <p>[Be able to calculate standard deviation, including from summary statistics]</p>	<ul style="list-style-type: none"> <li>• <a href="#">L3-01 [Data: Finding the Mean from Discrete Data]</a></li> <li>• <a href="#">L3-02 [Data: Finding the Mode from Discrete Data]</a></li> <li>• <a href="#">L3-03 [Data: Finding the Median and Quartiles from Discrete Data]</a></li> <li>• <a href="#">L3-04 [Data: Estimating the Mean from Grouped Continuous Data]</a></li> <li>• <a href="#">L3-05 [Data: Finding the Modal Class from Grouped Continuous Data]</a></li> <li>• <a href="#">L3-06 [Data: Estimating the Median from Grouped Continuous Data]</a></li> <li>• <a href="#">L3-07 [Data: Estimating the Quartiles from Grouped Continuous Data]</a></li> <li>• <a href="#">L3-08 [Data: The Interquartile Range]</a></li> <li>• <a href="#">L3-09 [Data: OCR MEI ONLY The Midrange]</a></li> <li>• <a href="#">L3-10 [Data: Comparing Data Sets Problem 1]</a></li> <li>• <a href="#">L3-11 [Data: Comparing Data Sets Problem 2]</a></li> <li>• <a href="#">L3-12 [Data: Introducing the Variance and Standard Deviation]</a></li> <li>• <a href="#">L3-13 [Data: Comparing Data Sets Problem 2 AGAIN!]</a></li> <li>• <a href="#">L3-14 [Data: The Sample Standard Deviation]</a></li> <li>• <a href="#">L3-15 [Data: OCR MEI and the Standard Deviation]</a></li> <li>• <a href="#">L3-16 [Data: EXTENSION Alternative Formulae for the Standard Deviation]</a></li> <li>• <a href="#">L3-17 [Data: The Standard Deviation from Summary Statistics]</a></li> </ul>

	<ul style="list-style-type: none"> <li>• <a href="#">L3-18 [Data: Introducing Linear Coding]</a></li> <li>• <a href="#">L3-19 [Data: Example of Linear Coding]</a></li> </ul>
<p><b>[Recognise and interpret possible outliers in data sets and statistical diagrams]</b></p> <p><b>[Select or critique data presentation techniques in the context of a statistical problem]</b></p> <p><b>[Be able to clean data, including dealing with missing data, errors and outliers]</b></p>	<ul style="list-style-type: none"> <li>• <a href="#">L4-01 [Outliers: Using the Quartiles and Interquartile Range]</a></li> <li>• <a href="#">L4-02 [Outliers: Using the Mean and Standard Deviation]</a></li> <li>• <a href="#">L4-03 [Data: Critiquing Data Example]</a></li> <li>• <a href="#">L4-04 [Data: Cleaning Data Example]</a></li> </ul>

## Chapter 10: Probability and discrete random variables

### M: Probability

<p><b>[Understand and use mutually exclusive and independent events when calculating probabilities]</b></p> <p><b>[Link to discrete and continuous distributions]</b></p>	<ul style="list-style-type: none"> <li>• <a href="#">M1-01 [Probability: Basic Probability Concepts and Notation]</a></li> <li>• <a href="#">M1-02 [Probability: Venn Diagrams - Union and Intersection]</a></li> <li>• <a href="#">M1-03 [Probability: Finding Probabilities from a Venn Diagram]</a></li> <li>• <a href="#">M1-04 [Probability: Finding Missing Probabilities]</a></li> <li>• <a href="#">M1-05 [Probability: Drawing a Venn Diagram]</a></li> <li>• <a href="#">M1-06 [Probability: A 3-circle Venn Diagram Problem]</a></li> <li>• <a href="#">M1-07 [Probability: A Trickier Venn Diagram Problem]</a></li> <li>• <a href="#">M1-08 [Probability: Independent or Mutually Exclusive?]</a></li> <li>• <a href="#">M1-09 [Probability: Are A and B Independent?]</a></li> <li>• <a href="#">M1-10 [Probability: With Replacement and Without Replacement]</a></li> <li>• <a href="#">M1-11 [Probability: Picking Three at Random Problem]</a></li> <li>• <a href="#">M1-12 [Probability: Tree Diagram Example 1]</a></li> <li>• <a href="#">M1-13 [Probability: Tree Diagram Example 2]</a></li> <li>• <a href="#">M1-14 [Probability: Two-Way Table Example 1]</a></li> <li>• <a href="#">M1-15 [Probability: Two-Way Table Example 2]</a></li> <li>• <a href="#">M1-16 [Probability: Histogram Example]</a></li> </ul>
---	---

## N: Statistical Distributions

[Understand and use simple, discrete probability distributions (calculation of mean and variance of discrete random variables is excluded), including the binomial distribution, as a model; calculate probabilities using the binomial distribution]

- [N1-01 \[DRV: Introducing Discrete Random Variables\]](#)
- [N1-02 \[DRV: Tabular Example 1\]](#)
- [N1-03 \[DRV: Tabular Example 2\]](#)
- [N1-04 \[DRV: Tabular Example 3\]](#)
- [N1-05 \[DRV: Tabular Example 4\]](#)
- [N1-06 \[DRV: A Problem involving a Probability Tree\]](#)
- [N1-07 \[DRV: Representing as an Algebraic Function\]](#)
- [N1-08 \[DRV: Algebraic Function Example 1\]](#)
- [N1-09 \[DRV: Algebraic Function Example 2\]](#)
- [N1-10 \[DRV: Algebraic Function Example 3\]](#)
- [N1-11 \[DRV: Discrete Uniform Distributions\]](#)
- [N1-12 \[DRV: Introducing the Cumulative Distribution Function\]](#)
- [N1-13 \[DRV: Cumulative Distribution Function Example\]](#)
- [N1-14 \[Binomial Distribution: Introducing Binomial Probabilities\]](#)
- [N1-15 \[Binomial Distribution: Introducing the Binomial Distribution\]](#)
- [N1-16 \[Binomial Distribution: Using the Formula\]](#)
- [N1-17 \[Binomial Distribution: Tabulating Probabilities\]](#)
- [N1-18 \[Binomial Distribution: Words to Inequalities\]](#)
- [N1-19 \[Binomial Distribution: Finding Probabilities\]](#)
- [N1-20 \[Binomial Distribution: A Worded Problem\]](#)

## Chapter 11: Hypothesis Testing

### O: Statistical Hypothesis Testing

[Understand and apply the language of statistical hypothesis testing, developed through a binomial model: null hypothesis, alternative hypothesis, significance level, test statistic, 1-tail test, 2-tail test, critical value, critical region, acceptance region,  $p$ -value]

- [O1-01 \[Hypothesis Testing: An Introduction\]](#)
- [O1-02 \[Hypothesis Testing: Explaining the Significance Level\]](#)
- [O1-03 \[Hypothesis Testing: One-Tail or Two-Tail Test?\]](#)
- [O1-04 \[Hypothesis Testing: Critical & Acceptance Regions\]](#)

[Conduct a statistical hypothesis test for the proportion in the binomial distribution and interpret the results in context]

[Understand that a sample is being used to make an inference about the population and appreciate that the significance level is the probability of incorrectly rejecting the null hypothesis]

- [O2-01 \[Binomial Hypothesis Testing: Less Than Example 1\]](#)
- [O2-02 \[Binomial Hypothesis Testing: Less Than Example 2\]](#)
- [O2-03 \[Binomial Hypothesis Testing: More Than Example 1\]](#)
- [O2-04 \[Binomial Hypothesis Testing: More Than Example 2\]](#)
- [O2-05 \[Binomial Hypothesis Testing: Two-Tail Example 1\]](#)
- [O2-06 \[Binomial Hypothesis Testing: Two-Tail Example 2\]](#)
- [O2-07 \[Binomial Hypothesis Testing: Finding the Critical Region\]](#)
- [O2-08 \[Binomial Hypothesis Testing: Critical Region Method 1\]](#)
- [O2-09 \[Binomial Hypothesis Testing: Critical Region Method 2\]](#)
- [O2-10 \[Binomial Hypothesis Testing: Two-Tail Critical Region Method 1\]](#)
- [O2-11 \[Binomial Hypothesis Testing: Two-Tail Critical Region Method 2\]](#)

## Chapter 12: Algebra 2

### A: Proof

Proof by contradiction (including proof of the irrationality of  $\sqrt{2}$  and the infinity of primes, and application to unfamiliar proofs)

- [A1-10 Introducing Proof by Contradiction](#)
- [A1-11 Proving  \$\sqrt{2}\$  is Irrational](#)
- [A1-12 Proving  \$\sqrt{3}\$  is Irrational](#)
- [A1-13 Proving there are Infinitely Many Primes](#)
- [A1-14 Proof by Contradiction Examples](#)

### B: Algebra and Functions

Simplify rational expressions including by factorising and cancelling, and algebraic division (by linear expressions only)

- [B6-15 Rational Expressions: Basic Simplifying of Fractions](#)
- [B6-16 Rational Expressions: Introducing Simplifying Algebraic Fractions](#)
- [B6-17 Rational Expressions: Examples of Simplifying Algebraic Fractions](#)
- [B6-18 Rational Expressions: Basic Adding and Subtracting Fractions](#)
- [B6-19 Rational Expressions: Examples of Adding / Subtracting Algebraic Fractions](#)

	<ul style="list-style-type: none"> <li>• <a href="#">B6-20 Rational Expressions: Simplifying using Polynomial Division</a></li> </ul>
the modulus of a linear function,	<ul style="list-style-type: none"> <li>• <a href="#">B7-05 Graphs: Introducing the Modulus Function</a></li> <li>• <a href="#">B7-06 Graphs: Sketching the Modulus of a Linear Function</a></li> <li>• <a href="#">B7-07 Graphs: Examples of Sketching the Modulus of a Linear Function</a></li> <li>• <a href="#">B7-08 Graphs: Solving Modulus Equations</a></li> <li>• <a href="#">B7-09 Graphs: Examples of Solving Modulus Equations</a></li> <li>• <a href="#">B7-09 Graphs: Solving Modulus Inequalities</a></li> <li>• <a href="#">B7-10 Graphs: EXTENSION Sketching the Modulus of Other Functions</a></li> <li>• <a href="#">B7-11 Graphs: EXTENSION Sketching <math>y=f( x )</math></a></li> </ul>
Understand and use composite functions; inverse functions and their graphs	<ul style="list-style-type: none"> <li>• <a href="#">B8-01 Functions: What is a Function?</a></li> <li>• <a href="#">B8-02 Functions: Introducing the Domain and Range of a Function</a></li> <li>• <a href="#">B8-03 Functions: Examples of Finding the Domain and Range</a></li> <li>• <a href="#">B8-04 Functions: One-to-One, Many-to-One, One-to-Many, Many-to-Many</a></li> <li>• <a href="#">B8-05 Functions: Restricting the Domain</a></li> <li>• <a href="#">B8-06 Functions: Even &amp; Odd Functions</a></li> <li>• <a href="#">B8-07 Functions: Introducing Composite Functions</a></li> <li>• <a href="#">B8-08 Functions: Examples of Composite Functions</a></li> <li>• <a href="#">B8-09 Functions: The Domain of a Composite Function</a></li> <li>• <a href="#">B8-10 Functions: Introducing Inverse Functions and Restricting the Domain</a></li> <li>• <a href="#">B8-11 Functions: Finding an Inverse Function</a></li> <li>• <a href="#">B8-12 Functions: Examples of finding Inverse Functions</a></li> <li>• <a href="#">B8-13 Functions: A Consequence of Inverse Functions</a></li> <li>• <a href="#">B8-14 Functions: Domain and Range of an Inverse Function</a></li> <li>• <a href="#">B8-15 Functions: Set Notation for Domain and Range</a></li> </ul>
Combinations of these transformations	<ul style="list-style-type: none"> <li>• <a href="#">B9-21 Graph Transformations: Combining Transformations - Does the Order Matter?</a></li> <li>• <a href="#">B9-22 Graph Transformations: Examples of Describing Two Transformations</a></li> <li>• <a href="#">B9-23 Graph Transformations: Examples of Two Transformations of <math>y = x(x - 2)</math></a></li> <li>• <a href="#">B9-24 Graph Transformations: Examples of Two</a></li> </ul>

	<ul style="list-style-type: none"> <li>• <a href="#">Transformations of <math>y = \arccos(x)</math></a></li> <li>• <a href="#">B9-25 Graph Transformations: Two Transformations via 'Replacing'</a></li> </ul>
Decompose rational functions into partial fractions (denominators not more complicated than squared linear terms and with no more than 3 terms, numerators constant or linear)	<ul style="list-style-type: none"> <li>• <a href="#">B10-01 Algebraic Fractions: Proper Fractions &amp; Improper Fractions</a></li> <li>• <a href="#">B10-02 Algebraic Fractions: Adding and Subtracting Algebraic Fractions</a></li> <li>• <a href="#">B10-03 Algebraic Fractions: Introducing Partial Fractions via Substitution</a></li> <li>• <a href="#">B10-04 Algebraic Fractions: Partial Fractions via Comparing Coefficients</a></li> <li>• <a href="#">B10-05 Algebraic Fractions: Examples of Partial Fractions</a></li> <li>• <a href="#">B10-06 Algebraic Fractions: THREE Partial Fractions</a></li> <li>• <a href="#">B10-07 Algebraic Fractions: Examples of THREE Partial Fractions</a></li> <li>• <a href="#">B10-08 Algebraic Fractions: How we deal with Repeated Factors in the Denominator</a></li> <li>• <a href="#">B10-09 Algebraic Fractions: Examples of Repeated Factors in the Denominator</a></li> <li>• <a href="#">B10-10 Algebraic Fractions: EXTENSION Quadratic Terms in the Denominator</a></li> <li>• <a href="#">B10-11 Algebraic Fractions: EXTENSION Examples of Quadratics in the Denominator</a></li> <li>• <a href="#">B10-12 Algebraic Fractions: EXTENSION How we deal with Improper Fractions</a></li> </ul>
Use of functions in modelling, including consideration of limitations and refinements of the models	<ul style="list-style-type: none"> <li>• <a href="#">B11-00 Introduction to Modelling</a></li> <li>• <a href="#">B11-01 Modelling: The Microbiologist Problem</a></li> <li>• <a href="#">B11-02 Modelling: The Fish in a Lake Problem</a></li> <li>• <a href="#">B11-03 Modelling: The Playground Problem</a></li> <li>• <a href="#">B11-04 Modelling: The Football Problem</a></li> </ul>

### C: Coordinate Geometry in the (x,y) plane

Understand and use the parametric equations of curves and conversion between Cartesian and parametric forms	<ul style="list-style-type: none"> <li>• <a href="#">C3-01 Parametric Equations: Introducing Parametric Equations</a></li> <li>• <a href="#">C3-02 Parametric Equations: The Difference between Cartesian &amp; Parametric</a></li> </ul>
---	---

	<ul style="list-style-type: none"> <li>• <a href="#">C3-03 Parametric Equations: Cartesian to Parametric</a></li> <li>• <a href="#">C3-04 Parametric Equations: Find where <math>x=t^3-4t</math>, <math>y=t^2+t</math> meets <math>y=20</math></a></li> <li>• <a href="#">C3-05 Parametric Equations: What does <math>x=t^3-4t</math>, <math>y=t^2+t</math> look like?</a></li> <li>• <a href="#">C3-06 Parametric Equations: What does <math>x=2\sin(t)</math>, <math>y=4\cos(t-\pi/4)</math> look like?</a></li> <li>• <a href="#">C3-07 Parametric Equations: Parametric to Cartesian</a></li> <li>• <a href="#">C3-08 Parametric Equations: Defining an Ellipse Parametrically</a></li> </ul>
Use parametric equations in modelling in a variety of contexts	<ul style="list-style-type: none"> <li>• <a href="#">C4-01 Parametric Equation Modelling: Parametric to Cartesian</a></li> <li>• <a href="#">C4-02 Parametric Equation Modelling: A Projectiles Problem</a></li> </ul>

## Chapter 13: Sequences

### D: Sequences and Series

<p><b>[Understand and use the binomial expansion of <math>(a + bx)^n</math> for positive integer <math>n</math>; the notations <math>n!</math> and <math>nCr</math>; link to binomial probabilities]</b></p> <p>Extend to any rational <math>n</math>, including its use for approximation; be aware that the expansion is valid for <math>bx &lt; 1</math>. (proof not required)</p>	<ul style="list-style-type: none"> <li>• <a href="#">D1-14 Binomial Expansion: EXTENSION Extending Binomial Expansion</a></li> <li>• <a href="#">D1-15 Binomial Expansion: Writing <math>(a + bx)^n</math> in the form <math>p(1 + qx)^n</math></a></li> <li>• <a href="#">D1-16 Binomial Expansion: Find the first four terms of <math>(1 + x)^{-1}</math></a></li> <li>• <a href="#">D1-17 Binomial Expansion: Find the first four terms of <math>(1 + 2x)^{-2}</math></a></li> <li>• <a href="#">D1-18 Binomial Expansion: Find the first four terms of <math>(1 - 3x)^{-3}</math></a></li> <li>• <a href="#">D1-19 Binomial Expansion: Find the first four terms of <math>(2 + 4x)^{-5}</math></a></li> <li>• <a href="#">D1-20 Binomial Expansion: Find the first four terms of <math>(9 - 3x)^{1/2}</math></a></li> <li>• <a href="#">D1-21 Binomial Expansion: Introducing the Range of Validity</a></li> <li>• <a href="#">D1-22 Binomial Expansion: Examples on Determining the Range of Validity</a></li> <li>• <a href="#">D1-23 Binomial Expansion: Two Trickier Binomial Expansions</a></li> <li>• <a href="#">D1-24 Binomial Expansion: Two Trickier Range of Validity</a></li> </ul>
---	---

	<ul style="list-style-type: none"> <li>• <a href="#">D1-25 Binomial Expansion: New Formula, Old Question</a></li> </ul>
Work with sequences including those given by a formula for the $n$ th term and those generated by a simple relation of the form $x_{n+1} = f(x_n)$ ; increasing sequences; decreasing sequences; periodic sequences	<ul style="list-style-type: none"> <li>• <a href="#">D2-01 Sequences: GCSE Revision on Linear and Quadratic Sequences</a></li> <li>• <a href="#">D2-02 Sequences: Inductive Definitions and Recurrence Relations</a></li> <li>• <a href="#">D2-03 Sequences: Finding the First Five Terms of an Inductive Definition</a></li> <li>• <a href="#">D2-04 Sequences: EXTENSION The Logistic Map</a></li> <li>• <a href="#">D2-05 Sequences: Investigating Limits of Inductive Definitions</a></li> <li>• <a href="#">D2-06 Sequences: Describing Sequences</a></li> </ul>
Understand and use sigma notation for sums of series	<ul style="list-style-type: none"> <li>• <a href="#">D3-01 Sigma Notation: Introducing Sigma Notation</a></li> <li>• <a href="#">D3-02 Sigma Notation: Writing a Series in Sigma Notation</a></li> <li>• <a href="#">D3-03 Sigma Notation: Examples of Evaluating Series</a></li> <li>• <a href="#">D3-04 Sigma Notation: When to Expand Brackets and When Not</a></li> </ul>
Understand and work with arithmetic sequences and series, including the formulae for $n$ th term and the sum to $n$ terms	<ul style="list-style-type: none"> <li>• <a href="#">D4-01 Arithmetic Sequences: Introducing Arithmetic Sequences</a></li> <li>• <a href="#">D4-02 Arithmetic Sequences: Finding the <math>n</math>th term</a></li> <li>• <a href="#">D4-03 Arithmetic Sequences: Finding the 2300th term</a></li> <li>• <a href="#">D4-04 Arithmetic Sequences: How many terms are there?</a></li> <li>• <a href="#">D4-05 Arithmetic Sequences: A Sequences Problem</a></li> <li>• <a href="#">D4-06 Arithmetic Sequences: Introducing Arithmetic Series</a></li> <li>• <a href="#">D4-07 Arithmetic Sequences: Examples of Finding the Sum of Arithmetic Series</a></li> <li>• <a href="#">D4-08 Arithmetic Sequences: Words to Algebra</a></li> <li>• <a href="#">D4-09 Arithmetic Sequences: 4th term is 9, 20th term is 73</a></li> <li>• <a href="#">D4-10 Arithmetic Sequences: 21st term is 118, Sum of the first 132 terms is 48609</a></li> <li>• <a href="#">D4-11 Arithmetic Sequences: Sum of 1st-10th is 506.5, Sum of 8th-16th is 321.3</a></li> </ul>
Understand and work with geometric sequences and series including the formulae for the $n$ th term and the sum of a finite geometric series; the sum to infinity of a convergent geometric series, including the use of $ r  < 1$ ; modulus notation	<ul style="list-style-type: none"> <li>• <a href="#">D5-01 Geometric Sequences: Introducing Geometric Sequences</a></li> <li>• <a href="#">D5-02 Geometric Sequences: Finding the <math>n</math>th term</a></li> <li>• <a href="#">D5-03 Geometric Sequences: Finding the 13th term</a></li> <li>• <a href="#">D5-04 Geometric Sequences: How many terms are there?</a></li> <li>• <a href="#">D5-05 Geometric Sequences: A Sequences Problem</a></li> <li>• <a href="#">D5-06 Geometric Sequences: Introducing Geometric Series</a></li> </ul>

	<ul style="list-style-type: none"> <li>• <a href="#">D5-07 Geometric Sequences: Examples of Finding the Sum of Geometric Series</a></li> <li>• <a href="#">D5-08 Geometric Sequences: Introducing Summing to Infinity</a></li> <li>• <a href="#">D5-09 Geometric Sequences: Examples of Finding the Sum to Infinity</a></li> <li>• <a href="#">D5-10 Geometric Sequences: Words to Algebra</a></li> <li>• <a href="#">D5-11 Geometric Sequences: 3rd term is 16, 6th term is 1.024</a></li> <li>• <a href="#">D5-12 Geometric Sequences: Sum of 1st &amp; 2nd is 1080, Sum of 4th &amp; 5th is 8.64</a></li> <li>• <a href="#">D5-13 Geometric Sequences: 4th term is 24, Sum of the first 4 terms is 21</a></li> <li>• <a href="#">D5-14 Geometric Sequences: 2nd term is 4, Sum to Infinity is 25</a></li> <li>• <a href="#">D5-15 Geometric Sequences: Exam-Style Problem</a></li> </ul>
Use sequences and series in modelling	<ul style="list-style-type: none"> <li>• <a href="#">D6-01 Modelling with Sequences: The Gardener Problem</a></li> <li>• <a href="#">D6-02 Modelling with Sequences: The Medicine Problem</a></li> </ul>

## Chapter 14: Trigonometric Identities

### E: Trigonometry

Work with radian measure, including use for arc length and area of sector	<ul style="list-style-type: none"> <li>• <a href="#">E1-15 Trigonometry: Introducing Radians</a></li> <li>• <a href="#">E1-16 Trigonometry: Converting Between Degrees and Radians</a></li> <li>• <a href="#">E1-17 Trigonometry: Deriving a Formula for Arc Length in Radians</a></li> <li>• <a href="#">E1-18 Trigonometry: Using the Formula for Arc Length in Radians</a></li> <li>• <a href="#">E1-19 Trigonometry: Deriving a Formula for Sector Area in Radians</a></li> <li>• <a href="#">E1-20 Trigonometry: Using the Formula for Area of a Sector in Radians</a></li> </ul>
Understand and use the standard small angle approximations of sine, cosine and tangent	<ul style="list-style-type: none"> <li>• <a href="#">E2-01 Small-Angle Approximation: Geometrical Derivation</a></li> <li>• <a href="#">E2-02 Small-Angle Approximation: EXTENSION Taylor Series Derivation</a></li> </ul>

<p><math>\sin \theta \approx \theta</math>, <math>\cos \theta \approx 1 - \theta^2</math>, <math>\tan \theta \approx \theta</math> where <math>\theta</math> is in radians</p>	<ul style="list-style-type: none"> <li>• <a href="#">E2-03 Small-Angle Approximation: Approximate <math>\sin(\pi/12)</math>, <math>\cos(\pi/12)</math> &amp; <math>\tan(\pi/12)</math></a></li> <li>• <a href="#">E2-04 Small-Angle Approximation: Approximate <math>\sin(10^\circ)</math>, <math>\cos(10^\circ)</math> &amp; <math>\tan(10^\circ)</math></a></li> <li>• <a href="#">E2-05 Small-Angle Approximation: Percentage Error Investigation</a></li> <li>• <a href="#">E2-06 Small-Angle Approximation: Trig Functions as Polynomials</a></li> </ul>
<p><b>[Understand and use the sine, cosine and tangent functions; their graphs, symmetries and periodicity]</b></p> <p>Know and use exact values of sin and cos for <math>0</math>, <math>\pi/6</math>, <math>\pi/4</math>, <math>\pi/3</math>, <math>\pi/2</math>, <math>\pi</math> and <math>2\pi</math></p> <p>multiples thereof, and exact values of tan for <math>0</math>, <math>\pi/6</math>, <math>\pi/4</math>, <math>\pi/3</math>, <math>\pi/2</math> and multiples thereof</p>	<ul style="list-style-type: none"> <li>• <a href="#">E3-08 Trig Graphs: Two Triangles in Radians to Learn</a></li> <li>• <a href="#">E3-09 Trig Graphs: Testing Yourself on Exact Values of <math>\sin(x)</math>, <math>\cos(x)</math> &amp; <math>\tan(x)</math></a></li> <li>• <a href="#">E3-10 Trig Graphs: Quickly Sketching <math>y = \sin(x)</math> in radians</a></li> <li>• <a href="#">E3-11 Trig Graphs: Quickly Sketching <math>y = \cos(x)</math> in radians</a></li> <li>• <a href="#">E3-12 Trig Graphs: Quickly Sketching <math>y = \tan(x)</math> in radians</a></li> </ul>
<p>Understand and use the definitions of secant, cosecant and cotangent and of arcsin, arccos and arctan; their relationships to sine, cosine and tangent; understanding of their graphs; their ranges and domains</p>	<ul style="list-style-type: none"> <li>• <a href="#">E4-01 Trigonometry: Introducing cosec(x), sec(x) &amp; cot(x)</a></li> <li>• <a href="#">E4-02 Trigonometry: Given <math>\sin(x) = 3/7</math>, exact values of cosec(x), sec(x) &amp; cot(x)</a></li> <li>• <a href="#">E4-03 Trigonometry: Sketching <math>y = \text{cosec}(x)</math></a></li> <li>• <a href="#">E4-04 Trigonometry: Sketching <math>y = \text{sec}(x)</math></a></li> <li>• <a href="#">E4-05 Trigonometry: Sketching <math>y = \text{cot}(x)</math></a></li> <li>• <a href="#">E4-06 Trigonometry: Transformations of <math>y = \text{cosec}(x)</math>, <math>y = \text{sec}(x)</math> &amp; <math>y = \text{cot}(x)</math></a></li> <li>• <a href="#">E4-07 Trigonometry: Why we Restrict the Domain to find an Inverse Function</a></li> <li>• <a href="#">E4-08 Trigonometry: Introducing Arcsin(x)</a></li> <li>• <a href="#">E4-09 Trigonometry: Introducing Arccos(x)</a></li> <li>• <a href="#">E4-10 Trigonometry: Introducing Arctan(x)</a></li> <li>• <a href="#">E4-11 Trigonometry: Transformations of Arcsin(x), Arccos(x) &amp; Arctan(x)</a></li> </ul>
<p>Understand and use <math>\sec^2 \theta = 1 + \tan^2 \theta</math> and <math>\text{cosec}^2 \theta = 1 + \cot^2 \theta</math></p>	<ul style="list-style-type: none"> <li>• <a href="#">E5-05 Trigonometric Identities: Proving <math>\sec^2 \theta = 1 + \tan^2 \theta</math></a></li> <li>• <a href="#">E5-06 Trigonometric Identities: Proving <math>\text{cosec}^2 \theta = 1 + \cot^2 \theta</math></a></li> <li>• <a href="#">E5-07 Trigonometric Identities: Simplifying Further Expressions</a></li> <li>• </li> </ul>

Understand and use double angle formulae; use of formulae for

$\sin(A \pm B)$ ,  $\cos(A \pm B)$  and  $\tan(A \pm B)$ ; understand geometrical proofs of these formulae

Understand and use expressions for  $a\cos\theta + b\sin\theta$  in the equivalent forms of  $r\cos(\theta \pm \alpha)$  or  $r\sin(\theta \pm \alpha)$

- [E6-01 Compound Angles: Proving the Compound Angle Formulae](#)
- [E6-02 Compound Angles: Exact Values of  \$\sin\(105^\circ\)\$ ,  \$\cos\(150^\circ\)\$  &  \$\tan\(15^\circ\)\$](#)
- [E6-03 Compound Angles: Using the Formulae Backwards](#)
- [E6-04 Compound Angles: Introducing the Double Angle Formulae](#)
- [E6-05 Compound Angles: Using Double Angle Formulae to Integrate](#)
- [E6-06 Compound Angles: Using Double Angle Formulae to Solve Equations](#)
- [E6-07 Equivalent Forms: Writing  \$a\cos\theta + b\sin\theta\$  in the form  \$r\cos\(\theta \pm \alpha\)\$  or  \$r\sin\(\theta \pm \alpha\)\$](#)
- [E6-08 Equivalent Forms: Writing  \$4\cos\theta + 3\sin\theta\$  in the form  \$r\sin\(\theta + \alpha\)\$](#)
- [E6-09 Equivalent Forms: Writing  \$3\cos\theta - 8\sin\theta\$  in the form  \$r\cos\(\theta + \alpha\)\$](#)
- [E6-10 Equivalent Forms: Solve  \$10\sin\theta - 6\cos\theta = 5\$](#)

**[Solve simple trigonometric equations in a given interval, including quadratic equations in  $\sin$ ,  $\cos$  and  $\tan$  and equations involving multiples of the unknown angle]**

- [E7-02 Trig Equations: Solve  \$\sin\(x\) = 1/2\$  between 0 and  \$2\pi\$](#)
- [E7-04 Trig Equations: Solve  \$\cos\(x\) = 1/2\$  between 0 and  \$2\pi\$](#)
- [E7-06 Trig Equations: Solve  \$\tan\(x\) = 1\$  between 0 and  \$2\pi\$](#)
- [E7-08 Trig Equations: Solving Basic Trigonometric Equations in radians](#)
- [E7-11 Trig Equations: Solve  \$1/\cos\(x\) = 5\$  between 0 and  \$2\pi\$](#)
- [E7-12 Trig Equations: Solve  \$1/\cos\(x\) = 5\$  between  \$2\pi\$  and  \$4\pi\$](#)
- [E7-14 Trig Equations: Solve  \$\sin^2\(x\) = 1/16\$  between 0 and  \$2\pi\$](#)
- [E7-17 Trig Equations: Solve  \$4\sin^2\(x\) = \sin\(x\)\$  between 0 and  \$2\pi\$](#)
- [E7-19 Trig Equations: Solve  \$4\sin\(x\) + 5\cos\(x\) = 0\$  between 0 and  \$2\pi\$](#)
- [E7-22 Trig Equations: Solve  \$\sin\(x + \pi/3\) = 0.7\$  between 0 and  \$2\pi\$](#)
- [E7-24 Trig Equations: Solve  \$\cos\(x - \pi/4\) = -0.3\$  between 0 and  \$2\pi\$](#)
- [E7-26 Trig Equations: Solve  \$\tan\(x + 3\pi\) = 4.1\$  between 0 and  \$2\pi\$](#)
- [E7-28 Trig Equations: Solve  \$\sin\(2x\) = 0.8\$  between 0 and  \$2\pi\$](#)
- [E7-30 Trig Equations: Solve  \$\cos\(3x\) = 0.7\$  between 0 and  \$2\pi\$](#)
- [E7-32 Trig Equations: Solve  \$\tan\(4x\) = 3.3\$  between 0 and  \$2\pi\$](#)

	<ul style="list-style-type: none"> <li>• <a href="#"><u>E7-34 Trig Equations: Solve <math>\sin(3x-0.8) = 0.25</math> between <math>\pi</math> and <math>3\pi</math></u></a></li> <li>• <a href="#"><u>E7-36 Trig Equations: Solve <math>\sin^2(x) + 2\sin(x) - 3 = 0</math> between 0 and <math>2\pi</math></u></a></li> <li>• <a href="#"><u>E7-38 Trig Equations: Solve <math>5\tan^2(x) - 38\tan(x) - 16 = 0</math> between 0 and <math>2\pi</math></u></a></li> <li>• <a href="#"><u>E7-40 Trig Equations: Solve <math>3\sin^2(x) = 3 - 2\cos(x)</math> between 0 and <math>2\pi</math></u></a></li> <li>• <a href="#"><u>E7-42 Trig Equations: Solve <math>3\sin(x) = 2\cos^2(x)</math> between 0 and <math>2\pi</math></u></a></li> <li>• <a href="#"><u>E7-44 Trig Equations: Solve <math>7\sin^2(x) - 5\sin(x) + \cos^2(x) = 0</math> between 0 and <math>2\pi</math></u></a></li> <li>• <a href="#"><u>E7-47 Trig Equations: Solve <math>\cos(x + \pi/3) = \sin(x)</math> between 0 and <math>2\pi</math></u></a></li> <li>• <a href="#"><u>E7-49 Trig Equations: Solve <math>\sin(x - \pi/7) = \cos(x)</math> between 0 and <math>2\pi</math></u></a></li> <li>• <a href="#"><u>E7-50 Trig Equations: Solve <math>\operatorname{cosec}(x) = 5</math> between 0 and <math>2\pi</math></u></a></li> <li>• <a href="#"><u>E7-51 Trig Equations: Solve <math>\sec(x) = 7</math> between 0 and <math>2\pi</math></u></a></li> <li>• <a href="#"><u>E7-52 Trig Equations: Solve <math>\cot(x) = 1/6</math> between 0 and <math>2\pi</math></u></a></li> <li>• <a href="#"><u>E7-53 Trig Equations: Solve <math>\sec^2(x) = 4 + 2\tan(x)</math> between 0 and <math>2\pi</math></u></a></li> <li>• <a href="#"><u>E7-54 Trig Equations: Solve <math>\operatorname{cosec}^2(x) = 3\cot(x) + 5</math> between 0 and <math>2\pi</math></u></a></li> <li>• <a href="#"><u>E7-55 Trig Equations: Solve <math>\sec(x) = \tan(x)</math> between 0 and <math>2\pi</math></u></a></li> <li>• <a href="#"><u>E7-56 Trig Equations: Solve <math>\sin(x) = \cot(x)</math> between 0 and <math>2\pi</math></u></a></li> </ul>
Construct proofs involving trigonometric functions and identities	<ul style="list-style-type: none"> <li>• <a href="#"><u>E8-01 Proving Trigonometric Identities: The Methods</u></a></li> <li>• <a href="#"><u>E8-02 Proving Trigonometric Identities: Example 1</u></a></li> <li>• <a href="#"><u>E8-03 Proving Trigonometric Identities: Example 2</u></a></li> <li>• <a href="#"><u>E8-04 Proving Trigonometric Identities: Example 3</u></a></li> <li>• <a href="#"><u>E8-05 Proving Trigonometric Identities: Example 4</u></a></li> <li>• <a href="#"><u>E8-06 Proving Trigonometric Identities: Example 5</u></a></li> </ul>
Use trigonometric functions to solve problems in context, including problems involving vectors, kinematics and forces	<ul style="list-style-type: none"> <li>• <a href="#"><u>E9-01 Trigonometry in Context: The Canoe Problem</u></a></li> <li>• <a href="#"><u>E9-02 Trigonometry in Context: The Two Particles Problem</u></a></li> </ul>

## Chapter 15: Differentiation 2

### G: Differentiation

<p>[Understand and use the derivative of <math>f(x)</math> as the gradient of the tangent to the graph of <math>y = f(x)</math> at a general point <math>(x, y)</math>; the gradient of the tangent as a limit; interpretation as a rate of change; sketching the gradient function for a given curve; second derivatives; differentiation from first principles for small positive integer powers of <math>x</math>] and for <math>\sin x</math> and <math>\cos x</math></p> <p>[Understand and use the second derivative as the rate of change of gradient]; connection to convex and concave sections of curves and points of inflection</p>	<ul style="list-style-type: none"><li>• <a href="#">G1-16 Differentiation: Differentiate <math>\sin(x)</math> from First Principles</a></li><li>• <a href="#">G1-17 Differentiation: Differentiate <math>\cos(x)</math> from First Principles</a></li><li>• <a href="#">G1-18 Differentiation: Convex &amp; Concave / Concave Up &amp; Concave Down</a></li><li>• <a href="#">G1-19 Differentiation: Convexity &amp; The Second Derivative</a></li></ul>
<p>[Differentiate <math>x^n</math>, for rational values of <math>n</math>, and related constant multiples, sums and differences]</p> <p>Differentiate <math>e^{kx}</math> and <math>a^{kx}</math>, <math>\sin kx</math>, <math>\cos kx</math>, <math>\tan kx</math> and related sums, differences and constant multiples</p> <p>Understand and use the derivative of <math>\ln x</math></p>	<ul style="list-style-type: none"><li>• <a href="#">G2-06 Differentiation: Differentiating <math>e^{(kx)}</math></a></li><li>• <a href="#">G2-07 Differentiation: Differentiating <math>a^{(kx)}</math></a></li><li>• <a href="#">G2-08 Differentiation: Differentiating <math>\sin(kx)</math> and <math>\cos(kx)</math></a></li><li>• <a href="#">G2-09 Differentiation: Differentiating <math>\tan(kx)</math></a></li><li>• <a href="#">G2-10 Differentiation: Differentiating <math>\ln(kx)</math></a></li></ul>
<p>[Apply differentiation to find gradients, tangents and normals, maxima and minima and stationary points], points of inflection</p> <p>[Identify where functions are increasing or decreasing]</p>	<ul style="list-style-type: none"><li>• <a href="#">G3-04 Gradients: Equations of Tangents</a></li><li>• <a href="#">G3-06 Gradients: Equations of Normals</a></li><li>• <a href="#">G3-09 Gradients: Examples of Finding Stationary Points</a></li><li>• <a href="#">G3-12 Gradients: The Second Derivative Test Part 2</a></li><li>• <a href="#">G3-15 Gradients: Determining Types of Stationary Points</a></li><li>• <a href="#">G3-16 Gradients: Finding Points of Inflection</a></li><li>• <a href="#">G3-17 Gradients: Finding where a Curve is Convex &amp; Concave</a></li><li>• <a href="#">G3-18 Gradients: Examples of Convex &amp; Concave Curves</a></li><li>• <a href="#">G3-19 Gradients: EXTENSION Points of Inflection of the Standard Normal Distribution</a></li><li>• <a href="#">G3-20 Gradients: EXTENSION Points of Inflection of the Normal Distribution</a></li></ul>

Differentiate using the product rule, the quotient rule and the chain rule, including problems involving connected rates of change and inverse functions

- [G4-01 Differentiation: Introducing the Chain Rule](#)
- [G4-02 Differentiation: Examples of using the Chain Rule Part 1 \(long method\)](#)
- [G4-03 Differentiation: Examples of using the Chain Rule Part 2 \(short method\)](#)
- [G4-04 Differentiation: Further Examples of using the Chain Rule](#)
- [G4-05 Differentiation: Introducing Connected Rates of Change](#)
- [G4-06 Differentiation: Connected Rates of Change Example 1](#)
- [G4-07 Differentiation: Connected Rates of Change Example 2](#)
- [G4-08 Differentiation: Connected Rates of Change Example 3](#)
- [G4-09 Differentiation: Tricky Factorisation](#)
- [G4-10 Differentiation: Introducing the Product Rule](#)
- [G4-11 Differentiation: Examples of using the Product Rule Part 1](#)
- [G4-12 Differentiation: Examples of using the Product Rule Part 2 \(Factorising\)](#)
- [G4-13 Differentiation: Further Examples of using the Product Rule](#)
- [G4-14 Differentiation: Simplifying Algebraic Fractions](#)
- [G4-15 Differentiation: Introducing the Quotient Rule](#)
- [G4-16 Differentiation: Examples of using the Quotient Rule](#)
- [G4-17 Differentiation: Choosing Between Rules](#)
- [G4-18 Differentiation: Gradient Problems](#)
- [G4-19 Differentiation: Differentiating an Inverse Function](#)

Differentiate simple functions and relations defined implicitly or parametrically, for first derivative only

- [G5-01 Differentiation: Introducing Implicit and Explicit Equations](#)
- [G5-02 Differentiation: Introducing Implicit Differentiation](#)
- [G5-03 Differentiation: Examples of Implicit Differentiation](#)
- [G5-04 Differentiation: Implicit Differentiation and Gradients](#)
- [G5-05 Differentiation: Introducing Parametric Differentiation](#)
- [G5-06 Differentiation: Examples of Parametric Differentiation](#)
- [G5-07 Differentiation: Parametric Differentiation and Gradients](#)
- [G5-08 Differentiation: A Tricky Parametric Differentiation Problem](#)

# Chapter 16: Integration and Differential Equations

## G: Differentiation

Construct simple differential equations in pure mathematics and in context,  (contexts may include kinematics, population growth and modelling the relationship between price and demand)	<ul style="list-style-type: none"><li>• <a href="#">G6-00 Differential Equations: Introducing Differential Equations</a></li><li>• <a href="#">G6-01 Differential Equations: Direct &amp; Inverse Proportion</a></li><li>• <a href="#">G6-02 Differential Equations: Examples of Forming DEs</a></li></ul>
---	--

## H: Integration

<b>[Integrate <math>x^n</math> (excluding <math>n = -1</math>), and related sums, differences and constant multiples ]</b>  Integrate $e^{kx}$ , $1/x$ , $\sin kx$ , $\cos kx$ and related sums, differences and constant multiples	<ul style="list-style-type: none"><li>• <a href="#">H2-06 Integration: Integrating <math>e^{kx}</math></a></li><li>• <a href="#">H2-07 Integration: Integrating <math>1/x</math></a></li><li>• <a href="#">H2-08 Integration: Integrating <math>\sin(kx)</math> &amp; <math>\cos(kx)</math></a></li><li>• <a href="#">H2-09 Integration: Further Examples of Integration</a></li></ul>
<b>[Evaluate definite integrals; use a definite integral to find the area under a curve]</b> and the area between two curves	<ul style="list-style-type: none"><li>• <a href="#">H3-11 Integration: Finding the Area between Two Curves Example 1</a></li><li>• <a href="#">H3-12 Integration: Finding the Area between Two Curves Example 2</a></li><li>• <a href="#">H3-13 Integration: Finding the Area between Two Curves Example 3</a></li><li>• <a href="#">H3-14 Integration: Finding the Area between Two Curves Example 4</a></li><li>• <a href="#">H3-15 Integration: Introducing Parametric Integration</a></li><li>• <a href="#">H3-16 Integration: Parametric Integration Example 1</a></li><li>• <a href="#">H3-17 Integration: Parametric Integration Example 2</a></li></ul>
Understand and use integration as the limit of a sum	<ul style="list-style-type: none"><li>• <a href="#">H4-01 Integration: Integration as the Limit of a Sum</a></li><li>• <a href="#">H4-02 Integration: An Example of finding an Area as the Limit of a Sum</a></li></ul>
Carry out simple cases of integration by substitution and	<ul style="list-style-type: none"><li>• <a href="#">H5-01 Further Integration: Reversing the Chain Rule</a></li></ul>

integration by parts; understand these methods as the inverse processes of the chain and product rules respectively

(Integration by substitution includes finding a suitable substitution and is limited to cases where one substitution will lead to a function which can be integrated; integration by parts includes more than one application of the method but excludes reduction formulae)

- [H5-02 Further Integration: Examples of Reversing the Chain Rule Part 1](#)
- [H5-03 Further Integration: More Reversing the Chain Rule](#)
- [H5-04 Further Integration: Examples of Reversing the Chain Rule Part 2](#)
- [H5-05 Further Integration: Reversing the Chain Rule with Trigonometry](#)
- [H5-06 Further Integration: Examples of Reversing the Chain Rule Part 3](#)
- [H5-07 Further Integration: Reversing the Chain Rule with Exponentials](#)
- [H5-08 Further Integration: Examples of Reversing the Chain Rule Part 4](#)
- [H5-09 Further Integration: Reversing the Chain Rule with Reciprocals](#)
- [H5-10 Further Integration: Examples of Reversing the Chain Rule Part 5](#)
- [H5-11 Further Integration: Introducing Integration by Substitution](#)
- [H5-12 Further Integration: Examples of Integration by Substitution Part 1](#)
- [H5-13 Further Integration: Integrating  \$x\(2x^2 + 3\)^6\$](#)
- [H5-14 Further Integration: Examples of Integration by Substitution 2](#)
- [H5-15 Further Integration: Integrating  \$\(2x - 5\)\(2x + 7\)^8\$](#)
- [H5-16 Further Integration: Examples of Integration by Substitution 3](#)
- [H5-17 Further Integration: Integrating  \$\cos\(x\)\sin^2\(x\)\$](#)
- [H5-18 Further Integration: Examples of Integration by Substitution 4](#)
- [H5-19 Further Integration: Definite Integrals with Integration by Substitution](#)
- [H5-20 Further Integration: Examples of Definite Integrals Part 1](#)
- [H5-21 Further Integration: Examples of Definite Integrals Part 2](#)
- [H5-22 Further Integration: Find the Area Between Two Curves](#)
- [H5-23 Further Integration: Tricky Integration by Substitution Problems](#)
- [H5-24 Further Integration: A Tough Integration by Substitution Problem](#)
- [H5-25 Further Integration: Introducing Integration by Parts &](#)

	<p><u>LATE</u></p> <ul style="list-style-type: none"> <li>• <a href="#">H5-26 Further Integration: When Integration by Parts goes Right</a></li> <li>• <a href="#">H5-27 Further Integration: When Integration by Parts goes Wrong</a></li> <li>• <a href="#">H5-28 Further Integration: Integration by Parts with Definite Integrals</a></li> <li>• <a href="#">H5-29 Further Integration: Examples of Integration by Parts</a></li> <li>• <a href="#">H5-30 Further Integration: Integrate <math>x^*(x+1)^5</math> by Parts</a></li> <li>• <a href="#">H5-31 Further Integration: Integrating <math>\ln(x)</math></a></li> <li>• <a href="#">H5-32 Further Integration: Integrating by Parts Twice</a></li> <li>• <a href="#">H5-33 Further Integration: Examples of Integration by Parts Twice</a></li> <li>• <a href="#">H5-34 Further Integration: Tabular Method for Integration by Parts</a></li> <li>• <a href="#">H5-35 Further Integration: Examples of the Tabular Method</a></li> <li>• <a href="#">H5-36 Further Integration: Find the Area Between Two Curves</a></li> <li>• <a href="#">H5-37 Further Integration: EXTENSION Integrate <math>\sin(x)*e^x</math></a></li> </ul>
<p>Integrate using partial fractions that are linear in the denominator</p>	<ul style="list-style-type: none"> <li>• <a href="#">H6-01 Integration with Partial Fractions: Example 1</a></li> <li>• <a href="#">H6-02 Integration with Partial Fractions: Example 2</a></li> <li>• <a href="#">H6-03 Integration with Partial Fractions: Example 3</a></li> <li>• <a href="#">H6-04 Integration with Partial Fractions: Example 4</a></li> <li>• <a href="#">H6-05 Integration with Partial Fractions: Example 5</a></li> <li>• <a href="#">H6-06 Integration with Partial Fractions: Example 6</a></li> <li>• <a href="#">H6-07 Integration with Partial Fractions: Example 7</a></li> <li>• <a href="#">H6-08 Integration with Partial Fractions: EXTENSION Example 8</a></li> </ul>
<p>Evaluate the analytical solution of simple first order differential equations with separable variables, including finding particular solutions</p> <p>(Separation of variables may require factorisation involving a common factor)</p>	<ul style="list-style-type: none"> <li>• <a href="#">H7-01 Differential Equations: Introducing Differential Equations</a></li> <li>• <a href="#">H7-02 Differential Equations: The Method of Separation of Variables</a></li> <li>• <a href="#">H7-03 Differential Equations: Examples of Finding General Solutions</a></li> <li>• <a href="#">H7-04 Differential Equations: Examples of Finding Particular Solutions</a></li> <li>• <a href="#">H7-05 Differential Equations: Tougher Examples</a></li> </ul>

Interpret the solution of a differential equation in the context of solving a problem, including identifying limitations of the solution; includes links to kinematics	<ul style="list-style-type: none"> <li>• <a href="#">H8-01 Differential Equations: A Worded Example 1</a></li> <li>• <a href="#">H8-02 Differential Equations: A Worded Example 2</a></li> <li>• <a href="#">H8-03 Differential Equations: A Worded Example 3</a></li> </ul>
--	--

## Chapter 17: Numerical Methods

### I: Numerical Methods

<p>Locate roots of <math>f(x) = 0</math> by considering changes of sign of <math>f(x)</math> in an interval of <math>x</math> on which <math>f(x)</math> is sufficiently well-behaved</p> <p>Understand how change of sign methods can fail</p>	<ul style="list-style-type: none"> <li>• <a href="#">I1-01 Locating Roots: Introducing the Change of Sign Method</a></li> <li>• <a href="#">I1-02 Locating Roots: The Change of Sign Method Example 1</a></li> <li>• <a href="#">I1-03 Locating Roots: The Change of Sign Method Example 2</a></li> <li>• <a href="#">I1-04 Locating Roots: Failure of the Change of Sign Method</a></li> </ul>
<p>Solve equations approximately using simple iterative methods; be able to draw associated cobweb and staircase diagrams</p> <p>Solve equations using the Newton-Raphson method and other recurrence relations of the form <math>x_{n+1} = g(x_n)</math></p> <p>Understand how such methods can fail</p>	<ul style="list-style-type: none"> <li>• <a href="#">I2-01 Locating Roots: Introducing the <math>x=g(x)</math> Method</a></li> <li>• <a href="#">I2-02 Locating Roots: Cobweb and Staircase Diagrams</a></li> <li>• <a href="#">I2-03 Locating Roots: The <math>x=g(x)</math> Method Example 1</a></li> <li>• <a href="#">I2-04 Locating Roots: The <math>x=g(x)</math> Method Example 2</a></li> <li>• <a href="#">I2-05 Locating Roots: Failure of the <math>x=g(x)</math> Method</a></li> <li>• <a href="#">I2-06 Locating Roots: Introducing the Newton-Raphson Method</a></li> <li>• <a href="#">I2-07 Locating Roots: The Newton-Raphson Method Example 1</a></li> <li>• <a href="#">I2-08 Locating Roots: The Newton-Raphson Method Example 2</a></li> <li>• <a href="#">I2-09 Locating Roots: Failure of the Newton-Raphson Method</a></li> </ul>
<p>Understand and use numerical integration of functions, including the use of the trapezium rule and estimating the approximate area under a curve and limits that it must lie between</p>	<ul style="list-style-type: none"> <li>• <a href="#">I3-01 Numerical Integration: Estimating using Rectangles</a></li> <li>• <a href="#">I3-02 Numerical Integration: Estimating using Trapeziums</a></li> <li>• <a href="#">I3-03 Numerical Integration: Introducing the Trapezium Rule</a></li> <li>• <a href="#">I3-04 Numerical Integration: Examples of Using the Trapezium Rule</a></li> <li>• <a href="#">I3-05 Numerical Integration: Overestimate or Underestimate?</a></li> <li>• <a href="#">I3-06 Numerical Integration: EXTENSION Monte Carlo Integration</a></li> </ul>
<p>Use numerical methods to solve problems in context</p>	<ul style="list-style-type: none"> <li>• <a href="#">I4-01 Numerical Methods: Contextual Problem 1</a></li> <li>• <a href="#">I4-02 Numerical Methods: Contextual Problem 2</a></li> </ul>

# Chapter 18: Motion in two dimensions

## J: Vectors

<p>[Use vectors to solve problems in pure mathematics and in context, including forces] and kinematics</p>	<ul style="list-style-type: none"><li>• <a href="#">J5-05 Vectors: Kinematics Problem</a></li></ul>
--	---

## Q: Kinematics

<p>[Understand, use and derive the formulae for constant acceleration for motion in a straight line]; extend to 2 dimensions using vectors</p>	<ul style="list-style-type: none"><li>• <a href="#">Q3-13 SUVAT: The Constant Acceleration Formulae in 2D</a></li><li>• <a href="#">Q3-14 SUVAT: 2D Example 1</a></li><li>• <a href="#">Q3-15 SUVAT: 2D Example 2</a></li><li>• <a href="#">Q3-16 SUVAT: 2D Example 3</a></li><li>• <a href="#">Q3-17 SUVAT: 2D Example 4</a></li><li>• <a href="#">Q3-18 SUVAT: 2D Example 5</a></li></ul>
<p>[Use calculus in kinematics for motion in a straight line: <math>v = \frac{dr}{dt}, a = \frac{dv}{dt} = \frac{d^2r}{dt^2}, r = \int v dt, v = \int a dt</math>] ; extend to 2 dimensions using vectors</p>	<ul style="list-style-type: none"><li>• <a href="#">Q4-07 Calculus in Kinematics: General Motion in 2D</a></li><li>• <a href="#">Q4-08 Calculus in Kinematics: 2D Example 1</a></li><li>• <a href="#">Q4-09 Calculus in Kinematics: 2D Example 2</a></li><li>• <a href="#">Q4-10 Calculus in Kinematics: 2D Example 3</a></li><li>• <a href="#">Q4-11 Calculus in Kinematics: 2D Example 4</a></li><li>• <a href="#">Q4-12 Calculus in Kinematics: 2D Example 5</a></li></ul>
<p>Model motion under gravity in a vertical plane using vectors; projectiles</p>	<ul style="list-style-type: none"><li>• <a href="#">Q5-01 Projectiles: Introducing Projectiles</a></li><li>• <a href="#">Q5-02 Projectiles: From the Ground Example 1 SUVAT Method</a></li><li>• <a href="#">Q5-03 Projectiles: From the Ground Example 1 Integration Method</a></li><li>• <a href="#">Q5-04 Projectiles: From the Ground Example 2 SUVAT Method</a></li><li>• <a href="#">Q5-05 Projectiles: From the Ground Example 2 Integration Method</a></li><li>• <a href="#">Q5-06 Projectiles: From the Ground Example 3 SUVAT Method</a></li><li>• <a href="#">Q5-07 Projectiles: From the Ground Example 3 Integration Method</a></li><li>• <a href="#">Q5-08 Projectiles: From the Ground Example 4 SUVAT Method</a></li><li>• <a href="#">Q5-09 Projectiles: From the Ground Example 4 Integration Method</a></li></ul>

	<ul style="list-style-type: none"> <li>• <a href="#">Q5-10 Projectiles: From the Ground Example 5 SUVAT Method</a></li> <li>• <a href="#">Q5-11 Projectiles: From the Ground Example 5 Integration Method</a></li> <li>• <a href="#">Q5-12 Projectiles: From a Height Example 1 SUVAT Method</a></li> <li>• <a href="#">Q5-13 Projectiles: From a Height Example 1 Integration Method</a></li> <li>• <a href="#">Q5-14 Projectiles: From a Height Example 2 SUVAT Method</a></li> <li>• <a href="#">Q5-15 Projectiles: From a Height Example 2 Integration Method</a></li> <li>• <a href="#">Q5-16 Projectiles: From a Height Example 3 SUVAT Method</a></li> <li>• <a href="#">Q5-17 Projectiles: From a Height Example 3 Integration Method</a></li> <li>• <a href="#">Q5-18 Projectiles: Derive a Formula for Maximum Height SUVAT Method</a></li> <li>• <a href="#">Q5-19 Projectiles: Derive a Formula for Maximum Distance SUVAT Method</a></li> <li>• <a href="#">Q5-20 Projectiles: Derive a Formula for Maximum Height Integration Method</a></li> <li>• <a href="#">Q5-21 Projectiles: Derive a Formula for Maximum Distance Integration Method</a></li> </ul>
--	--

## Chapter 19: Forces 2

### J: Vectors

[Use vectors in two dimensions] and in three dimensions	<ul style="list-style-type: none"> <li>• <a href="#">J1-05 Vectors: Introducing 3D Vectors</a></li> </ul>
[Calculate the magnitude and direction of a vector and convert between component form and magnitude/direction form]	<ul style="list-style-type: none"> <li>• <a href="#">J2-09 Vectors: Finding the Magnitude / Length of a 3D vector</a></li> <li>• <a href="#">J2-10 Vectors: Examples of Finding the Magnitude of 3D Vectors</a></li> <li>• <a href="#">J2-11 Vectors: Finding the Angle between Two 3D Vectors Method 1</a></li> <li>• <a href="#">J2-12 Vectors: Finding the Angle between Two 3D Vectors Method 2</a></li> </ul>
[Use vectors to solve problems in pure mathematics and in context, including forces] and kinematics	<ul style="list-style-type: none"> <li>• <a href="#">J5-06 Vectors: 3D Vectors Problem</a></li> </ul>

### P: Quantities and Units in Mechanics

<p>[Understand and use fundamental quantities and units in the S.I. system: length, time, mass]</p> <p>[Understand and use derived quantities and units: velocity, acceleration, force, weight], moment</p>	<ul style="list-style-type: none"> <li>• <a href="#">P1-02 S.I. Units: Moments</a></li> </ul>
---	---

## R: Forces and Newton's Laws

<p>[Understand the concept of a force; understand and use Newton's first law]</p>	<ul style="list-style-type: none"> <li>• <a href="#">R1-10 Forces: Writing Forces in Component Form</a></li> <li>• <a href="#">R1-11 Forces: Finding the Magnitude and Direction of a Resultant Force</a></li> <li>• <a href="#">R1-12 Forces: Resolving Forces Example 1</a></li> <li>• <a href="#">R1-13 Forces: Resolving Forces Example 2</a></li> <li>• <a href="#">R1-14 Forces: Resolving Forces Example 3</a></li> <li>• <a href="#">R1-15 Forces: Resolving Forces Example 4</a></li> <li>• <a href="#">R1-16 Forces: Resolving Forces Example 5</a></li> </ul>
<p>[Understand and use Newton's second law for motion in a straight line (restricted to forces in two perpendicular directions or simple cases of forces given as 2-D vectors)]; extend to situations where forces need to be resolved (restricted to 2 dimensions)</p>	<ul style="list-style-type: none"> <li>• <a href="#">R2-07 Forces: With SUVAT Example 4</a></li> <li>• <a href="#">R2-08 Forces: With SUVAT Example 5</a></li> <li>• <a href="#">R2-09 Forces: With SUVAT Example 6 Vectors</a></li> </ul>
<p>[Understand and use Newton's third law; equilibrium of forces on a particle and motion in a straight line (restricted to forces in two perpendicular directions or simple cases of forces given as 2-D vectors); application to problems involving smooth pulleys and connected particles]; resolving forces in 2 dimensions; equilibrium of a particle under coplanar forces</p>	<ul style="list-style-type: none"> <li>• <a href="#">R4-12 Forces: Introducing Smooth Inclined Planes</a></li> <li>• <a href="#">R4-13 Forces: Smooth Inclined Plane Example 1</a></li> <li>• <a href="#">R4-14 Forces: Smooth Inclined Plane Example 2</a></li> <li>• <a href="#">R4-15 Forces: Smooth Inclined Plane Example 3</a></li> <li>• <a href="#">R4-16 Forces: Introducing Rough Inclined Planes</a></li> <li>• <a href="#">R4-17 Forces: Rough Inclined Plane Example 1</a></li> <li>• <a href="#">R4-18 Forces: Rough Inclined Plane Example 2</a></li> <li>• <a href="#">R4-19 Forces: Rough Inclined Plane Example 3</a></li> <li>• <a href="#">R4-20 Forces: Pulley on Inclined Plane Example 1</a></li> <li>• <a href="#">R4-21 Forces: Pulley on Inclined Plane Example 2</a></li> <li>• <a href="#">R4-22 Forces: Pulley on Inclined Plane Example 3</a></li> </ul>
<p>Understand and use addition of forces; resultant forces;</p>	<ul style="list-style-type: none"> <li>• <a href="#">R5-01 Forces: Magnitude and Direction of Acceleration</a></li> </ul>

<p>dynamics for motion in a plane</p>	<ul style="list-style-type: none"> <li>● <a href="#">R5-02 Differential Equations: Introducing <math>F=ma</math> as a DE</a></li> <li>● <a href="#">R5-03 Differential Equations: Example 1</a></li> <li>● <a href="#">R5-04 Differential Equations: Example 2</a></li> <li>● <a href="#">R5-05 Differential Equations: Example 3</a></li> <li>● <a href="#">R5-06 Differential Equations: Example 4</a></li> </ul>
<p>Understand and use the <math>F \leq \mu R</math> model for friction; coefficient of friction; motion of a body on a rough surface; limiting friction and statics</p>	<ul style="list-style-type: none"> <li>● <a href="#">R6-01 Forces: Introducing the Coefficient of Friction</a></li> <li>● <a href="#">R6-02 Forces: Coefficient of Friction Example 1</a></li> <li>● <a href="#">R6-03 Forces: Coefficient of Friction Example 2</a></li> <li>● <a href="#">R6-04 Forces: Coefficient of Friction Example 3</a></li> <li>● <a href="#">R6-05 Forces: Coefficient of Friction and Pulley Example 1</a></li> <li>● <a href="#">R6-06 Forces: Coefficient of Friction and Pulley Example 2</a></li> <li>● <a href="#">R6-07 Forces: Coefficient of Friction and Inclined Plane Example 1</a></li> <li>● <a href="#">R6-08 Forces: Coefficient of Friction and Inclined Plane Example 2</a></li> <li>● <a href="#">R6-09 Forces: Coefficient of Friction and Inclined Plane Example 3</a></li> <li>● <a href="#">R6-10 Forces: Coefficient of Friction and Inclined Plane Example 4</a></li> </ul>

## S: Moments

<p>Understand and use moments in simple static contexts</p>	<ul style="list-style-type: none"> <li>● <a href="#">S1-01 Moments: What is a Moment?</a></li> <li>● <a href="#">S1-02 Moments: Basic Examples of Finding Moments 1</a></li> <li>● <a href="#">S1-03 Moments: Basic Examples of Finding Moments 2</a></li> <li>● <a href="#">S1-04 Moments: What is a Lamina?</a></li> <li>● <a href="#">S1-05 Moments: The Moment of a Force on a Lamina</a></li> <li>● <a href="#">S1-06 Moments: Total Moment of Forces on a Lamina 1</a></li> <li>● <a href="#">S1-07 Moments: Total Moment of Forces on a Lamina 2</a></li> <li>● <a href="#">S1-08 Moments: Total Moment of Forces on a Lamina 3</a></li> <li>● <a href="#">S1-09 Moments: Total Moment of Forces on a Rod</a></li> <li>● <a href="#">S1-10 Moments: Centre of Mass</a></li> <li>● <a href="#">S1-11 Moments: Lamina Held in Equilibrium</a></li> <li>● <a href="#">S1-12 Moments: Lamina Held in Equilibrium at an Angle</a></li> <li>● <a href="#">S1-13 Equilibrium of a Rigid Body: An Introduction</a></li> <li>● <a href="#">S1-14 Equilibrium of a Rigid Body: Basic Examples</a></li> <li>● <a href="#">S1-15 Equilibrium of a Rigid Body: Example 1</a></li> </ul>
---	---

	<ul style="list-style-type: none"> <li>• <a href="#">S1-16 Equilibrium of a Rigid Body: Example 2</a></li> <li>• <a href="#">S1-17 Equilibrium of a Rigid Body: Example 3</a></li> <li>• <a href="#">S1-18 Equilibrium of a Rigid Body: Example 4</a></li> <li>• <a href="#">S1-19 Tilting: An Introduction</a></li> <li>• <a href="#">S1-20 Tilting: Example 1</a></li> <li>• <a href="#">S1-21 Tilting: Example 2</a></li> <li>• <a href="#">S1-22 Tilting: Example 3</a></li> <li>• <a href="#">S1-23 Tilting: Example 4</a></li> <li>• <a href="#">S1-24 Non-Parallel Forces: An Introduction to Pivots</a></li> <li>• <a href="#">S1-25 Non-Parallel Forces: An Introduction to Ladders</a></li> <li>• <a href="#">S1-26 Non-Parallel Forces: Example 1</a></li> <li>• <a href="#">S1-27 Non-Parallel Forces: Example 2</a></li> <li>• <a href="#">S1-28 Non-Parallel Forces: Example 3</a></li> <li>• <a href="#">S1-29 Non-Parallel Forces: Example 4</a></li> </ul>
--	---

## Chapter 20: Probability and Continuous Random Variables

### **M: Probability**

<p>Understand and use conditional probability, including the use of tree diagrams, Venn diagrams, two-way tables</p> <p>Understand and use the conditional probability formula</p> $P(A B) = P(A \cap B) / P(B)$	<ul style="list-style-type: none"> <li>• <a href="#">M2-01 Probability: Introducing Conditional Probability</a></li> <li>• <a href="#">M2-02 Probability: Conditional Probability Formulae</a></li> <li>• <a href="#">M2-03 Probability: Determining whether Two Events are Independent</a></li> <li>• <a href="#">M2-04 Probability: Venn Diagram Example</a></li> <li>• <a href="#">M2-05 Probability: Tree Diagram Example</a></li> <li>• <a href="#">M2-06 Probability: Two-Way Table Example</a></li> </ul>
<p>Modelling with probability, including critiquing assumptions made and the likely effect of more realistic assumptions</p>	<ul style="list-style-type: none"> <li>• <a href="#">M3-01 Modelling with Probability: Binomial Distribution</a></li> <li>• <a href="#">M3-02 Modelling with Probability: Normal Distribution</a></li> </ul>

### **N: Statistical Distributions**

<p>[Understand and use simple, discrete probability distributions (calculation of mean and variance of</p>	<ul style="list-style-type: none"> <li>• <a href="#">N1-20 Binomial Distribution: Mean and Variance</a></li> </ul>
--	--

<p>discrete random variables is excluded), including the binomial distribution, as a model; calculate probabilities using the binomial distribution]</p>	
<p>Understand and use the Normal distribution as a model; find probabilities using the Normal distribution</p> <p>Link to histograms, mean, standard deviation, points of inflection and the binomial distribution</p>	<ul style="list-style-type: none"> <li>• <a href="#">N2-01 Normal Distribution: Introducing the Bell Curve</a></li> <li>• <a href="#">N2-02 Normal Distribution: Introducing the Normal Distribution</a></li> <li>• <a href="#">N2-03 Normal Distribution: Finding Probabilities Example 1</a></li> <li>• <a href="#">N2-04 Normal Distribution: Finding Probabilities Example 2</a></li> <li>• <a href="#">N2-05 Normal Distribution: A Worded Problem 1</a></li> <li>• <a href="#">N2-06 Normal Distribution: The Inverse Normal</a></li> <li>• <a href="#">N2-07 Normal Distribution: Inverse Normal Example</a></li> <li>• <a href="#">N2-08 Normal Distribution: Simultaneous Equations</a></li> <li>• <a href="#">N2-09 Normal Distribution: A Worded Problem 2</a></li> <li>• <a href="#">N2-10 Normal Distribution: Normal to Binomial Problem</a></li> <li>• <a href="#">N2-11 Normal Distribution: Normal to Histogram</a></li> <li>• <a href="#">N2-12 Normal Distribution: Approximating a Binomial Distribution</a></li> <li>• <a href="#">N2-13 Normal Distribution: Continuity Correction Examples</a></li> <li>• <a href="#">N2-14 Normal Distribution: Approximating a Binomial Example</a></li> </ul>
<p>Select an appropriate probability distribution for a context, with appropriate reasoning, including recognising when the binomial or Normal model may not be appropriate</p>	<ul style="list-style-type: none"> <li>• <a href="#">N3-01 Probability Distributions: Appropriate Distributions</a></li> <li>• <a href="#">N3-02 Probability Distributions: Approximating <math>\mu</math> and <math>\sigma</math></a></li> </ul>

## Chapter 21: Hypothesis Testing 2

### O: Statistical Hypothesis Testing

<p>[Understand and apply the language of statistical hypothesis testing, developed through a binomial model: null hypothesis, alternative hypothesis, significance level, test statistic, 1-tail test, 2-tail test, critical value, critical region, acceptance region, <math>p</math>-value]; extend to correlation coefficients as measures of how close data points lie to a straight line and be able to interpret a given correlation</p>	<ul style="list-style-type: none"> <li>• <a href="#">O1-05 Hypothesis Testing: PMCC Introduction</a></li> <li>• <a href="#">O1-06 Hypothesis Testing: PMCC Example 1</a></li> <li>• <a href="#">O1-07 Hypothesis Testing: PMCC Example 2</a></li> <li>• <a href="#">O1-08 Hypothesis Testing: PMCC Example 3</a></li> <li>• <a href="#">O1-09 Hypothesis Testing: OCR MEI ONLY Rank Correlation</a></li> <li>• <a href="#">O1-10 Hypothesis Testing: OCR MEI ONLY Rank Correlation Example 1</a></li> <li>• <a href="#">O1-11 Hypothesis Testing: OCR MEI ONLY Rank Correlation</a></li> </ul>
--	--

<p>coefficient using a given p-value or critical value (calculation of correlation coefficients is excluded)</p>	<ul style="list-style-type: none"> <li>• <a href="#"><u>Example 2</u></a></li> <li>• <a href="#"><u>O1-12 Hypothesis Testing: OCR MEI ONLY Rank Correlation Example 3</u></a></li> </ul>
<p>Conduct a statistical hypothesis test for the mean of a Normal distribution with known, given or assumed variance and interpret the results in context</p>	<ul style="list-style-type: none"> <li>• <a href="#"><u>O3-01 Sample Means: The Distribution of Sample Means</u></a></li> <li>• <a href="#"><u>O3-02 Sample Means: Hypothesis Test Example 1</u></a></li> <li>• <a href="#"><u>O3-03 Sample Means: Hypothesis Test Example 2</u></a></li> <li>• <a href="#"><u>O3-04 Sample Means: Hypothesis Test Example 3</u></a></li> <li>• <a href="#"><u>O3-05 Sample Means: Hypothesis Test Example 4</u></a></li> <li>• <a href="#"><u>O3-06 Sample Means: Finding a Critical Region</u></a></li> </ul>