

## Activity 4

### Learner checklist

Pure Mathematics 1: Unit P1

Topic	Skill	Knowledge	Application	Checklist
<b>Quadratics</b>	Complete the square Find discriminant Solve quadratic equations Solve linear and quadratic inequalities Solve by substitution a pair of simultaneous equations one linear and one quadratic		Locate vertex of graph Sketch graph of quadratic Use in connection with the number of real roots Recognise and solve equations that can be put into quadratic form Solve problems, e.g. involving the intersection of a line and a curve	
<b>Functions</b>	Find range of a given function Find $fg(x)$ for given $f$ and $g$ Identify one-one functions Find inverse of one-one function	Understand terms: function, domain and range one-one function, inverse function composition of functions Understand how the graphs of a one-one function and its inverse are related	Sketch graphs of a one-one function and its inverse Restrict a domain to ensure that a function is one-one	
<b>Coordinate geometry</b>	Given end points of a line: find the length find the gradient find the mid-point Find equation of a line, e.g. using 2 points on it, or 1 point and the gradient	Gradients of parallel lines are equal Perpendicular gradients: $m_1 m_2 = -1$ Know the forms $y = mx + c$ and $y - y_1 = m(x - x_1)$ Understand the relationship between a graph and its equation	Use these relationships in solving problems Interpret and use linear equations Solve problems that relate points of intersection of graphs to solution of equations (including the correspondence between a line being a tangent to curve and an equation having a repeated root)	

## Pure Mathematics 1: Unit P1

Topic	Skill	Knowledge	Application	Checklist
<b>Circular measure</b>	Convert between radians and degrees Use formulae $s = r\theta$ and $A = \frac{1}{2}r^2\theta$ to calculate arc length and sector area	Definition of a radian	Solve problems involving arc lengths and areas of sectors and segments	
<b>Trigonometry</b>	Sketch and recognise graphs of the sine, cosine and tangent functions (angles of any size, degrees or radians) Solve trig equations giving all solutions in specified interval	Know exact values for $\sin$ , $\cos$ , $\tan$ of $30^\circ$ , $45^\circ$ , $60^\circ$ Understand notation $\sin^{-1}x$ , $\cos^{-1}x$ , $\tan^{-1}x$ as denoting principal values Identities: $\frac{\sin\theta}{\cos\theta} = \tan\theta$ $\sin^2\theta + \cos^2\theta = 1$	Use trigonometric graphs Use exact values of related angles e.g. $\cos 150^\circ$ Use these identities, e.g. to prove other identities or to solve equations	
<b>Vectors</b>	Add and subtract vectors, and multiply a vector by a scalar Find magnitude of a vector and the scalar product of two vectors	Standard vector notations Meaning of terms: unit vector displacement vector position vector	Geometrical interpretation Use scalar products to find angles and to solve problems involving perpendicular lines	
<b>Series</b>	Expand $(a + b)^n$ for positive integer $n$ Find: $n$ th term of AP sum of AP $n$ th term GP sum of GP sum to infinity of convergent GP	Notation $n!$ and $\binom{n}{r}$ Recognise arithmetic progressions and geometric progressions Condition for convergence of geometric progression	Use arithmetic progression and/or geometric progression formulae in solving problems	

## Pure Mathematics 1: Unit P1

Topic	Skill	Knowledge	Application	Checklist
<b>Differentiation</b>	Differentiate $x^n$ for rational $n$ , together with constant multiples, sums and differences of functions Use the chain rule on composite functions Find stationary points and identify maximum/minimum	Understand gradient of a curve Notation $\frac{dy}{dx}$ , $\frac{d^2y}{dx^2}$ , $f'$ , $f''(x)$	Apply differentiation to: gradients tangents and normals increasing/decreasing functions connected rates of change Use information about stationary points to sketch graphs	
<b>Integration</b>	Integrate $(ax + b)^n$ (rational $n \neq -1$ ) together with constant multiples, sums and differences. Evaluate definite integrals	Integration as reverse differentiation	Use integration to solve problems involving finding a constant of integration Solve problems involving: area under a curve area between two curves volume of revolution about one of the axes	