

**Algebra and functions** indices and surds, quadratic functions, simultaneous equations, inequalities, polynomials, graphs and graph transformations

**Coordinate geometry in the (x,y) plane** straight lines, quadratics, circles

**Sequences and Series** binomial expansion (integer power) and link to binomial probabilities

**Trigonometry** sine and cosine rule,  $\sin^2 + \cos^2 = 1$ , solve simple trigonometric equations

**Exponentials and logarithms**  $a^x$  and  $e^x$ , derivative of  $e^{kx}$ ,  $\log_a x$  and  $\ln x$ , laws of logarithms

**Differentiation** first and second derivatives of  $x^n$ , gradient, tangent, normal, stationary points

**Integration** fundamental theorem of calculus, integrate  $x^n$ ,  $n \neq -1$ , area under a curve

**Vectors** 2D vectors

**Data presentation and interpretation** histograms, probability distributions, scatter diagrams, regression and informal interpretation of correlation, measures of central tendency and variation, standard deviation

**Probability** mutually exclusive and independent events, discrete and continuous distributions,

**Statistical distributions** - binomial distribution only

**Kinematics** position displacement, distance, velocity, speed, acceleration, velocity/time graphs, SUVAT equations in a straight line with constant acceleration, use of calculus in kinematics for motion in a straight line with variable acceleration

**Forces and Newton's laws** force, Newton's first law, Newton's second law for motion in a straight line, Newton's third law, pulleys and connected particles

**Mechanics** dynamics, energy, momentum

**Mechanical properties of matter** stress, strain, Young modulus, force-extension, energy stores

**Electric circuits** current, emf and pd, resistance, DC circuits

**Waves** polarisation, diffraction, interference, superposition and stationary waves