Year 12 T6
Maths Overview

Number & Algebra

Learning Outcomes	Elaboration	Textbook
Students should be able to: • use surds and π in exact calculations;	Distinguish between rational and irrational numbers; know that $\sqrt{2}$ and π are irrational. Simplification of surds including rationalise a denominator; $\sqrt{12} = 2\sqrt{3}$; $\frac{1}{\sqrt{3}} = \frac{\sqrt{3}}{3}$; Write $(5-\sqrt{5})^2$ in the form $a + b\sqrt{5}$.	**16**
· Change a recurring decimal to a fraction;	Know the significance of recurring and non-recurring decimals.	**13**
	Calculate with numbers in standard index form using both positive and negative powers of ten. Calculate $\frac{3.2\times10^4}{1.6\times10^{-3}}$; Use standard index form on a calculator.	**16**
· distinguish in meaning between the words *equation*, *formula*, *identity* and *expression*;	Know the meaning of and use the word 'identity'. Understand the identity symbol.	
· derive a formula, substitute numbers into a formula and change the subject of a formula, including cases where the subject appears in more than one term or where a power of the subject appears;	Use the formula $F = \frac{GMm}{r^2}$ to calculate one variable given the others. Transform formulae such as $v = u + at$, $A = \pi r^2$, $p = \frac{100(s-c)}{c}$	**15**
· solve linear inequalities in one or two variables, and represent the solution set on a number line or suitable diagram;	List the values of the integer n such that $-10 < 2n \leq 20$ or solve the inequality $2n - 3 \geq 7$ illustrating the solution on a number line. Solve $x \leq 3x - 5$ where x is a real number. Use straight line graphs to locate regions representing linear inequalities; For example, $x < 10$, $y \geq 6$, $y < 2x + 3$.	**14**
· find the intersection points of the graphs of a linear and quadratic function, knowing that these are the approximate solutions of the corresponding simultaneous equations	For example, Solve $y = 5x - 6$ and $y = x^2$, by drawing the graph of each function. Use the graph of $y = x^2 + 5x$ to solve $x^2 + 5x = 7$	**19, 35**

representing the linear and quadratic functions; · draw, sketch and recognise graphs of: – simple cubic functions; – the reciprocal function $y = \frac{1}{x}$ with $x \neq 0$; – the function $y=k^x$ for integer values of x and simple positive values of k; and	Make tables of such functions, sketch and interpret their graphs using graphical calculators and computers to understand their behaviour. To include drawing graphs of: $y = ax + b$ $y = ax^2 + bx + c$ $y = \frac{a}{x}$ where $a \neq 0$ and $x \neq 0$ $y = a^x$ where $a = 2, 3, 4$ Use the graphs of $y = x^2 + 5x$ and $y = x^3$ to solve $x^3 = x^2 + 5x$ $y = a^x$ where $a = 2, 3, 4$ Use the graphs of $y = x^2 + 5x$ and $y = x^3$ to solve $x^3 = x^2 + 5x$	**35**
– the trigonometric functions Y= sin X, Y= cos X and Y= tan x	Recognise the characteristic shapes of these functions. Within the range 0° to + 360°	**33, 36**
· construct the graphs of simple loci;	Including the region bounded by a circle and an intersecting line.	**29**
· construct linear, quadratic and other functions from real-life problems and plot their corresponding graphs; use growth and decay rates and display these graphically; and	For example, distance-time graphs including intersecting travel graphs. Know about rates of economic growth and decline and the half-life of radioactive elements.	**19, 20**
· use index laws in algebra for multiplication and division of integer, fractional and negative powers.	Simple expressions such as $6x^6 \div 3x^4,\ 2x^2 \times 3x^3,\ (3x^2)^3;$ $\frac{6x^2y}{8xy^3}$ $\frac{2x^4}{y} \times \frac{-3y^2}{6x^2}$ Use : $x^0 = 1, y^{-3} = \frac{1}{y^3}, \frac{x^2}{x^3} = \frac{1}{x} = x^{-1}, x^{\frac{1}{2}} \times x^{\frac{3}{2}} = x^2$	**16, 20**