Overview of YEAR 12 SUMMER 1 START A2

Week	Statements	Teaching activities	Notes
1	1.02u Understand and be able to use the definition of a function. *The vocabulary and associated notation is expected i.e. the terms many-one, one-many, one-one, mapping, image, range, domain.* *Includes knowing that a function is a mapping from the domain to the range such that for each x in the domain, there is a unique y in the range with $f(x) = y$. The range is the set of all possible values of $f(x)$; learners are expected to use set notation where appropriate.* *Within Stage 1, learners should understand and be able to apply functions and function notation in an informal sense in the context of the factor theorem (1.02j), transformations of graphs (1.02w), differentiation (Section 1.07) and the Fundamental Theorem of Calculus (1.08a).*		CHAPTER 2 FUNCTIONS SECTION 1 MAPPINGS AND FUNCTIONS Page 11 EXERCISE 2A Page 16

Week	Statements	Teaching activities	Notes
2	1.02u Understand and be able to use the definition of a function. *The vocabulary and associated notation is expected i.e. the terms many-one, one-many, one-one, mapping, image, range, domain.* *Includes knowing that a function is a mapping from the domain to the range such that for each x in the domain, there is a unique y in the range with $f(x) = y$. The range is the set of all possible values of $f(x)$; learners are expected to use set notation where appropriate.* *Within Stage 1, learners should understand and be able to apply functions and function notation in an informal sense in the context of the factor theorem (1.02j), transformations of graphs (1.02w), differentiation (Section 1.07) and the Fundamental Theorem of Calculus (1.08a).*		SECTION 2 DOMAIN AND RANGE Page 16-19 EXERCISE 2B Page 20-21

Week	Statements	Teaching activities	Notes
3	1.02v Understand and be able to use inverse functions and their graphs, and composite functions. Know the condition for the inverse function to exist and be able to find the inverse of a function either graphically, by reflection in the line $y = x$, or algebraically. *The vocabulary and associated notation is expected e.g.* $gf(x) = \mathrm{g(f}(x))$, $f^2(x)$, $f^{-1}(x)$.		SECTION 3 COMPOSITE FUNCTIONS Page 21 EXERCISE 2C Page 24

Week	Statements	Teaching activities	Notes
4	1.02v Understand and be able to use inverse functions and their graphs, and composite functions. Know the condition for the inverse function to exist and be able to find the inverse of a function either graphically, by reflection in the line $y = x$, or algebraically. *The vocabulary and associated notation is expected e.g.* $gf(x) = \mathrm{g(f}(x))$, $f^2(x)$, $f^{-1}(x)$.		SECTION 4 INVERSE FUNCTIONS Page 25 EXERCISE 2D Page 28-31

Week	Statements	Teaching activities	Notes
5	1.02v Understand and be able to use inverse functions and their graphs, and composite functions. Know the condition for the inverse function to exist and be able to find the inverse of a function either graphically, by reflection in the line $y = x$, or algebraically. *The vocabulary and associated notation is expected e.g.* $gf(x) = \mathrm{g}(\mathrm{f}(x))$, $f^2(x)$, $f^{-1}(x)$.		INVERSE FUNCTIONS-ONE TO ONE FUNCTIONS Page 32 EXERCISE 2E Page 34-35

Week	Statements	Teaching activities	Notes
6	1.02u Understand and be able to use the definition of a function. *The vocabulary and associated notation is expected i.e. the terms many-one, one-many, one-one, mapping, image, range, domain.* *Includes knowing that a function is a mapping from the domain to the range such that for each* x *in the domain, there is a unique* y *in the range with*		MIXED PRACTICE 2 Page 37-39

	$f(x) = y$. The range is the set of all possible values of $f(x)$; learners are expected to use set notation where appropriate. *Within Stage 1, learners should understand and be able to apply functions and function notation in an informal sense in the context of the factor theorem (1.02j), transformations of graphs (1.02w), differentiation (Section 1.07) and the Fundamental Theorem of Calculus (1.08a).*		
	1.02v Understand and be able to use inverse functions and their graphs, and composite functions. Know the condition for the inverse function to exist and be able to find the inverse of a function either graphically, by reflection in the line $y = x$, or algebraically. *The vocabulary and associated notation is expected e.g. $gf(x) = \mathrm{g(f}(x))$, $f^2(x)$, $f^{-1}(x)$.*		

Week	Statements	Teaching activities	Notes
7	1.04e Be able to work with sequences including those given by a formula for the nth term and those generated by a simple relation of the form $x_{n+1} = \mathrm{f}(x_n)$. *Learners may be asked to generate terms, find nth terms and comment on the mathematical behaviour of the sequence.*		CHAPTER 4 SEQUENCES AND SERIES Page 63 SECTION 1 GENERAL SEQUENCES Page 64 EXERCISE 4A Page 66-67
	1.04f Understand the meaning of and work with increasing sequences, decreasing sequences and periodic sequences. *Learners should know the difference between and be able to recognise:* *1. a sequence and a series,* *2. finite and infinite sequences.*		

Week	Statements	Teaching activities	Notes
8	1.04g Understand and be able to use sigma notation for sums of series.		SECTION 2 GENERAL SERIES AND SIGMA NOTATION Page 68

			EXERCISE 4B Page 69-70

Week	Statements	Teaching activities	Notes
9	1.04h Understand and be able to work with arithmetic sequences and series, including the formulae for the nth term and the sum to n terms. *The term arithmetic progression (AP) may also be used. The first term will usually be denoted by a, the last term by l and the common difference by d. The sum to n terms will usually be denoted by S_n.*		SECTION 3 ARITHMETIC SEQUENCES Page 70 EXERCISE 4C Page 72

Week	Statements	Teaching activities	Notes
10	1.04h Understand and be able to work with arithmetic sequences and series, including the formulae for the nth term and the sum to n terms. *The term arithmetic progression (AP) may also be used. The first term will usually be denoted by a, the last term by l and the common difference by d.*		SECTION 4 ARITHMETIC SERIES Page 72 EXERCISE 4D Page 74

	The sum to n terms will usually be denoted by S_n.		

Week	Statements	Teaching activities	Notes
11	1.04i Understand and be able to work with geometric sequences and series including the formulae for the nth term and the sum of a finite geometric series. *Learners should know the difference between convergent and divergent geometric sequences and series.*		SECTION 5 GEOMETRIC SEQUENCES Page 75 EXERCISE 4E Page 78

Week	Statements	Teaching activities	Notes
12	1.04i Understand and be able to work with geometric sequences and series including the formulae for the nth term and the sum of a finite geometric series. *Learners should know the difference between convergent and divergent geometric sequences and series.*		SECTION 6 GEOMETRIC SERIES Page 79 EXERCISE 4F Page 81

Week	Statements	Teaching activities	Notes
13	1.04j Understand and be able to work with the sum to infinity of a convergent geometric series, including the use of $\|r\| < 1$ and the use of modulus notation in the condition for convergence. *The term geometric progression (GP) may also be used. The first term will usually be denoted by a and the common ratio by r.* *The sum to n terms will usually be denoted by S_n and the sum to infinity by S_∞.*		SECTION 7 INFINITE GEOMETRIC SERIES Page 81 EXERCISE 4G Page 84

Week	Statements	Teaching activities	Notes
14	1.04k Be able to use sequences and series in modelling. *e.g. Contexts involving compound and simple interest on bank deposits, loans, mortgages, etc. and other contexts in which growth or decay can be modelled by an arithmetic or geometric sequence.*		SECTION 8 USING SEQUENCES AND SERIES TO SOLVE PROBLEMS Page 85 EXERCISE 4H Page 87

	Includes solving inequalities involving exponentials and logarithms.		

Week	Statements	Teaching activities	Notes
15			MIXED PRACTICE 4 Page 90-92

Week	Statements	Teaching activities	Notes
16	1.01a Understand and be able to use the structure of mathematical proof, proceeding from given assumptions through a series of logical steps to a conclusion. *In particular, learners should use methods of proof including proof by deduction and proof by exhaustion.*		CHAPTER 1 PROOF SECTION 1 A REMINDER OF METHODS OF PROOF Page 1 EXERCISE 1A Page 2
	1.01c Be able to show disproof by counter example. *Learners should understand that this means that, given a statement of the form "if $P(x)$ is true then $Q(x)$ is true",*		

	finding a single x for which $P(x)$ is true but $Q(x)$ is false is to offer a disproof by counter example. *Questions requiring proof will be set on content with which the learner is expected to be familiar e.g. through study of GCSE (9–1) or AS Level Mathematics.* *Learners are expected to understand and be able to use terms such as "integer", "real", "rational" and "irrational".*		

Week	Statements	Teaching activities	Notes
17	1.01d Understand and be able to use proof by contradiction. *In particular, learners should understand a proof of the irrationality of $\sqrt{2}$ and the infinity of primes.* *Questions requiring proof by contradiction will be set on content with which the learner is expected to be familiar e.g. through study of GCSE (9–1), AS or A Level Mathematics.*		SECTION 2 PROOF BY CONTRADICTION Page 3 EXERCISE 1B Page 4-5

Week	Statements	Teaching activities	Notes
18	1.01b Understand and be able to use the logical connectives $\equiv, \Rightarrow, \Leftrightarrow$. *Learners should be familiar with the language associated with the logical connectives: "congruence", "if..... then" and "if and only if" (or "iff").*		SECTION 3 CRITICISING PROOFS Page 5 EXERCISE 1C Page 6-7

Week	Statements	Teaching activities	Notes
19			MIXED PRACTICE 1 Page 8-9

Week	Statements	Teaching activities	Notes
20	1.02w Understand the effect of simple transformations on the graph of $y = \mathrm{f}(x)$ including sketching associated graphs, describing transformations and finding relevant equations: $y = a\mathrm{f}(x)$, $y = \mathrm{f}(x) + a$, $y = \mathrm{f}(x + a)$ and $y = \mathrm{f}(\mathrm{a}x)$, for any real a. *Only single transformations will be requested.*		CHAPTER 3 FURTHER TRANSFORMATIONS OF GRAPHS Page 40 Remind students of single transformations SECTION 1 COMBINED TRANSFORMATIONS Page 41 EXERCISE 3A Page 47-49

	Translations may be specified by a two-dimensional column vector.		
	1.02x Understand the effect of combinations of transformations on the graph of $y = \mathrm{f}(x)$ including sketching associated graphs, describing transformations and finding relevant equations. *The transformations may be combinations of $y = a\mathrm{f}(x)$, $y = \mathrm{f}(x) + a$, $y = \mathrm{f}(x + a)$ and $y = \mathrm{f}(ax)$, for any real a, and f any function defined in the Stage 1 or Stage 2 content.*		

Week	Statements	Teaching activities	Notes
21	1.02l Understand and be able to use the modulus function, including the notation $\lvert x\rvert$, and use relations such as $\lvert a\rvert = \lvert b\rvert \Leftrightarrow a^2 = b^2$ and $\lvert x - a\rvert < b \Leftrightarrow a - b < x < a + b$ in the course of solving equations and inequalities. e.g. Solve $\lvert x + 2\rvert \leq \lvert 2x - 1\rvert$.		SECTION 2 MODULUS FUNCTION Page 50 EXERCISE 3B Page 53-55

Week	Statements	Teaching activities	Notes
22	1.02l Understand and be able to use the modulus function, including the notation $\|x\|$, and use relations such as $\|a\| = \|b\| \Leftrightarrow a^2 = b^2$ and $\|x - a\| < b \Leftrightarrow a - b < x < a + b$ in the course of solving equations and inequalities. e.g. Solve $\|x + 2\| \leq \|2x - 1\|$.		SECTION 3 MODULUS EQUATIONS AND INEQUALITIES Page 55 EXERCISE 3C Page 58

Week	Statements	Teaching activities	Notes
23			MIXED PRACTICE 3 Page 60-62

Week	Statements	Teaching activities	Notes
24			