



YEAR 12 FM 2023-2024 Autumn TERM 2

'An ambitious curriculum that meets the needs of all'

Medium Term Planning – Decision 1: Ch 6, 7, 5, 8 Linear Programming, The Simplex Algorithm, Travelling Salesman, Critical Path Analysis

Medium Term Planning – Core Pure 1: Ch 4, 8 Roots, Proof by Induction

Curriculum Intent

Decision 1: Ch 6 Linear Programming

Skills/Assessment Objective Links

Chapter 6: Linear programming: **Chapter 6: Linear programming**

D24 I can formulate a problem as a linear programming problem			
D25 I can illustrate a two-variable linear programming problem graphically			
D26 I can locate the optimal point in a feasible region using the objective line (ruler) method			
D27 I can use the vertex testing method to locate the optimal point			
D28 I can determine solutions that need integer values			

Prior knowledge

- Inequalities and regions on graphs (Pure Y1, Ch3)

Learning further developed in the future in:

- Simplex Algorithms (Decision 1 Ch7)

Skills/Assessment Objective Links

Decision 1: Ch 7 The Simplex Algorithm

Skills/Assessment Objective Links

Chapter 7: The simplex algorithm: **Chapter 7: The simplex algorithm**

D29 I can understand and use slack and surplus variables			
D30 I can solve maximising and minimising linear programming problems using simplex tableaux			
D31 I can use the simplex tableau method to solve linear programming problems requiring integer solutions			
D32 I can understand and use the two-stage simplex method for maximising and minimising problems which may include and constraints			
D33 I can understand and use the Big-M method for maximising and minimising problems which may include and constraints			

Prior knowledge

- Intersecting points (Pure Y1, Ch5)
- Linear Programming (Decision 1 Ch6)
- Simultaneous Equations (Pure Y1 Ch3)

Learning further developed in the future in:

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Decision 1: Ch 5 Travelling Salesman

Skills/Assessment Objective Links

Prior Knowledge

Current learning to be developed in the future

Chapter 5: The travelling salesman problem: Chapter 5: The travelling salesman problem

D20 I can explain the differences between the classical and practical problems			
D21 I can use a minimum spanning tree method to find an upper bound			
D22 I can use a minimum spanning tree method to find a lower bound			
D23 I can use the nearest neighbour algorithm to find an upper bound			

Prior knowledge

- Algorithms on Graphs (Decision 1 Chapter 3)

Learning further developed in the future in:

Decision 1: Ch 8 Critical Path Analysis**Skills/Assessment Objective Links**

Chapter 8: Critical path analysis: Chapter 8: Critical path analysis

D34 I can model a project by an activity network using a precedence table			
D35 I can use dummy activities			
D36 I can identify and calculate early and late event times in activity networks			
D37 I can identify critical activities			
D38 I can calculate the total float of an activity			
D39 I can calculate and use Gantt (cascade) charts			
D40 I can construct resource histograms			
D41 I can construct scheduling diagrams			

Prior knowledge

- Algorithms on Graphs (D1: Chapter 3)

Learning further developed in the future in:

Core Pure 1: Ch 4 Roots**Skills/Assessment Objective Links**

Chapter 4: Roots of polynomials: Chapter 4: Roots of polynomials

FM16 I can derive and use the relationships between the roots of a quadratic equation			
FM17 I can derive and use the relationships between the roots of a cubic equation			
FM18 I can derive and use the relationships between the roots of a quartic equation			
FM19 I can evaluate expressions relating to the roots of polynomials			
FM20 I can find the equation of a polynomial whose roots are a linear transformation of the roots of a given polynomial			

	<p>Prior knowledge</p> <ul style="list-style-type: none">• Complex Numbers (Core Pure 1 Ch1)• Roots of functions (Pure Y1 Ch4) <p>Learning further developed in the future in:</p> <ul style="list-style-type: none">• <p><u>Core Pure 1: Ch 8 Proof by Induction</u></p> <p>Skills/Assessment Objective Links</p> <p>Chapter 8: Proof by induction: Chapter 8: Proof by induction</p> <table><tr><td>FM41 I can understand the principle of proof by mathematical induction and prove results about sums of series</td><td></td><td></td><td></td></tr><tr><td>FM42 I can prove results about divisibility using induction</td><td></td><td></td><td></td></tr><tr><td>FM43 I can prove results about matrices using induction</td><td></td><td></td><td></td></tr></table> <p>Prior knowledge</p> <ul style="list-style-type: none">• Proof (Pure Y1 Ch7)• Series (Core Pure 1 Ch3) <p>Learning further developed in the future in:</p> <ul style="list-style-type: none">•	FM41 I can understand the principle of proof by mathematical induction and prove results about sums of series				FM42 I can prove results about divisibility using induction				FM43 I can prove results about matrices using induction			
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FM43 I can prove results about matrices using induction													
Spiritual, moral, social, and cultural development	<p>SMSC: Making choices, looking for patterns which may reflect the natural world, supporting and collaborating with each other, realisation that mathematics is an international language and making cultural links as we explore the history of mathematics.</p> <p>PSHE/British Values: Working collaboratively, being respectful during discussion and valuing contributions made by others</p> <p>Skills Builder: Key skills in numeracy used in all topic areas.</p>												
Numeracy	Focus on key skills.												
Literacy	<p>Vocabulary Tier 2: Command words displayed in the classroom and italicized/bold font used in shared resources/presentations. These are a constant focus in discussion and questioning,</p> <p>Vocabulary Tier 3: Title slide in all shared resource presentations show the key vocabulary for each topic.</p> <p>Reading: Underlining command words,</p> <p>Writing: Modelling solutions</p> <p>Oracy: Think, pair, share, discussion, verbal feedback (peer to peer), questioning, student modelling</p>												
Becoming future ready	<p>Personal Skills: As a Mathematics student you will learn many skills: you will gain opportunities to listen to others supportively and to use questioning to develop your own understanding, you will learn how to cope with challenging questions and how to build up your resilience, you will get the chance to work on your own and with others. You will develop problem solving skills and you will learn how to break a problem down into smaller more manageable steps. You will learn how to collaborate with others when solving problems and you will learn how to articulate your solution to a problem.</p> <p>Employability: Mathematical skills are invaluable in the workplace. There are many transferable skills which are much valued by employers. Specific career paths for each topic are discussed at the beginning of each unit of work.</p>												
Adaptation	<ul style="list-style-type: none">• By progressive questioning: exploring pupils’ understanding through interactive dialogue.• By outcome: different learners will produce different outcomes.• By resource: worksheets are clearly presented and accessible.• By intervention: by providing different levels of supervision and support.• By offering optional activities: In class or as homework, to extend learning.												
QFT/SEND Provision													
Implementation	See curriculum intent												

Curriculum Delivery	
Learning Outcomes (Knowledge)	
Assessment	Refer to assessment maps for formative and summative assessment opportunities.
Impact	Attainment and Progress – Refer to assessment results / data review documentation.