

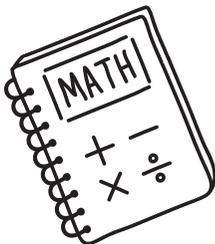


Statistics & Further Maths GCSE Curriculum Palette

Autumn

Further Maths – Introducing Extension topics and new topics beyond the GCSE mathematics course

Year 11



- Work Out The Gradient Of A Line Given Two Points On The Line
- Select Two Points On A Given Line To Work Out The Gradient
- Use The Gradient Of A Line & A Known Point To Work Out The Co-Ordinates Of A Different Point On The Line
- Work Out The Gradients Of Lines That Are Parallel & Perpendicular To A Given Line
- Show That Two Lines Are Parallel Or Perpendicular Using Gradients
- Recall The Formula Or Use A Sketch Diagram To Obtain The Appropriate Lengths Of Sides
- Use The Formula For The Coordinates Of The Midpoint
- Use A Given Ratio To Work Out Coordinates Of A Point Given Two Other Points
- Understand & Use The Notation dy/dx
- Understand The Concept Of The Gradient Of A Curve
- Understand The Concept Of A Rate Of Change
- Work Out Gradients Of Curves & Rates Of Change
- Understand The Concept Of The Gradient Of A Curve
- State The Gradient Of A Curve At A Point Given
- The Gradient Or Equation Of The Tangent At That Point



INTERLEAVING REVISION TOPICS IN RESPONSE TO MOCK EXAMS

- Solve Quadratic Inequalities
- Solve Linear Inequalities
- Identify Any Symmetries On A Quadratic Graph & From This Determine The Coordinates Of The Turning Points
- Understand That Graphs Should Only Be Drawn Within The Given Domain
- Label Points Of Intersection Of Graphs With The Axes
- Draw Or Sketch Graphs Of Linear, Quadratic & Exponential Functions With Up To 3 Domains
- Understand, Interpret & Use Inverse Function $f^{-1}(x)$
- Understand, Interpret & Use Composite Function $fg(x)$
- Express A Range In A Variety Of Forms, For Example $f(x) > 0$, For All $f(x)$ except $f(x) = 1$
- Express A Domain In A Variety Of Forms, For Example $x > 2$, For All x Except $x = 0$, For All Real Values
- Work Out The Range Of A Function
- Define The Domain Of A Function
- Solve Equations That Use Function Notation
- Substitute Values Into A Function, Knowing That, For Example $f(2)$ Is The Value Of The Function When $x = 2$
- Understand & Use Function Notation, For example $f(x)$
- Understand That A Function Is A Relation Between Two Sets Of Values
- Simplify Expressions Before Differentiating If Necessary
- Find dy/dx , where $y = kx^n$ where k is a Constant and n is An Integer (Including 0)
- Work Out Gradients Of Curves & Tangents

- Simplify Expressions By Manipulating Surds
- Expand Brackets Which Contain Surds
- Rationalise The Denominator, Including Denominators In The Form $a/b + c/d$ Where a, b, c & d Are Integers
- Understand The Concept Of Using Surds To Give An Exact Answer
- Simplify Expressions Involving Fractional & Negative Indices Which May Be Written In A Variety Of Forms
- Solve Equations Involving Expressions Involving Fractional & Negative Indices
- Understand That, For Example $x^{1/n}$ Is Equivalent To The n th Root Of x
- Understand That, For Example x^n Is Equivalent To $1/x^n$
- Work Out The Gradient & The Intercepts With The Axes Of A Given Equation Or Graph
- Work Out The Equation Of A Line Using The Gradient & A Known Point On The Line
- Work Out The Equation Of A Line Using Two Known Points On The Line
- Give Equations In A Particular Form When Instructed To Do So
- Work Out Coordinates Of The Point Of Intersection Of Two Lines
- Draw A Straight Line Using A Given Gradient & A Given Point On The Line
- Draw A Straight Line Using Two Points On The Line
- Recognise The Equation Of A Circle, Centre $(0, 0)$, Radius r
- Write Down The Equation Of A Circle Given Centre $(0, 0)$ & Radius
- Work Out Coordinates Of Points Of Intersection Of A Given Circle & A Given Straight Line
- Recognise The Equation Of A Circle, Centre (a, b) , Radius r

Spring

INTERLEAVING REVISION TOPICS IN RESPONSE TO MOCK EXAMS

- Identify Appropriate Right-Angled Triangles In 2 & 3 Dimensional Shapes & Apply Pythagoras' Theorem
- Recognise & Use Pythagorean Triples
- Identify Appropriate Right-Angled Triangles In 2 & 3 Dimensional Shapes & Apply Pythagoras' Theorem
- Work Out Any Unknown Side Using Two Given Sides
- Work Out The Matrix Which Represents A Combined Transformation
- Understand That The Matrix Product PQ Represents The Transformation With Matrix Q Followed By The Transformation With Matrix P
- Work Out Or Recall The Matrix Operator For A Given Transformation
- Work Out The Image Of Any Vertex Of The Unit Square Given The Matrix Operator
- Understand That $AI = IA = A$
- Understand That Matrix Multiplication Is Associative
- Understand That, In General, Matrix Multiplication Is Not Commutative
- Multiply 2×2 & 2×1 Matrices By A Scalar
- Multiply A 2×2 Matrix By A 2×2 Matrix
- Multiply A 2×2 Matrix By A 2×1 Matrix
- Solve Three Linear Simultaneous Equations Using Any Valid Algebraic Method
- Solve Simultaneous Equations Where One Is Linear & One Is Second Order Using Substitution Or Any Other Valid Method
- Understand That The Circle $(x-a)^2 + (y-b)^2 = r^2$ Is A Translation Of The Circle $x^2 + y^2 = r^2$ By The Vector a, b
- Work Out Coordinates Of Points Of Intersection Of A Given Circle & A Given Straight Line
- Write Down The Equation Of A Circle Given Centre (a, b) & Radius

- Identify Appropriate Triangles In 2 & 3 Dimensional Shapes & Apply Trigonometry
- Work Out The Angle Between A Line & A Plane
- Work Out The Angle Between Two Planes
- Understand & Use Bearings
- Recall Or Work Out The Exact Values Of The Trigonometric Ratios For Angles $30^\circ, 45^\circ$ & 60°
- Work Out The Equation Of A Tangent To A Curve
- Work Out The Equation Of A Normal To A Curve
- Understand That Stationary Points Are Points At Which The Gradient Is Zero
- Work Out Stationary Points On A Curve
- Understand & Use The Fact That When The Gradient Of A Function Is Positive, The Function Is Increasing
- Understand & Use The Fact That When The Gradient Of A Function Is Negative, The Function Is Decreasing
- Work Out The Second Derivative
- Understand That Maxima & Minima Points Are Points At Which The Gradient Is Zero
- Work Out Maxima & Minima Points On A Curve
- Prove Whether A Point At Which The Gradient Is Zero Is A Maximum Or Minimum Point
- Using Either Increasing/Decreasing Functions Or d^2y/dx^2
- Use Mensuration Formulae To Obtain Expressions For Perimeters, Areas Or Volumes
- Work Out Maxima & Minima
- Draw A Sketch Graph Of A Curve Work Out The Maximum & Or Minimum Points

- Use Factorisation
- Rearrange Equations Including The Use Of The Identities
- Work Out All Solutions In A Given Interval
- Use The Identities In Solution Of Equations
- Use The Identities To Prove Other Identities
- Use The Identities To Simplify Expressions
- Understand & Use The Relationships Between Positive Angles up to 360° E.G. $\sin(180 - \theta) = \sin \theta$
- Recall The Sign Of $\sin \theta, \cos \theta$ & $\tan \theta$ For Any Positive Angle Up To 360°
- Sketch & Use The Graphs To Solve Problems
- Understand & Use The Properties Of The Graphs Of $y = \sin x, y = \cos x$ & $y = \tan x$ For Angles Of Any Size
- Solve Polynomial Equations
- Show That $(a-b)$ Is A Factor Of The Function $f(x)$ By Checking That $f(b/a) = 0$
- Find Rational Roots Of Polynomial Equations
- Understand & Use The Factor Theorem To Factorise Polynomials
- Work Out The n th Term Of A Given Quadratic Sequence
- Write Down The Value Of The n th Term Of A Quadratic Sequence For Any Given Value Of n
- Work Out The n th Term Of A Given Linear Sequence
- Write Down The Value Of The n th Term Of A Linear Sequence For Any Given Value Of n
- Work Out The Limiting Value For A Given Sequence Or For A Given n th Term As n Approaches Infinity
- Write Down The Value Of The n th Term Of A Sequence For Any Given Value Of n

REVISION

