

# Year 11 Mathematics Scheme of Work

Higher and Foundation



edexcel 



# Tiers

- Sets 1 and 2 will do the Higher specification.
- Sets 3 and 4 will do the Higher specification but with a focus on the topics that overlap Higher and Foundation (it will be up to teacher discretion in regard to non-overlap Higher topics).
- Sets 5 and 6 will do the Foundation specification.

# Route map

Winter term

Spring term

Summer term

Useful links

Need to know  
formulae  
(Foundation)

Need to know  
formulae  
(Higher)

\* Text that is underlined is on the Higher specification only.

# Winter term

[Return to route map](#)

	Higher (Sets 1 and 2)	Overlap (Sets 3 and 4)	Foundation (Sets 5 and 6)
Week 1	Number 3		Algebra 3
Week 2			
Week 3	Algebra 5		Geometry and Measures 5
Week 4	Geometry and Measures 6		Geometry and Measures 6
Week 5			
Week 6	Geometry and Measures 7		Geometry and Measure 7
Week 7			
Half term			
Week 8	Algebra 6		Geometry and Measure 8
Week 9			
Week 10	Algebra 7		
Week 11			Algebra 4
Week 12	Algebra 8		
Week 13			
Week 14	Geometry and Measures 8		Probability 2
Week 15			

# Spring term

	Higher (Sets 1 and 2)	Overlap (Sets 3 and 4)	Foundation (Sets 5 and 6)
Week 16	YEAR 11 EXAMS		
Week 17			
Week 18	Algebra 9		Geometry and Measures 9
Week 19			
Week 20	Geometry and Measures 9		Revision
Week 21			
Half term			
Week 22	Algebra 10		Revision
Week 23			
Week 24	Revision		
Week 25			
Week 26			
Week 27			

[Return to route map](#)

# Summer term

	Higher (Sets 1 and 2)	Overlap (Sets 3 and 4)	Foundation (Sets 5 and 6)	
Week 28	<b>YEAR 11 EXAMS</b>			
Week 29				
Week 30				<b>Revision</b>
Week 31				
Week 32				
<b>Half term</b>				
Week 33				
Week 34				
Week 35				
Week 36				
Week 37				
Week 38				
Week 39				
Week 40				

# Algebra 3 - Sequences

- Recognise sequences in number patterns, including odd numbers, even numbers, square numbers, triangular numbers and Fibonacci sequence.
- Use a function machine to find terms of a sequence.
- Write term-to-term sequence in words.
- Find a specific term in a sequence by using position-to-term or term-to-term rules.
- Generate arithmetic sequences including square numbers, triangular numbers, cube numbers and sequences seen in diagrams.
- Recognise a sequence using diagrams, where they are able to draw the next pattern.
- Find the  $n$ th term (including negatives) for: a pattern sequence, linear sequence and arithmetic sequence.
- Use the  $n$ th term of an arithmetic sequence to generate terms and to decide whether a certain term is in a sequence or not.
- Continue a geometric progression, and describe the term-to-term rule (including fractions, decimals and negatives).
- Continue a quadratic sequence and use the  $n$ th term to generate terms.
- Find  $n$ th term of quadratic sequences that are very simple, for example  $n^2$  or  $2n^2$  etc.
- Know the difference between arithmetic and geometric sequences.

# Geometry and Measures 5 – Volume and surface area

- Find the surface area and volume of cubes and cuboids.
- Find the surface area and volume of cylinders.
- Find the surface area and volume of triangular prisms.
- Find the surface area and volume of prisms
- Find the surface area and volume of composite shapes.
- Find the surface area and volume of a sphere
- Find the surface area and volume of a pyramid
- Find the surface area and volume of cone



# Geometry and Measures 6 - Transformations

- Translate a shape given a column vector and identify the column vector for a translation.
- Reflect a 2d shape in a given mirror line and identify and describe a reflection.
- Rotate a shape about a point, identify and describe a rotation that has already taken place.
- Enlarge a shape by a given scale factor including a fraction scale factor. Also describe an enlargement that has already taken place.
- Identify a set of similar shapes.
- Identify the scale factor of enlargement of two shapes as a ratio of the lengths of two corresponding sides.
- Understand the effect of enlargement on perimeter of shapes.
- Solve problems to find missing lengths in similar shapes.

# Geometry and Measures 7 – Similarity and Congruence

- Understand the terms ‘congruent’ and ‘similar’
- Use congruence criteria for triangles
- Prove that triangles and quadrilaterals are congruent (including use of Pythagoras’ theorem and knowledge of isosceles triangles)

# Geometry and Measures 8 – Pythagoras and Trigonometry

- Know and apply Pythagoras theorem, even when finding the shorter side.
- Know and understand the use of Sin, Cos and Tan to find missing lengths and angles in right angled triangles only.
- Know exact values of Sin, Cos and Tan 30, 45, 60 and 90.

# Algebra 4 – Quadratic equations, quadratic graphs and simultaneous equations

- Revise sketching quadratics graphs, by plotting points from a table.
- Identify the line of symmetry of a drawn quadratic curve.
- Find approximate solutions of a quadratic equation using a graph.
- Identify roots, intercepts and turning points of a quadratic graph.
- Revise factorising quadratics and then solving.
- Solve a set of linear simultaneous equations algebraically.

# Probability 2 – independent and dependent events

- Recap probability covered in Year 10.
- Use Venn diagrams to solve probability questions
- Find probability of successive events.
- Use tree diagrams to calculate probability of two independent and dependent events.

# Geometry and Measures 9 - Vectors

- Understand the use of column notation in relation to vectors.
- Be able to graphically represent given column vectors.
- Identify two column vectors that are parallel.
- Calculate using column vectors and represent graphically the sum, different and a scalar multiple of vectors.

# Number 3 – Surds and Limits of Accuracy

- Understand what a surd is.
- Simplify a surd.
- Rationalise a surd.
- Expand brackets including double brackets which contain surds.
- Solve problems containing surds, for example Pythagoras etc
- Find the upper and lower bound of given numbers.
- Find the upper and lower bounds of calculations.
- Rounding to a suitable degree of accuracy.

# Algebra 5 – Graphs

- Draw and identify cubic graphs using a table of values.
- Draw and identify reciprocal and exponential graphs.
- Draw and identify circle graphs, understand how to find the centre and the radius.
- Find the equation of circles using the centre and the radius.
- Draw the graphs for  $y=\sin(x)$ ,  $\cos(x)$  and  $\tan(x)$ , for various domain values.



# Geometry and Measures 6 – Similarity and Trigonometry

- Finding missing lengths in two similar shapes.
- Find areas and volumes of similar shapes, using either scale factor or ratios.
- Know exact values of Sin, Cos and Tan 30, 45, 60 and 90.
- Know and use the sine and cosine rule to find missing lengths and angles in non-right-angled triangles.
- Know and use the  $\frac{1}{2}ab\sin C$  to find area of triangles.

# Geometry and Measures 7 – Transformations

- Reflections.
- Rotations.
- Translations.
- Enlargements including negative and fractional scale factors.
- Combinations of transformations.

# Algebra 6 – Inequalities, algebraic fractions and proof

- Revise solving linear inequalities.
- Represent linear inequalities on a number line.
- Solve quadratic inequalities and represent them on a graph.
- Algebraic fractions.
- Solve simultaneous equations algebraically where one is quadratic.
- Rearranging the subject of a formula where what you are trying to isolate appears more than once
- Algebraic proof.

# Algebra 7 – Functions

- Understand what functions are.
- Understand what a composite function is.
- Interpret the succession of two functions as a ‘composite function’.
- Understand what an inverse function is. (using function notation)
- Interpret the reverse process as the inverse function (using function notation)

# Algebra 8 – Rates of change and areas under curves

- Calculate the gradients of graphs including quadratics and other non-linear graphs.
- Find the gradient on a graph at a particular point.
- Solve problems including gradients.
- Calculate area under graphs including non-linear graphs using the trapezium rule – this will not involve using the formula but instead will mean splitting the area up into separate trapezia and calculating the sum of their areas to approximate the area under the curve).

Please note: Pupils do not need to learn to differentiate or integrate for GCSE Maths.

# Geometry and Measures 8 – Vectors

- Understand the use of column notation in relation to vectors,
- Be able to graphically represent given column vectors.
- Identify two column vectors that are parallel.
- Calculate using column vectors and represent graphically the sum, different and a scalar multiple of vectors.
- Find the magnitude of vectors.
- Use vectors to construct geometric arguments and proofs.

# Algebra 9 – Sequences

- Recognise sequences in number patterns, including odd numbers, even numbers, square numbers, triangular numbers and Fibonacci sequence.
- Find a specific term in a sequence by using position-to-term or term-to-term rules.
- Generate arithmetic sequences including square numbers, triangular numbers, cube numbers and sequences seen in diagrams.
- Find the  $n$ th term (including negatives) for: a pattern sequence, linear sequence and arithmetic sequence.
- Use the  $n$ th term of an arithmetic sequence to generate terms and to decide whether a certain term is in a sequence or not.
- Continue a geometric progression, and describe the term-to-term rule (including fractions, decimals and negatives and surds).
- Continue a quadratic sequence and use the  $n$ th term to generate terms.
- Find  $n$ th term of quadratic sequences.
- Know the difference between arithmetic and geometric sequences.

# Geometry and Measures 9 – Transforming graphs

- Transform graphs up and down by a units.
- Transform graphs left and right by a units.
- Describe vertical and horizontal transformations using function notation.
- Reflect graphs in the x or y-axis using function notation.
- Describe reflections using function notation.
- Stretch graphs in the x or y axis and describe these using function notation.
- Transform the trigonometric graphs.



# Algebra 10 – Iteration

- Find approximate solutions to roots of equations by using an iterative process.
- Know that a change in sign between two values that are substituted into a function shows that a solution lies between.

# Need to know formulae (Foundation):

- Area of a rectangle
- Area of a parallelogram
- Area of a circle
- Circumference of a circle
- Volume of a cuboid
- Volume of a prism
- Volume of a cylinder
- Pythagoras' theorem
- Trigonometric ratios
- Speed
- Density
- Pressure

The full formula sheet can be found here:

<https://qualifications.pearson.com/content/dam/pdf/GCSE/mathematics/2015/misc/gcse-maths-formulae-sheet-a5.pdf>

# Need to know formulae (Higher):

- Area of a rectangle
- Area of a parallelogram
- Area of a circle
- Circumference of a circle
- Volume of a cuboid
- Volume of a prism
- Volume of a cylinder
- Pythagoras' theorem
- Trigonometric ratios
- Speed
- Density
- Pressure
- The Quadratic Equation
- Sine rule
- Cosine rule
- Area of a non-right angled triangle

The full formulae sheet can be found here:

<https://qualifications.pearson.com/content/dam/pdf/GCSE/mathematics/2015/misc/gcse-maths-formulae-sheet-a5.pdf>

## Useful links:

- Link to the full Pearson specification:  
<http://qualifications.pearson.com/content/dam/pdf/GCSE/mathematics/2015/specification-and-sample-assesment/gcse-maths-2015-specification.pdf>
- Link to the guide to assessment:  
<http://qualifications.pearson.com/content/dam/pdf/GCSE/mathematics/2015/specification-and-sample-assesment/gcse-9-1-mathematics-assessment-guide.pdf>
- Link to course materials:  
<http://qualifications.pearson.com/en/qualifications/edexcel-gcses/mathematics-2015.coursematerials.html#filterQuery=category:Pearson-UK:Category%2FSpecification-and-sample-assessments>