

AQA Maths Higher GCSE (Modular) - Contents of Module 5

This is a list of all the topics that you need to know for Module 5 Higher level. An idea of the grade level is given in brackets

Area & Volume

- Find the area of a triangle, parallelogram, kite and trapezium (D)
- Find the area and perimeter of compound shapes (D)
- Calculate the circumference of a circle to an appropriate degree of accuracy (D)
- Find the perimeter of a semicircle (C)
- Calculate the area of a circle to an appropriate degree of accuracy (D)
- Find the area of a semicircle (C)
- Calculate volumes of triangular prisms, parallelogram-based prisms and cylinders (C)
- Convert between measures of volume (C)
- Solve problems involving surface areas of prisms and cylinders (C)
- Convert between measures of area (C)
- Calculate volumes of spheres and Cones (A)
- Calculate areas of sectors and segments (A)
- Calculate the length of arcs (A)

Properties of polygons

- Classify a quadrilateral by geometric properties (C)
- Calculate exterior and interior angles of a regular polygon (C)

Sequences

- Write the terms of a sequence or a series of diagrams given the nth term (D)
- Write the nth term of a sequence or a series of diagrams (C)

Co-ordinates

- Draw lines such as $y = 2x + 3$ (D)
- Solve problems involving straight lines (D)
- Find the midpoint of a line segment (C)
- Use and understand coordinates in three dimensions (C)

Equations

- Solve equations such as $3x - 4 = 5 + x$ (D)
- Solve equations such as $2(5x + 1) = 28$ (D)
- Solve equations such as $3x - 12 = 2(x - 5)$ (C)
- Solve equations such as $7 - x/3$ or $2x/3 - x/4 = 5$ (C)
- Solve equations such as $2x - 1/6 + x + 3/3 = 5/2$ (B)

Reflections and rotations

- Reflect shapes in lines such as $x = 2$ or $y = -1$ (D)
- Rotate shapes about the origin (D)
- Reflect shapes in the lines $y = x$ and $y = -x$ (C)
- Rotate shapes about any point (C)
- Describe fully reflections and rotations about the origin (D)
- Describe fully reflections and rotations about any point (C)
- Find the centre of a rotation and describe it fully (C)
- Combine reflections and rotations (C)
- Identify reflection symmetry in 3-D solids (D)

Properties of circles

- Use the angle properties of a circle (B)
- Prove the angle properties of a circle (A)
- Use the tangent / chord properties of a circle (B)
- Prove the tangent / chord properties of a circle (A)
- Use and prove the alternate segment theorem (A)

Trial and improvement

- Form and solve equations such as $x^3 + x = 12$ using trial and improvement methods

Translation and enlargement

- Translate a shape using a description such as 4 units right and 3 units down (D)
- Translate a shape by a vector such as $(4/-3)$ (C)
- Transform shapes by a combination of translation, reflection and rotation (C)
- Compare the area of an enlarged shape with the original shape (C)
- Enlarge a shape by a positive scale factor from a given centre (D)
- Enlarge a shape by a fractional scale factor (C)
- Enlarge a shape by a negative scale factor (A)
- Compare areas and volumes of enlarged shapes (A)
- Distinguish between formulae for perimeter, area and volume by considering dimensions (B)

Measures

- Solve more difficult speed problems (C)
- Understand and use compound measures such as speed and density (C)
- Recognise accuracy in measurements given to the nearest whole unit (C)
- Find the upper and lower bounds of simple calculations involving quantities given to a particular degree of accuracy (B)
- Find the upper and lower bounds of more difficult calculations with quantities given to a various degrees of accuracy (A-A*)

Real-life graphs

- Calculate simple average speeds from distance–time graphs (D)

- Calculate complex average speeds from distance–time graphs (C)
- Interpret velocity–time graphs (B)
- Discuss and interpret graphs modeling real situations (B)

Formulae

- Substitute numbers into more complicated formulae such as $C = (A+1)D / 9$ (D)
- Find a solution to a problem by forming an equation and solving it (C)
- Rearrange linear formulae such as $P=3q+5$ (C)
- Rearrange formulae that include brackets, fractions and square roots (B)
- Rearrange formulae where the variable appears twice (A)

Construction

- Draw a quadrilateral such as a kite or a parallelogram with given measurements (D)
- Understand that giving the lengths of two sides and a non-included angle may not produce a unique triangle (D)
- Construct the perpendicular bisector of a line (C)
- Construct the bisector of an angle (C)
- Construct the perpendicular from a point to a line (C)
- Construct angles of 60° and 90° (C)
- Construct and recognise the nets of 3-D solids such as pyramids and triangular prisms (D)
- Draw plans and elevations of 3-D solids (D)

Vectors

- Add, subtract and multiply vectors to solve vector geometry problems (A)
- Understand the relationship between parallel and perpendicular vectors (A)
- Solve more difficult vector geometry problems (A*)

Graphs of linear functions

- Solve problems involving graphs, such as finding where the line $y = x+2$ crosses the line $y = 1$ (D)
- Recognise the equations of straight-line graphs such as $y = -4x+2$ (C)
- Find the gradients of straight-line graphs (C)
- Explore the gradients of parallel straight-line graphs (B)
- Explore the gradients of perpendicular straight-line graphs (A)

Similarity and congruence

- Match sides and angles of similar triangles, given some dimensions (B)
- Find the area of a 2-D shape, given the area of a similar shape and the ratio (A)
- Find the volume of a 3-D solid, given the volume of a similar solid and the ratio (A)
- Match one side and one angle of congruent triangles, given some dimensions (C)
- Prove that two triangles are congruent (A)
- Prove the construction theorems (A)

Pythagoras' theorem

- Use Pythagoras' theorem to find the hypotenuse of a right-angled triangle (C)
- Use Pythagoras' theorem to find any side of a right-angled triangle (C)
- Use Pythagoras' theorem to find the height of an isosceles triangle (C)
- Use Pythagoras' theorem in practical problems (C)
- Find the distance between two points from their coordinates (B)
- Use Pythagoras' theorem in 3-D problems (A)

Quadratic functions

- Solve quadratic equations such as $x^2 - 8x + 15 = 0$ by factorisation (B)
- Solve equations such as $(4/x+2) + (3/2x-1) = 2$ (A*)
- Solve equations such as $x^2 - 2x - 1 = 0$ by using the quadratic formula (A)
- Write quadratic expressions in forms like $(x+a)^2 + b$ (that is, complete the square) (A*)
- Use completing the square to solve equations and find maximum and minimum values (A*)

Inequalities and simultaneous equations

- Solve inequalities such as $3x + 9 < 12$ and $12 = 3n < 20$ (C)
- Solve linear inequalities such as $4x - 3 < 10$ and $4x < 2x + 7$ (C)
- Represent sets of solutions on the number line (C)
- Solve linear inequalities such as $x + 13 > 5x - 3$ (B)
- Solve a set of linear inequalities in two variables and represent the solution as a region of a graph (B)
- Solve a pair of simultaneous equations in two unknowns such as $2x+y=5$ and $3x-2y=4$ (B)
- Know that each equation can be represented by a line on a graph and that the point of intersection of the lines is the solution (B)
- Solve a pair of simultaneous equations where one is linear and one is non-linear such as $y=3x-2$ and $y=x^2$ (A)
- Solve a pair of simultaneous equations where one is linear and one is non-linear such as $x+5y=13$ and $x^2+y^2=13$ (A*)

Trigonometry

- Use sine, cosine and tangent to calculate a side in a right-angled triangle (B)
- Use sine, cosine and tangent to calculate an angle in a right-angled triangle (B)
- Use trigonometry to find sides and angles in three dimensions (A*)
- Find the angle between a line and a plane (A*)
- Sketch and draw trigonometric graphs (A)
- Understand the graphs of trigonometric functions for angles of any size (A*)
- Use the sine rule to find the missing sides and missing angles in any triangle (A)
- Use the cosine rule to find the missing sides and missing angles in any triangle (A)
- Use the formula for the area of a non right-angled triangle (A)

Other functions

- Complete tables for, and draw graphs of cubic functions (B)
- Use cubic graphs to solve equations (B)
- Solve cubic equations by drawing appropriate lines on graphs (A*)
- Complete tables for, and draw graphs of reciprocal functions (B)
- Use reciprocal graphs to solve equations (B)
- Plot and sketch graphs of exponential functions (A*)
- Recognise the shapes of graphs of functions (A*)

Loci

- Understand the idea of a locus (D)
- Construct accurately loci, such as those of points equidistant from two fixed points (C)
- Solve loci problems, such as identifying points less than 3 cm from a point P (C)
- Construct the graphs of loci, including the circle $x^2 + y^2 = r^2$
- Solve simultaneous equations graphically, such as $y = x - 1$ and $x^2 + y^2 = 16$ (A)
- Solve simultaneous equations graphically, such as $y = 2x - 1$ and $x^2 + y^2 = 2$ (A*)

Transforming functions

- Transform the graphs of $y=f(x)$, such as linear, quadratic, cubic, sine and cosine functions, using the transformations $y=af(x)$, $y=f(x)+a$, $y=f(x+a)$, $y=f(ax)$ (A*)

Algebraic proofs

- Decide with a reason whether a harder statement is true or false (D)
- Identify a counter example (D)
- Understand the difference between a demonstration and a proof (C)
- Show step-by-step deductions in providing a basic algebraic explanation (C)
- Show step-by-step deductions in providing a full mathematical explanation (B)