

## Y11 Unit 2 Overview-**Algebra and Shape**:

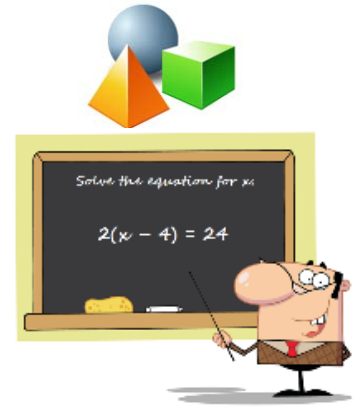
### Target grade for tests:

### You will learn about:

- Algebraic equations
- Similar shapes
- Maps, scale drawings and bearings
- Area and perimeter of shapes including circles
- Volume of right prisms

### You will be able to:

- Solve linear equations with the unknown on both sides of the equation.
- Find approximate solutions to linear equations using a graph.
- Measure line segments and angles in geometric figures, including interpreting maps and scale drawings and use of bearings.
- Identify, describe and construct similar shapes, including on coordinate axes, by considering enlargement.
- Interpret plans and elevations of 3D shapes.
- Use scale factors, scale diagrams and maps.
- Identify and apply circle definitions and properties, including: centre, radius, chord, diameter, circumference.
- Know the formulae: circumference of a circle =  $2\pi r = \pi d$ , area of a circle =  $\pi r^2$ .
- Calculate perimeters and areas of circles and composite shapes.
- Know and apply formulae to calculate volume of right prisms (including cylinders).



### Lesson Overview

#### SOLVING EQUATIONS

- Identify the correct order of undoing the operations in an equation
- Solve linear equations with the unknown on one side when the solution is a negative number
- Solve linear equations with the unknown on both sides when the solution is a whole number, negative number or fraction
- Solve linear equations with the unknown on both sides when the equation involves brackets
- Recognise that the point of intersection of two graphs corresponds to the solution of a connected equation
- Check the solution to an equation by substitution

#### INVESTIGATING ANGLES

- Identify alternate angles and know that they are equal
- Identify corresponding angles and know that they are equal
- Use knowledge of alternate and corresponding angles to calculate missing angles in geometrical diagrams
- Establish the fact that angles in a triangle must total  $180^\circ$
- Use the fact that angles in a triangle total  $180^\circ$  to work out the total of the angles in any polygon
- Establish the size of an interior angle in a regular polygon
- Know the total of the exterior angles in any polygon
- Establish the size of an exterior angle in a regular polygon

#### VISUALISING AND CONSTRUCTING

- Know the vocabulary of enlargement
- Find the centre of enlargement
- Find the scale factor of an enlargement
- Use the centre and scale factor to carry out an enlargement with positive integer (fractional) scale factor
- Know and understand the vocabulary of plans and elevations
- Interpret plans and elevations

### Key Words

#### Refer

to <http://studymaths.co.uk/glossary.php> for definitions of the key words

Algebra, algebraic, algebraically

Unknown

Equation

Operation

Solve

Solution

Brackets

Symbol

Substitute

Graph

Point of intersection

#### Notation

The lower case and upper case of a letter should not be swapped when worked with algebra

2a is used rather than a2.

Division is written as a fraction

Degrees

Right angle, acute angle, obtuse angle, reflex angle

Vertically opposite

Geometry, geometrical

Parallel

Alternate angles, corresponding angles

Interior angle, exterior angle

Regular polygon

#### Notation

Dash notation to represent equal lengths in shapes and geometric diagrams

Arrow notation to show parallel lines

Similar, Similarity

Enlarge, enlargement

- Use the concept of scaling in diagrams
- Measure and state a specified bearing
- Construct a scale diagram involving bearings
- Use bearings to solve geometrical problems

**CALCULATING SPACE (AREA, PERIMETER AND VOLUME)**

- Know the vocabulary of circles
- Know that the number  $\pi$  (pi) = 3.1415926535...
- Recall  $\pi$  to two decimal places
- Know the formula circumference of a circle =  $2\pi r = \pi d$
- Calculate the circumference of a circle when radius (diameter) is given
- Calculate the radius (diameter) of a circle when the circumference is known
- Calculate the perimeter of composite shapes that include sections of a circle
- Know the formula area of a circle =  $\pi r^2$
- Calculate the area of a circle when radius (diameter) is given
- Calculate the radius (diameter) of a circle when the area is known
- Calculate the area of composite shapes that include sections of a circle
- Know the formula for finding the volume of a right prism (cylinder)
- Calculate the volume of a right prism (cylinder)

Scaling  
 Scale factor  
 Centre of enlargement  
 Object  
 Image  
 Scale drawing  
 Bearing  
 Plan, Elevation  
**Notation**  
 Bearings are always given as three figures; e.g. 025°.  
 Coordinates must have a comma & brackets  
 Circle  
 Centre  
 Radius, diameter, chord, circumference  
 Pi  
 (Right) prism  
 Cross-section  
 Cylinder  
 Polygon, polygonal  
 Solid  
**Notation**  
 $\pi$   
 Abbreviations of units in the metric system:  
 km, m, cm, mm, mm<sup>2</sup>, cm<sup>2</sup>, m<sup>2</sup>, km<sup>2</sup>, mm<sup>3</sup>, cm<sup>3</sup>, km<sup>3</sup>

**Suggested reading or support/ challenge available**

Support is available from a Maths teacher in 'MORALE' in M1 daily from 1:30pm -1:45pm

**Pixl Maths App**

login: PY2415  
 username: surname followed by first initial  
 password: first name

[www.doddlelearn.co.uk](http://www.doddlelearn.co.uk)

See your teacher for your personal login details

**Mathswatch App (video clips and worksheets)**

school id: penryn  
 login: school username  
 password: octagon

[www.corbettmaths.com](http://www.corbettmaths.com)

Perfect for revision. Including practice exam questions on specific topics and the "5-a-day"

**Use your revision guide**

Use the code in the front of your guide to access your free online revision

[www.justmaths.co.uk/online](http://www.justmaths.co.uk/online)

login: PenrynStudent  
 password: Penryn

**Cross curricular**

**SMSC:**  
 1.1 Exploring, understanding and respecting cultural diversity e.g. exploration of different methods of calculation.  
 3.1 Developing personal qualities and using social skills (regular paired/ group work communication).  
 3.2 Participating, cooperating and resolving conflicts (paired/group activities).  
 4.2 Experiencing fascination, awe and wonder of mathematics.  
 4.4 Using imagination and creativity in learning.  
**Literacy:**  
 Verbal communication of understanding using key words in the correct context.  
 Development of written communication of methods and strategies to problem solve.  
**NAC:**  
**Science** – Use formulae involving fractions, decimals or negative numbers (Y10, 11). Transform formulae. Be aware of common scientific formulae. Use simple formulae. Understand angle as a measure of turn. Measure and draw angles. Recognise 2-D representations of 3-D shapes. Make simple 3-D models from nets. Know and use the formula for the area of a rectangle. Calculate areas of sectors. Calculate lengths and areas in plane shapes. Use the formulae for the volume of a cuboid.  
**Business** – Use formulae involving fractions, decimals or negative numbers (Y10, 11). Use simple formulae (Y11).  
**Technology**- Make simple 3-D models from nets.