

Y11 Unit 2 Overview-Algebra and Shape:

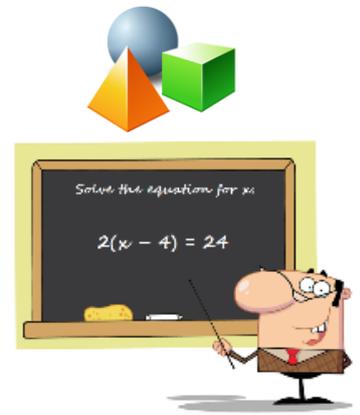
Target grade for tests:

You will learn about:

- Algebraic inequalities
- Construction
- Circles
- Pythagoras' theorem
- Trigonometry

You will be able to:

- Understand and use the concepts and vocabulary of inequalities and solve inequalities.
- Represent the solution set to an inequality on a number line.
- Use a ruler and compasses to construct: perpendicular bisector of a line segment, perpendicular to a given line from/at a given point, angle bisector and use these to solve loci problems.
- Construct plans and elevations of 3D shapes.
- Identify and apply circle definitions and properties, including: tangent, arc, sector and segment.
- Calculate arc lengths, angles and areas of sectors of circles.
- Calculate surface area of right prisms (including cylinders).
- Calculate exactly with multiples of π .
- Use Pythagoras' theorem.



Lesson Overview

SOLVING EQUATIONS AND INEQUALITIES

- Understand the meaning of the four inequality symbols
- Choose the correct inequality symbol for a particular situation
- Represent practical situations as inequalities
- Recognise a simple linear inequality
- Find the set of integers that are solutions to an inequality
- Use set notation to list a set of integers
- Use a formal method to solve an inequality
- Use a formal method to solve an inequality with unknowns on both sides
- Use a formal method to solve an inequality involving brackets
- Know how to deal with negative number terms in an inequality
- Know how to show a range of values that solve an inequality on a no. line
- Know when to use an open circle or filled circle at the end of a range of values shown on a number line
- Use a number line to find the set of values that are true for 2 inequalities

VISUALISING AND CONSTRUCTING

- Use compasses to construct clean arcs
- Use ruler and compasses to construct the perpendicular bisector of a line segment
- Use ruler and compasses to bisect an angle
- Use a ruler and compasses to construct a perpendicular to a line from a point (at a point)
- Understand the meaning of locus (loci)
- Know how to construct the locus of points a fixed distance from a point (from a line)
- Identify when to use the locus of points a fixed distance from a point (from a line)
- Identify when a perpendicular bisector is needed to solve a loci problem
- Identify when an angle bisector is needed to solve a loci problem
- Choose techniques to construct 2D shapes; e.g. rhombus

Key Words

Refer to

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

(Linear) inequality
Unknown
Manipulate
Solve
Solution set
Integer

Notation

The inequality symbols: < (less than), > (greater than), \leq (less than or equal to), \geq (more than or equal to)

The number line to represent solutions to inequalities. An open circle represents a boundary that is not included. A filled circle represents a boundary that is included.

Set notation; e.g. $\{-2, -1, 0, 1, 2, 3, 4\}$

Compasses
Arc
Line segment
Perpendicular
Bisect
Perpendicular bisector
Locus, Loci
Plan
Elevation

Notation

- Combine techniques to solve more complex loci problems
- Know how to deal with a change in depth when dealing with plans and elevations
- Construct a shape from its plans and elevations
- Construct the plan and elevations of a given shape

INVESTIGATING PROPERTIES OF SHAPES

- Appreciate that the ratio of corresponding sides in similar triangles is constant
- Label the sides of a right-angled triangle using a given angle
- Choose an appropriate trigonometric ratio that can be used in a given situation
- Understand that sine, cosine and tangent are functions of an angle
- Establish the exact values of $\sin\theta$ and $\cos\theta$ for $\theta = 0^\circ, 30^\circ, 45^\circ, 60^\circ$ and 90°
- Establish the exact value of $\tan\theta$ for $\theta = 0^\circ, 30^\circ, 45^\circ$ and 60°
- Know how to select the correct mode on a scientific calculator
- Use a calculator to find the sine, cosine and tangent of an angle
- Know the trigonometric ratios, $\sin\theta = \text{opp/hyp}$, $\cos\theta = \text{adj/hyp}$, $\tan\theta = \text{opp/adj}$
- Set up and solve a trigonometric equation to find a missing side in a right-angled triangle
- Set up and solve a trigonometric equation to find a missing angle in a right-angled triangle
- Use trigonometry to solve problems involving bearings
- Use trigonometry to solve problems involving an angle of depression or an angle of elevation

CALCULATING SPACE

- Know the vocabulary of circles
- Know how to find arc length
- Calculate the arc length of a sector when radius is given
- Know how to find the area of a sector
- Calculate the area of a sector when radius is given
- Calculate the angle of a sector when the arc length and radius are known
- Know how to find the surface area of a right prism (cylinder)
- Calculate the surface area of a right prism (cylinder)
- Calculate exactly with multiples of π
- Know Pythagoras' theorem
- Identify the hypotenuse in a right-angled triangle
- Know when to apply Pythagoras' theorem
- Calculate the hypotenuse of a right-angled triangle using Pythagoras' theorem
- Calculate one of the shorter sides in a right-angled triangle using Pythagoras' theorem

Bearings are always given as three figures; e.g. 025° .

Coordinates: separated by a comma and enclosed by brackets

Circle, Pi

Radius, diameter, chord, circumference, arc, tangent, sector, segment

(Right) prism, cylinder

Cross-section

Hypotenuse

Pythagoras' theorem

Similar

Opposite

Adjacent

Hypotenuse

Trigonometry

Function

Ratio

Sine

Cosine

Tangent

Angle of elevation, angle of depression

Notation

π

Abbreviations of units in the metric system:
km, m, cm, mm, mm^2 , cm^2 , m^2 , km^2 , mm^3 , cm^3 , km^3

$\sin\theta$ stands for the 'sine of θ '

\sin^{-1} is the inverse sine function, and not $1 \div \sin$

Research	
Note-making	
Group work & discussion	
Memorisation	
Precision & accuracy	
Independence	
Reflection	