Geometry—Measures, mensuration, position and direction

Stage 6

solve problems involving the calculation and conversion of units of measure, using decimal notation up to three decimal places where appropriate

use, read, write and convert between standard units, converting measurements of length, mass, volume and time from a smaller unit of measure to a larger unit, and vice versa, using decimal notation to up to three decimal places

convert between miles and kilometres

recognise that shapes with the same areas can have different perimeters and vice versa

calculate the area of parallelograms and triangles

recognise when it is possible to use formulae for area and volume of shapes

calculate, estimate and compare volume of cubes and cuboids using standard units, including cubic centimetres (cm^3) and cubic metres (m^3), and extending to other units

describe positions on the full coordinate grid (all four quadrants)

draw and translate simple shapes on the coordinate plane, and reflect them in the axes

Stage 7

use standard units of measure and related concepts (length, area, volume/capacity, mass, time, money, etc.)

change freely between related standard units (e.g. time, length, area, volume/capacity, mass) in numerical contexts

measure line segments and angles in geometric figures

calculate perimeters of 2D shapes

know and apply formulae to calculate area of triangles, parallelograms, trapezia

know and apply formulae to calculate volume of cuboids

calculate surface area of cuboids

solve geometrical problems on coordinate axes

identify, describe and construct congruent shapes, including on coordinate axes, by considering rotation, reflection and translation

describe translations as 2D vectors

Stage 8/Foundation

change freely between compound units (e.g. speed, rates of pay, prices) in numerical contexts

use compound units such as speed, rates of pay, unit pricing)

measure line segments and angles in geometric figures, including interpreting maps and scale drawings and use of bearings

know the formulae: circumference of a circle = $2\pi r = \pi d$,

calculate perimeters of 2D shapes, including circles

know the formulae: area of a circle = πr^2

calculate areas of circles and composite shapes

know and apply formulae to calculate volume of right prisms (including cylinders)

identify, describe and construct similar shapes, including on coordinate axes, by considering enlargement

Stage 9/FH

change freely between compound units (e.g. density, pressure) in numerical and algebraic contexts

use compound units such as density and pressure

calculate arc lengths, angles and areas of sectors of circles

calculate surface area of right prisms (including cylinders)

apply the concepts of congruence and similarity, including the relationships between lengths in similar figures

know the formulae for: Pythagoras' theorem, $a^2 + b^2 = c^2$, and apply it to find lengths in right-angled triangles in two dimensional figures

Stage 10/Higher

calculate surface area and volume of spheres, pyramids, cones

apply the concepts of congruence and similarity, including the relationships between lngth, areas and **volume**s in similar figures

know the formulae for: Pythagoras' theorem, $a^2 + b^2 = c^2$, and apply it to find lengths in right-angled triangles and, **where possible, general triangles and in three dimensional figures**

know the trigonometric ratios, $\sin\theta$ = opposite/hypotenuse, $\cos\theta$ = adjacent/hypotenuse, $\tan\theta$ = opposite/adjacent

apply it to find angles and lengths in right-angled triangles in two dimensional figures

know the exact values of $\sin\theta$ and $\cos\theta$ for $\theta = 0°, 30°, 45°, 60°$ and $90°$; know the exact value of $\tan\theta$ for $\theta = 0°, 30°, 45°$ and $60°$

identify, describe and construct similar shapes, including on coordinate axes, by considering enlargement (including fractional scale factors)

describe the changes and invariance achieved by combinations of rotations, reflections and translations

apply addition and subtraction of vectors, multiplication of vectors by a scalar, and diagrammatic and column representations of vectors

Stage 11/Higher+

Units of measure

calculate surface area and volume of spheres, pyramids, cones and composite solids

apply them to find angles and lengths in right-angled triangles and, where possible, general triangles **in three dimensional figures**

know and apply the sine rule, $a/\sin A = b/\sin B = c/\sin C$, and the cosine rule, $a^2 = b^2 + c^2 - 2bc\cos A$, to find unknown lengths and angles

know and apply Area = ½ab sinC to calculate the area, sides or angles of any trian-

Mensuration

identify, describe and construct similar shapes, including on coordinate axes, by considering enlargement **(including negative scale factors)**

use vectors to construct geometric arguments and proofs

Transformations