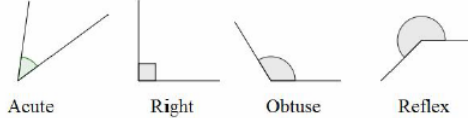
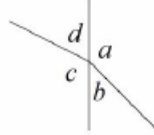
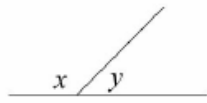
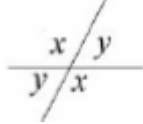
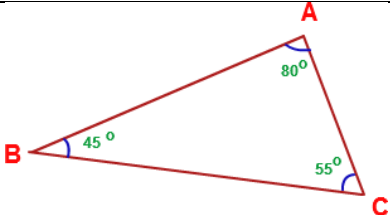
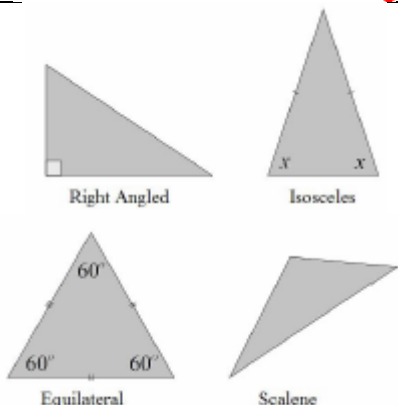
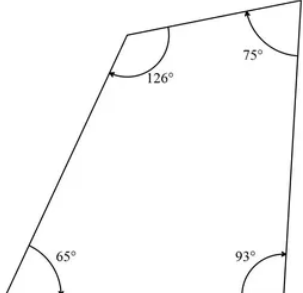
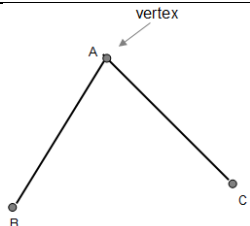
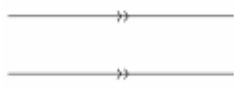
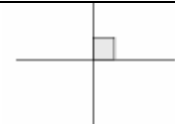
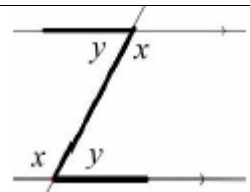
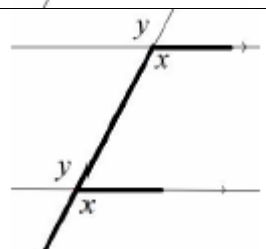
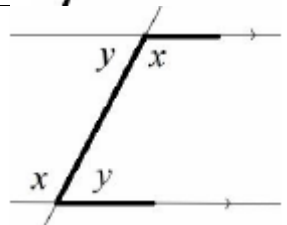
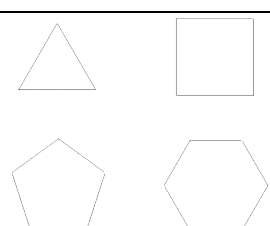
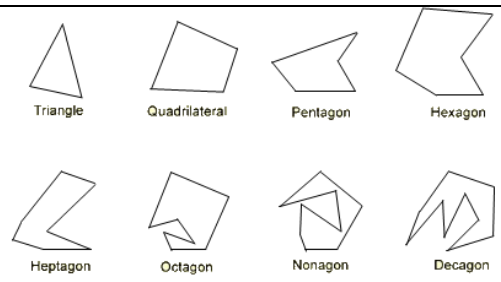
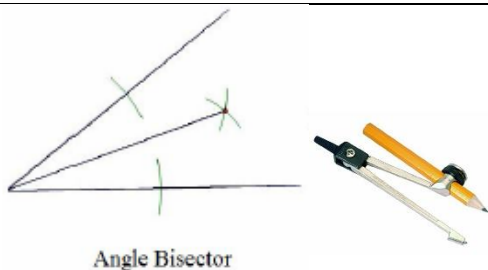
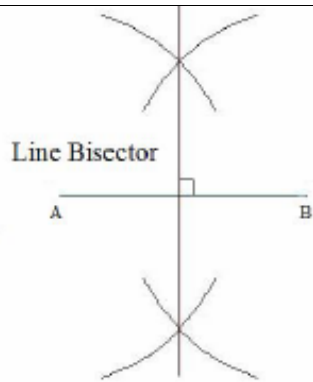
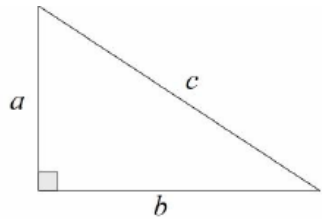
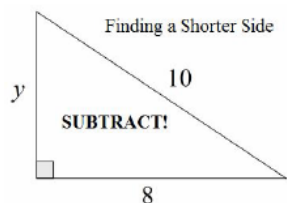
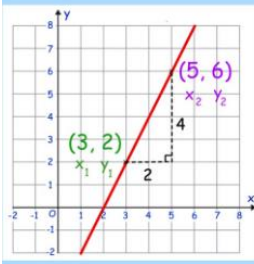
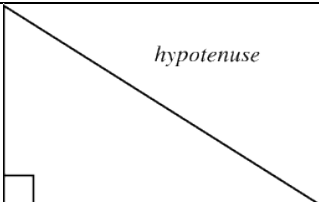
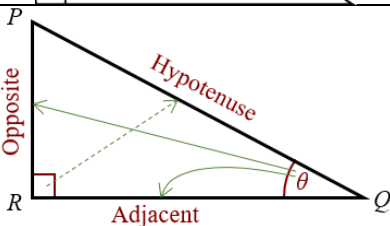
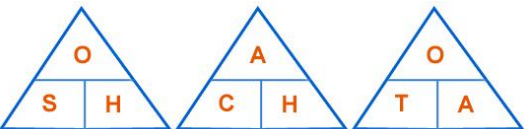
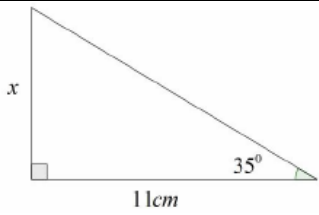
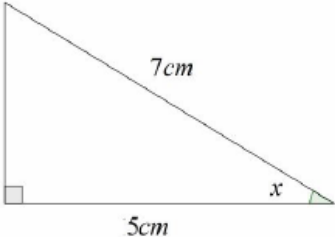


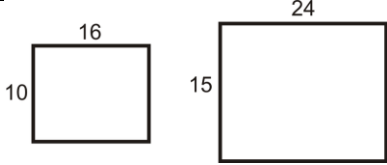
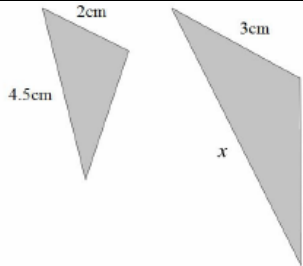
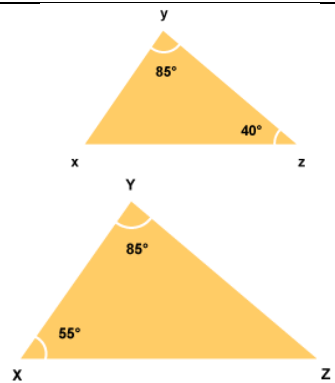
Topic: Angles Year 9

Topic/Skill	Definition/Tips	Example
Types of Angles	Acute angles are less than 90°. Right angles are exactly 90°. Obtuse angles are greater than 90° but less than 180°. Reflex angles are greater than 180° but less than 360°.	 Acute Right Obtuse Reflex
Angles at a Point	Angles around a point add up to 360°.	 $a + b + c + d = 360^\circ$
Angles on a Straight Line	Angles around a point on a straight line add up to 180°.	 $x + y = 180^\circ$
Opposite Angles	Vertically opposite angles are equal.	
Angles in a Triangle	Angles in a triangle add up to 180°.	
Types of Triangles	Right Angle Triangles have a 90° angle in. Isosceles Triangles have 2 equal sides and 2 equal base angles. Equilateral Triangles have 3 equal sides and 3 equal angles (60°). Scalene Triangles have different sides and different angles. Base angles in an isosceles triangle are equal.	 Right Angled Isosceles Equilateral Scalene
Angles in a Quadrilateral	Angles in a quadrilateral add up to 360°.	

Vertex	A corner or a point where two lines meet.	
Parallel	Parallel lines never meet.	
Perpendicular	Perpendicular lines are at right angles. There is a 90° angle between them.	
Alternate Angles	Alternate angles are equal. They look like Z angles, but never say this in the exam.	
Corresponding Angles	Corresponding angles are equal. They look like F angles, but never say this in the exam.	
Co-Interior Angles	Co-Interior angles add up to 180°. They look like C angles, but never say this in the exam.	
Polygon	A 2D shape with only straight edges .	Rectangle, Hexagon, Decagon, Kite etc.
Regular	A shape is regular if all the sides and all the angles are equal .	
Names of Polygons	3-sided = Triangle 4-sided = Quadrilateral 5-sided = Pentagon 6-sided = Hexagon 7-sided = Heptagon/Septagon 8-sided = Octagon 9-sided = Nonagon 10-sided = Decagon	 Triangle Quadrilateral Pentagon Hexagon Heptagon Octagon Nonagon Decagon

Sum of Interior Angles	$(n - 2) \times 180$ where n is the number of sides.	Sum of Interior Angles in a Decagon = $(10 - 2) \times 180 = 1440^\circ$
Size of Interior Angle in a Regular Polygon	$\frac{(n - 2) \times 180}{n}$ You can also use the formula: $180 - \text{Size of Exterior Angle}$	Size of Interior Angle in a Regular Pentagon = $\frac{(5 - 2) \times 180}{5} = 108^\circ$
Size of Exterior Angle in a Regular Polygon	$\frac{360}{n}$ You can also use the formula: $180 - \text{Size of Interior Angle}$	Size of Exterior Angle in a Regular Octagon = $\frac{360}{8} = 45^\circ$
Angle Bisector	Angle Bisector: Cuts the angle in half. 1. Place the sharp end of a pair of compasses on the vertex. 2. Draw an arc, marking a point on each line. 3. Without changing the compass put the compass on each point and mark a centre point where two arcs cross over. 4. Use a ruler to draw a line through the vertex and centre point.	
Perpendicular Bisector	Perpendicular Bisector: Cuts a line in half and at right angles. 1. Put the sharp point of a pair of compasses on A. 2. Open the compass over half way on the line. 3. Draw an arc above and below the line. 4. Without changing the compass, repeat from point B. 5. Draw a straight line through the two intersecting arcs.	
Pythagoras' Theorem	For any right angled triangle : $a^2 + b^2 = c^2$  Used to find missing lengths. a and b are the shorter sides, c is the hypotenuse (longest side).	Finding a Shorter Side  SUBTRACT! $a = y, b = 8, c = 10$ $a^2 = c^2 - b^2$ $y^2 = 100 - 64$ $y^2 = 36$ $y = 6$

Distance between two points	- Find the horizontal distance i.e the difference in x between the two co-ordinates ($x_2 - x_1$) - Find the vertical distance i.e the difference in y between the two co-ordinates ($y_2 - y_1$) - Use pythagoras	 $d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$ $d = \sqrt{(2)^2 + (4)^2}$ $d = \sqrt{4 + 16}$ $d = \sqrt{20} \text{ or } 4.47$
Trigonometry	The study of triangles.	
Hypotenuse	The longest side of a right-angled triangle. Is always opposite the right angle.	
Adjacent	Next to	
Trigonometric Formulae	Use SOHCAHTOA. $\sin \theta = \frac{O}{H}$ $\cos \theta = \frac{A}{H}$ $\tan \theta = \frac{O}{A}$  When finding a missing angle, use the 'inverse' trigonometric function by pressing the 'shift' button on the calculator.	 Use 'Opposite' and 'Adjacent', so use 'tan' $\tan 35 = \frac{x}{11}$ $x = 11 \tan 35 = 7.70\text{cm}$  Use 'Adjacent' and 'Hypotenuse', so use 'cos' $\cos x = \frac{5}{7}$ $x = \cos^{-1}\left(\frac{5}{7}\right) = 44.4^\circ$
Similar Shapes	Shapes are similar if they are the same shape but different sizes.	

	The proportion of the matching sides must be the same, meaning the ratios of corresponding sides are all equal.	
Scale Factor	The ratio of corresponding sides of two similar shapes. To find a scale factor, divide a length on one shape by the corresponding length on a similar shape.	 Scale Factor = $15 \div 10 = 1.5$
Finding missing lengths in similar shapes	1. Find the scale factor. 2. Multiply or divide the corresponding side to find a missing length. If you are finding a missing length on the larger shape you will need to multiply by the scale factor. If you are finding a missing length on the smaller shape you will need to divide by the scale factor.	 Scale Factor = $3 \div 2 = 1.5$ $x = 4.5 \times 1.5 = 6.75cm$
Similar Triangles	To show that two triangles are similar, show that: 1. The three sides are in the same proportion 2. Two sides are in the same proportion, and their included angle is the same 3. The three angles are equal	

Where else is the Angles topic used in maths?

Transformations

Algebra

Links to other subjects