1			C1	states (angle) ABC = (angle) BCD
			C1	states 2nd link $AB = CD$
			C1	states 3rd link with reason: $BC = BC$ (common)
			C1	concludes proof by stating (triangle) $ABC \equiv$ (triangle) DCB with reason SAS and $AC = BD$

2		Shows polygon is a hexagon	M1	for a complete method to find the interior or exterior angle of the dodecagon eg $180 - \frac{360}{12}$, $\frac{180}{12}(12-2)$ oe (= 150), 360 ÷ 12 (=30)
			M1	for a complete method to find the interior angle of polygon **P** eg at B or C: 360 – "150" – 90 (= 120) or "30" + 90 (= 120) **or** for a complete method to find the interior or exterior angle of the hexagon eg $180 - \frac{360}{6}$, $\frac{180}{6}(6-2)$ oe (= 120), 360 ÷ 6 (= 60)
			A1 C1	for 30 and 120 **or** 30 and 60 **or** 120 and 150 **or** 60 and 150 complete solution, fully supported by accurate figures

3		15	P1	for a process to find the interior or exterior angle of a regular 12 sided polygon e.g. $\frac{10\times180}{12}$ (= 150) or $\frac{360}{12}$ (= 30), must be no contradictions
			P1	for process to find angle STR, eg $\frac{180-"150"}{2}$ or $\frac{"30"}{2}$
			A1	cao

4	140	P1	for complete process to find sum of the interior angles of a pentagon eg (5 – 2) × 180 or exterior 360 ÷ 5 = 72, interior 180 – 72 = 108, 108 × 5 **OR** for complete process to find sum of the exterior angles of the pentagon eg (180 – x) + (180 – 2x) + (180 – 125) + (180 – 115) + (180 – 90)	Must be a complete process that could lead to a figure of 540 if that process is evaluated incorrectly
		A1	for sum of interior angles is 540 **OR** for sum of exterior angles is 360	360 must be identified as the sum of the exterior angles
		P1	for start to process to find angle ABC eg [angles in a pentagon] – 115 – 125 – 90 (= 210) or 115 + 125 + 90 + x + 2x = [angles in a pentagon] **OR** (180 – x) + (180 – 2x) + (180 – 125) + (180 – 115) + (180 – 90) = 360	Award provided [angles in a pentagon] is greater than 400 Algebraic route needs to show both sides of the equation. LHS of equation may be simplified
		P1	for process to find angle ABC eg "210" ÷ 3 (= 70), "210" divided in the ratio 2 : 1 **or** for process to find angle BCD eg $\frac{2}{3}$ × "210" **or** for 3x = "210" or –3x = –"210"	Award if 70 is given for either ABC or BCD on the diagram
		A1	cao	Award marks for 140 on the diagram with working and not contradicted by the answer line. Award 0 marks for 140 without working.

5	162 supported	M1	for method to find sum of the interior angles of a hexagon eg $(6 - 2) \times 180$ (= 720) oe **OR** for method to find sum of the interior angles of a pentagon, eg $(5 - 2) \times 180$ (= 540) **OR** for method to find angle *AFC* or *BCF*, eg $(360 - 2 \times 117) \div 2$ (= 63) **OR** for dropping a perpendicular from *A* or *B* to *ED* with 90° marked on *ED* and 27° at the top	Must be a complete process that would lead to a figure of 720 if evaluated correctly. For a pentagon there must be an indication that they have divided the hexagon into two halves. 63 may be shown on the diagram for angle *AFC* or angle *BCF*
		M1	for method to use ratio 2 : 1 eg marks as $2x$ and x or as x and $\frac{1}{2}x$ on diagram **OR** for ([angle sum of hexagon] $- 2 \times 117) \div 6$ (= 81) oe or ([angle sum of hexagon] $\div 2 - 117) \div 3$ (= 81) oe **or** $117 + 117 + 2x + 2x + x + x =$ [angle sum of hexagon] oe **OR** eg ([angle sum of pentagon] $- 117 - 180) \div 3$ (= 81) oe **or** $117 + 180 + 2x + x =$ [angle sum of pentagon] oe	Ratio must be used correctly if awarded for diagram Award provided [angle sum of hexagon] is greater than 700 or [angle sum of pentagon] is greater than 500 Algebraic route needs to show both sides of the equation. LHS of equation may be simplified.
		M1	for finding angle *FED* = 81 or for finding angle *CDE* = 81 **OR** for complete process to find angle *AFE* eg ([angle sum of hexagon] $- 2 \times 117) \div 6 \times 2$ oe **OR** ([angle sum of pentagon] $- 117 - 180) \div 3 \times 2$ oe	This may be shown by solving a correct equation to find the value of x.
		C1	for accurate working leading to angle *AFE* = 162	Award marks for 162 on the diagram with working and not contradicted by the answer line. Award 0 marks for 162 without working.

6	45	P1	for $180 - 117$ (=63) **or** states, or uses, exterior angle + x =117	Angles may be shown on the diagram. Any angle labelled correctly as 63 and not contradicted scores this mark
		P1	for process to find the exterior or the interior angle of the pentagon, eg $360 \div 5$(=72) **or** $180 - (360 \div 5)$ (=108) **or** $((5-2) \times 180) \div 5$ (=108)	Exterior = 108 or interior =72 does not score the mark
		P1	for a complete process to find x, eg 180 – "72" – "63" **or** "108" – "63" **or** 117 – "72"	
		A1	cao	An answer of 45 with no supporting working scores 0

7	85 with working and reasons	M1	for correct use of corresponding angles eg *AEB* = 63 **or** co-interior angles eg *BCD* = 180 – 148 (= 32) or *DEB* = 180 – 63 (= 117)	Angles must be clearly labelled on the diagram or otherwise identified. Full solution must be seen.
		M1	for a complete method to find angle *EAB* eg. 180 – "63" – (180 – 148) **or** 148 – "63" **or** "117" – (180 – 148)	Correct method can be implied from angles on the diagram if no ambiguity or contradiction.
		A1	for *EAB* = 85 (identified)	
		C2	(dep on M2) all working correct with all appropriate reasons stated. Corresponding angles are equal Allied angles / Co-interior angles add up to 180 Angles on a straight line add up to 180 Angles in a triangle add up to 180 The exterior angle of a triangle is equal to the sum of the interior opposite angles.	When reasons are given the key words underlined must be present. Reasons need to be linked to their method; any reasons not linked, do not credit. There should be no incorrect reasons given.
		(C1	for **one** reason relating to parallel lines clearly used and stated **or** for any **two** reasons clearly stated for their fully correct method)	