ANGELS

Pearson Edexcel – Monday 8 June 2020 - Paper 3 (Calculator) Higher Tier

1.

14	60 (supported)	M1	for angle *DBF*, eg 180 – 100 (= 80)	Angles may be shown on the diagram or in working
		M1	for angle *BFD*, eg 180 – "80" – 40 (= 60) or for angle *CBF* = 40	
		A1	for angle *ABD* = 60	
		C1	(dep M2) for at least 2 reasons from Opposite angles of a cyclic quadrilateral add up to 180 Angles in a triangle add up to 180 Alternate segment theorem **OR** Opposite angles of a cyclic quadrilateral add up to 180 Alternate segment theorem Angles on a straight line add up to 180	Underlined words need to be shown; reasons need to be linked to their method

Pearson Edexcel - Tuesday 19 May 2020 - Paper 1 (Non-Calculator) Higher Tier

2.

6	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	(dep) 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)	

Pearson Edexcel - Thursday 6 June 2019 - Paper 2 (Calculator) Higher Tier

3.

18	75° with reasons	M1	for finding angle $BAD = \frac{180-40}{2}$ (= 70) **or** angle $BDA = \frac{180-40}{2}$ (= 70)	Could be shown on the diagram or in working
		M1	for finding angle BCD = 180 – "70" (=110) or $40 + x + 70 + x = 180$	
		A1	for finding angle ADE = 75	
		C2	(dep M2) for Opposite angles of a cyclic quadrilateral add up to 180 **and** one other reason; all reasons given must be appropriate for their working Base angles of an isosceles triangle are equal Angles in a triangle add up to 180, Angles on a straight line add up to 180 [**or** exterior angle of a cyclic quadrilateral is equal to the interior opposite angle]	Underlined words need to be shown; reasons need to be linked to their method
		(C1	(dep M2) for Opposite angles of a cyclic quadrilateral add up to 180, **or** all other reasons given appropriate for their working)	Apply the above criteria

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4.

12	21	C1	for angle OAB = 90 – 56 (= 34)	Throughout, angles may be written on the diagram; accept as evidence if correct. Ignore absence of degree sign Reasons need not be given.
		C1	for process to find angle CAD (= 69) or angle BCA (= 56) or angle COA (= 138) , eg use of alternate segment theorem or angle at centre is twice the angle at the circumference	
		C1	cao	

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5.

12	73.6	P1	for correct initial use of Pythagoras eg $5^2 + 5^2$ (=50) **or** a trigonometric ratio in the form $\frac{5 \div 2}{0.5AC}$ = sin 45 oe	
		P1	for finding the length of half of the diagonal eg $\sqrt{"50"} \div 2$ (= 3.5...) **or** $0.5AC = \frac{5 \div 2}{\sin 45}$ (=3.5...) oe	do not accept $\sqrt{20} \div 2$
		P1	for process to use tan eg tan TAC = (12 ÷ "3.5..") (=3.3..) **or** complete alternative method arriving at an equation with the subject as sin TAC or cos TAC	
		A1	for an answer in the range 73.58 to 74.1	

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6.

11	$90 - 2x$	M1	for identifying an unknown angle eg $BAO = x$, $AOB = 180 - 2x$, $OBC = 90$, $ABC = 90 + x$	Could be shown on the diagram alone
		M1	full method to find the required angle eg a method leading to $180 - x - x - 90$	Needs to be an algebraic method Accept $x + x + 90 + y = 180$ for M2
		A1	for $90 - 2x$	
		C2	(dep M2) full reasons for their method, from base angles in an isosceles triangle are equal angles in a triangle add up to 180° a tangent to a circle is perpendicular to the radius (diameter) angles on a straight line equal 180° the exterior angle of a triangle is equal to the sum of the interior opposite angles	Underlined words need to be shown; reasons need to be linked to their method; any reasons not linked do not credit.
		(C1	(dep M1) for a tangent to a circle is perpendicular to the radius (diameter))	Apply the above criteria

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7.

5	(a)	50.5	M1	for $\cos ABC = \frac{7}{11}$ (0.63…) oe	Must be a complete statement for cos, sin or tan with all three elements present.
			A1	for answer in the range 50.4 to 50.51	If an answer is in the range 50.4 to 50.51 is given in the working space then incorrectly rounded, award full marks.
	(b)	Increase (supported)	C1	States increase with supporting reason eg " $\frac{7}{10}$ is greater than $\frac{7}{11}$" " 0.636 is less than 0.7" …."cos increases as angle decreases" "decreasing the denominator increases the value of the fraction" "angle is now 45.6" (accept 45.5 – 45.6)	If figures are given they must be correct (truncated or rounded).

Pearson Edexcel - Wednesday 8 November 2017 - Paper 3 (Calculator) Higher Tier

8.

20		Proof	C1	draws OC and considers angles in an isosceles triangle (algebraic notation may be used, eg two angles labelled x)
			C1	finds sum of angles in triangle ABC, eg $x + x + y + y = 180$, or sum of angles at O, eg $180 - 2x + 180 - 2y$
			C1	complete method leading to $ACB = 90$
			C1	complete proof with all reasons given, eg base angles of an isosceles triangle are equal, angles in a triangle add up to 180°, angles on a straight line add up to 180°

Pearson Edexcel - Specimen Papers Set 1 - Paper 1 (Non-Calculator) Higher Tier

9.

1		42	P1	process to start problem solving eg forms an appropriate equation
			P1	complete process to solve their equation
			A1	cao

Pearson Edexcel - Sample Paper 2 - (Calculator) Higher Tier

10.

11		29°	C1	angle $OTP = 90^{\circ}$, quoted or shown on the diagram
			M1	method that leads to 180 – (90 + 32) or 58 shown at *TOP* OR that leads to 122 shown at *SOT*
			M1	complete method leading to "58"÷2 or (180 – "122") ÷ 2 or 29 shown at *TSP*
			C1	for angle of 29° clearly indicated and appropriate reasons linked to method eg angle between radius and tangent = 90° and sum of angles in a triangle = 180°; ext angle of a triangle equal to sum of int opp angles and base angles of an isos triangle are equal or angle at centre = 2x angle at circumference or ext angle of a triangle equal to sum of int opp angles

Pearson Edexcel - Thursday 26 May 2016 - Paper 1 (Non-Calculator) Higher Tier

11.

*20		69° (supported)	5	M1 for method to find angle PSR eg 90 – 48 (= 42) or method in triangle POS to find angle POS (= 84) M1 for method to find angle PMS (= 42) A1 cao C2 (dep on at least M1) for correct and complete set of appropriate reasons (C1 for one correct reason involving a circle theorem supported by working) eg The tangent to a circle is perpendicular (90) to the radius (diameter) Alternate segment theorem. Angles in a triangle add up to 180 Base angles of an isosceles triangle are equal. The angle at the centre of a circle is twice the angle at the circumference.

Pearson Edexcel - Friday 7 November 2014 - Paper 2 (Calculator) Higher Tier

12.

17			35°	4	M1 for $ABC = 90$ M1 for $(ACB =)$ 180 – 90 – 25 (= 65) M1 for $(DBC =)$ 180 – '65' – 80 (=35) A1 cao supported by working OR M1 for $(AOB =)$ 180 – 2 × 25 (= 130) M1 for $(ADB =)$ 130 ÷ 2 (=65) M1 for $(DAC =)$ 180 – 65 – 80 A1 cao supported by working.

Pearson Edexcel - Monday 9 June 2014 - Paper 1 (Non-Calculator) Higher Tier

13.

21			55	3	M1 for angle ABO = 90 or angle ADO = 90, or angle OBC = 15 or angle FDO = 90 or angle EBO = 90 (could be marked on the diagram) M1 for reflex angle BOD = 360 – (360 – 90 – 90 – 40) (= 220) or angle BCD = (360 – 90 – 90 – 40) ÷ 2 (= 70) or angle BDO or angle DBO = 90 – (180 – 40)/2 (= 20) or angle BOC = 180 – (15 + 15) (=150) A1 cao

Pearson Edexcel - Wednesday 6 November 2013 - Paper 1 (Non-Calculator) Higher Tier

14.

*22		$360 - y$	$180 - \frac{y}{2}$	4	M1 $ADC = \frac{y}{2}$ A1 $180 - \frac{y}{2}$ C2 (dep on M1) for both reasons Angle at centre is twice the angle at the circumference Opposite angles in cyclic quadrilateral add to 180° (C1 (dep on M1) for one appropriate circle theorem reason) OR M1 reflex $AOC = 360 - y$ A1 $\frac{360 - y}{2}$ oe C2 (dep on M1) for both reasons Angles around a point add up to 360° Angle at centre is twice the angle at the circumference (C1 (dep on M1) for one appropriate circle theorem reason)

Pearson Edexcel - Friday 14 June 2013 - Paper 2 (Calculator) Higher Tier

15.

*16		Angle $POT = 180 - 90 - 32 = 58$ (angle between radius and tangent = 90° and sum of angles in a triangle = 180°) Angle OST =angle $OTS = 58 \div 2$ (ext angle of a triangle equal to sum of int opp angles and base angles of an isos triangle are equal) or (angle at centre = 2x angle at circumference) OR Angle $SOT = 90 + 32 = 122$ (ext angle of a triangle equal to sum of int opp angles) $(180 - 122) \div 2$ (base angles of an isos triangle are equal)	29	5	B1 for angle OTP = 90°, quoted or shown on the diagram M1 for a method that leads to $180 - (90 + 32)$ or 58 shown at *TOP* M1 for completing the method leading to "58"÷2 or 29 shown at *TSP* A1 cao C1 for "angle between radius and tangent = 90°" **and** one other correct reason given from theory used NB: C0 if inappropriate rules listed OR B1 for angle OTP = 90°, quoted or shown on the diagram M1 for a method that leads to 122 shown at *SOT* M1 for $(180 - "122") \div 2$ or 29 shown at *TSP* A1 cao C1 for "angle between radius and tangent = 90°" **and** one other correct reason given from theory used NB: C0 if inappropriate rules listed

Pearson Edexcel - Thursday 28 February 2013 - Paper 1 (Non-Calculator) Higher Tier

16.

19			68	3	M1 for angle $OBC = 90°$ or angle $OAC = 90°$ (may be marked on the diagram or used in subsequent working) M1 for correct method to find angle BOC or AOC or AOB e.g. angle $BOC = 180 - 90 - 34$ (= 56) or angle $AOC = 180 - 90 - 34$ (=56) or angle $AOB = 180 - 2 \times 34$ (= 112) A1 cao **NB** (68 must be clearly stated as an answer and not just seen on diagram)

Pearson Edexcel - Monday 11 June 2012 - Paper 1 (Non-Calculator) Higher Tier

17.

21*		$ABO = ADO = 90°$ (Angle between tangent and radius is 90°) $DOB = 360 – 90 – 90 – 50$ (Angles in a quadrilateral add up to 360°) $BCD = 130 \div 2$ (Angle at centre is twice angle at circumference) **OR** $ABD = (180 – 50) \div 2$ (Base angles of an isosceles triangle) $BCD = 65$ (Alternate segment theorem)	65^o	4	B1 for $ABO = 90$ **or** $ADO = 90$ (may be on diagram) B1 for $BCD = 65$ (may be on diagram) C2 for $BCD = 65^o$ stated **or** $DCB = 65^o$ stated **or** angle C = 65^o stated **with** all reasons: angle between tangent and radius is 90^o; angles in a quadrilateral sum to 360^o; angle at centre is twice angle at circumference (accept angle at circumference is half (or $\frac{1}{2}$) the angle at the centre) (C1 for one correct and appropriate circle theorem reason) QWC: Working clearly laid out and reasons given using correct language **OR** B1 for $ABD = 65$ or $ADB = 65$ (may be on diagram) B1 for $BCD = 65$ (may be on diagram) C2 for $BCD = 65^o$ stated **or** $DCB = 65^o$ stated **or** angle C = 65^o stated **with** all reasons: base angles of an isosceles triangle are equal; angles in a triangle sum to 180^o; tangents from an external point are equal; alternate segment theorem (C1 for one correct and appropriate circle theorem reason) QWC: Working clearly laid out and reasons given using correct language

Pearson Edexcel - Friday 2 March 2012 - Paper 3 (Non-Calculator) Higher Tier

18.

19	(a)		50^o reason	2	B2 for Angle $BAD = 50$ **and** the sum of opposite angles in a cyclic quadrilateral is 180 (B1 for angle $BAD = 50$ or angle $BAD = 180 - 130$)
	(b)	Angle $BOD = 100^o$ Angle OBD = angle ODC Angle $ODC = (360^o – 230^o) \div 2 = 65$ **OR** Reflex angle $BOD = 260$ Angle $BOD = 360 – 260 = 100$ Angle OBD = angle ODC Angle $ODC = (360^o – 230^o) \div 2 = 65$ **OR** $OB = OD$ Angle $OCD = 130 \div 2 = 65$ and either Angle OCD = angle $ODC = 65$ Or Angle $COD = 100 \div 2 = 50$ Angle $ODC = 180 – (65 + 50) = 65$	65^o	4	M1 angle BOD = 100° or ft 2 × their answer to (a) (may be on diagram) M1 360° – (130° + "100°") and ÷2 A1 cao B1 The angle at the centre of a circle is twice the angle at the circumference **and** Angles in a quadrilateral (4 sided shape) add up to 360^o or opposite angles of a kite are the same. **OR** M1 angle $BOD = 100°$ or ft 2 × their answer to (a) (may be on diagram) M1 angle $ODB = OBD = 40°$ **and** angle CBD = angle $CBD = 25°$ A1 cao B1 The angle at the centre of a circle is twice the angle at the circumference **and** angles in a triangle add up to 180^o or Base angles of an isosceles triangle are equal. **or** radii of a circle are equal

19b (contd)					**OR** M1 for obtuse Angle $BOD = 2 \times 130 (=260)$ (may be on diagram) M1 for $(360 - (360 - 260) - 130) \div 2$ A1 cao B1 for angle at the centre is twice the angle at the circumference **and** sum of the angles in a quadrilateral is 360° **or** equal opposite angles in a kite **OR** M1 Angle $OCD = 130 \div 2$ M1 Angle OCD = angle ODC A1 cao B1 for Kite is symmetrical **and** angles in a triangle add up to 180° **or** radii of a circle are equal

Pearson Edexcel - Wednesday 9 November 2011 - Paper 3 (Non-Calculator) Higher Tier

19.

19		$ACB = 90^{\circ}$ angle in a semi circle $CBD = 180 - ACB$ co-interior angles add to 180° $CBD = 90^{\circ}$ $DCB = CDB = (180^{\circ} - 90^{\circ}) \div 2$ base angles of an isosceles triangles	45	4	B1 $ACB = 90$ (could be on the diagram) or 45 seen in a correct position on the diagram B1 answer of 45 B1 angle in a semicircle = 90 B1 base angles isosceles triangle are equal or alternate angles are equal

Pearson Edexcel - Monday 14 November 2011 - Paper 4 (Calculator) Higher Tier

20.

6	(a)	$2x - 10 + x + 50$ (ext angle of a triangle = sum of interior opp angles) OR $180 - (2x - 10 + x + 50) = 140 - 3x$ (sum of the angles in a triangle = 180) $180 - (140 - 3x)$ (sum of the angles on a straight line = 180)	Show result, with reasons	3	M1 for $2x - 10 + x + 50$ **or** $2x + x$ and $50 - 10$ A1 for completing the algebra to complete the proof and showing $y = 3x + 40$ B1 for '**ext angle** of a **triangle** = **sum** of interior **opp** angles' OR M1 for $180 - (2x - 10 + x + 50)$ or $140 - 3x$ seen A1 for completing the algebra to complete the proof and showing $y = 3x + 40$ B1 for 'sum of the **angles** in a **triangle** = **180**' oe **and** 'sum of the **angles** on a straight **line** = **180**' oe
	(b)(i)	$3x = 145 - 40 = 105$ $105 \div 3$ $35 + 50 = 85$	35	4	M1 for clear attempt to subtract 40 from both sides of the equation **or** divide all 3 terms by 3 **or** $(3x =) 145 - 40$ or 105 seen A1 cao
	(ii)	$2 \times 35 - 10 = 60$ $180 - 145 = 35$	85		M1 ft for $2 \times$'35' $- 10$ **or** '35' $+ 50$ **or** $180 - 145$ **or** can be implied by sight of 85 or 60 **or** for substituting '35' in order to find at least one angle implied by sight of 85 or 60 A1 for 85 or ft for '35' provided 'x' < 47

Pearson Edexcel - Friday 10 June 2011 - Paper 4 (Calculator) Higher Tier

21.

17	(a)	$BC \div 12 = 10 \div 6$ $BC = 10 \times 12 \div 6$	20	2	M1 for $12 \div 6$ or $6 \div 12$ or $10 \div 6$ or $6 \div 10$ oe or a decimal equivalent including 1.6, 1.66...., 1.67 or 1.7 A1 19.9 – 20.4
	(b)	$PR \div 18 = 6 \div 10$ $PR = 6 \times 18 \div 10$	10.8	2	M1 for $6 \times 18 \div 10$ oe or $18 \div (1.6, 1.66..., 1.67, 1.7)$ oe or a complete method ft '20' eg $12 \div$'20'$\times 18$ A1 for 10.8

Pearson Edexcel - Friday 10 June 2011 - Paper 4 (Calculator) Higher Tier

22.

21	(i)		54	1	B1 cao
	(ii)		reason	1	B1 for angles in the same segment (are equal), or angles subtended at the circumference by the same chord (are equal) or angles subtended at the circumference by the same arc (are equal)

Pearson Edexcel - Tuesday 9 November 2010 - Paper 3 (Non-Calculator) Higher Tier

23.

9	(a)	180° - 60° or 60° + 60°	120°	2	M1 for 180 ÷ 3 **or** 60 as angle of triangle **or** 180 - 60 **or** 60 + 60 A1 cao
	(b)		Reason	1	B1 for at least one correct reason and no incorrect reasons (ignore irrelevant reasons) 'angles on a straight line add to 180°' **or** 'angles in a triangle add up to 180°' **or** 'angles in an equilateral triangle are equal' **or** 'exterior angle of a triangle is equal to the sum of the interior angles at the two other vertices'

Pearson Edexcel - Friday 12 November 2010 - Paper 4 (Calculator) Higher Tier

24.

23	Angle ***ADC*** = 180 – 128 = 52° ***x*** = 2 × 52° or Reflex angle ***AOC*** = 256° ***x*** = 360 – 256	104	2	M1 for valid method to get angle ***ADC*** or 128 × 2 or 256° seen ... can be on the diagram A1 cao

Pearson Edexcel - Monday 7 June 2010 - Paper 3 (Non-Calculator) Higher Tier

25.

3	(i) (ii)	$180-110=70$ 180 - 2 × 70	40 Reasons	4	M1 for $180-110$ or 70 seen M1 for $180-2\times"70"$ or 110 - "70" A1 cao B1 for two out of three of: angles on a line add to $180°$; isosceles triangle (accept 2 sides equal or 2 angles equal) ; sum of the angles in a triangle is equal to $180°$ **OR** for two out of three of: angles on a line add to $180°$; isosceles triangle (accept 2 sides equal or 2 angles equal) ; exterior angle of a triangle is equal to the sum of the interior opposite angles

Pearson Edexcel - Monday 7 June 2010 - Paper 3 (Non-Calculator) Higher Tier

26.

27	***PQT*** = 58° (Alternate segment theorem) ***QTP*** = (180 - 58)/2 (= 61°) (Isosceles triangle) ***OTQ*** = 61 - (90-58) (Angle between tangent and radius) Alternative: ***OTP*** = 90 - 58 (=32°) (angle between radius and tangent) ***OTP*** = ***OPT*** = 32° (isosceles triangle) ***POT*** = 180 - 32 - 32 = 116° (angles in a triangle) ***PQT*** = 116 ÷ 2 = 58° (angle at centre = 2 × angle at circumference) ***QTP*** = ***QPT*** = (180 - 58)/2 (= 61°) (Isosceles triangle) ***OTQ*** = 61 - 32	29	5	M1 for ***PQT*** = 58° or ½ (180 - 2(90 - 58)) M1 (dep) for ***QPT*** or ***QTP*** = (180 - "58")/2 A1 for ***OTQ*** = 29° B2 for fully correct reasons (B1 for alternate segment theorem or equivalent circle theorems leading to ***PQT***)

Pearson Edexcel - Thursday 5 November 2009 - Paper 3 (Non-Calculator) Higher Tier

27.

18	(a)		55° Reason	2	B1 cao B1 Angle between tangent & radius, diameter (is 90°) OR alternate segment theorem
	(b)		55° Reason	2	B1 cao or ft (a) providing the answer is < 90° B1 Angle in a semicircle or angle subtended by a diameter (is 90°) OR alternate segment theorem

OCR GSCE – Monday 11 November 2019 – Paper 6 (Calculator) Higher Tier

28.

16	**a**		50 nfww	**4**	**M3** for ABC = 25 or B = 25 or for AOB = 150 and COB = 160 or **M2** for ABO = 15 and CBO = 10 or for AOB = 150 or for COB = 160 or **M1** for ABO = 15 or CBO = 10 If **0** scored, **SC1** for AOC = 2 × *[their]* ABC stated or applied or for 360 – *their* AOB – *their* COB applied <u>Alternative method to find AOC = *x*</u> **M3** for $\frac{x}{2} + 2\left(\frac{180-x}{2}\right) + 15 + 10 = 180$ oe OR **M1** for OAC = OCA = $\frac{180-x}{2}$ and **M1** for ABC = $\frac{x}{2}$ <u>Alternative method to find AOC = *x*</u> **M3** for 360 – x + 10 + 15 + $\frac{x}{2}$ = 360 OR **M1** for [reflex] AOC = 360 – *x* and **M1** for ABC = $\frac{x}{2}$	Throughout, angles could be on diagram **SC0** for angle at centre = 2 × angle at circumference
	b		e.g. DEF = 180 – (43 + 55) = 82 angles in a triangle HDF = DEF = 82 alternate segment theorem OR GDE = 55 alternate segment theorem HDF = 180 – (43+55) = 82 angles on a straight line	**4**	**M2** for [DEF =] 180 – (43 + 55) soi by DEF = 82 and angles in a triangle or **M1** for [DEF =] 180 – (43 + 55) soi by DEF = 82 AND **M2** for HDF = DEF [= 82] and alternate segment theorem or **M1** for HDF = DEF [= 82] <u>Alternative method</u> **M2** for GDE = 55 and alternate segment theorem or **M1** for GDE = 55 AND **M2** for [HDF =] 180 – (43 + 55) [= 82] and angles on a straight line or **M1** for [HDF =] 180 – (43 + 55) [= 82]	Allow full marks if 3 letter angle notation not used provided their angles are unambiguously defined (eg. labelled on the diagram and referred to in working using their labels) Note: 180 – (43 + 55) with no other creditable working or reasoning scores **M1**

OCR GSCE – Thursday 6 June 2019 – Paper 5 (Non-Calculator) Higher Tier

29.

9	**(a)**		1 : 5	**2**	**B1** for [1]k : 5k with both values numeric	e.g. B1 for 0.2 : 1, 30: 150
	(b)		30 , 75 , 75 and 30, 30, 120	**4**	**B3** for 30, 75, 75 or 30, 30, 120 or **B2** for p = 30 or **M1** for 180 ÷ (1 + 5) FT *their* (a) If 0 scored, **SC2** for 150, 15, 15	Accept each set in any order Could be on diagram

OCR GSCE – Tuesday 2 November 2017 – Paper 4 (Calculator) Higher Tier

30.

14			32.6 or 32.56 or 32.556…	**5**	**M2** for $\sqrt{(11^2 + 6^2)}$ soi by 12.52 to 12.53 or **M1** for $[\ldots]^2 = 11^2 + 6^2$ and **M2** for tan [… =] 8 ÷ *their* 12.52 or **M1** for 8 ÷ *their* 12.52	accept any correct and full method note: HB = 14.866…

AQA GSCE – Tuesday 12 June 2018 – Paper 3 (Calculator) Higher Tier

31.

22	Alternate segment or Reason on first line of working is incorrect	B1	oe Any incorrect statement B0
	Additional Guidance		
	Incorrect theorem stated in first line		B1
	First line is incorrect. It should say alt segment		B1
	Angles not in same segment		B1
	Angles in same segment are not equal		B0
	Opposite segments (are not equal)		B0
	First line is incorrect. It should say opposite segment		B0
	The angle between the chord and the tangent is equal to the angle in the opposite segment		B0
	Angle *ACB* is not in the same segment, it is alternate		B0
	Angles are not in the same segment, they are alternate		B0

AQA GSCE – Thursday 2 November 2017 – Paper 1 (Non - Calculator) Higher Tier

32.

19	$a + 65 + 115 + c = 360$ or $b + c = 180$	M1	oe oe
	$a + c = 180$ and $b + c = 180$ and $a = b$	A1	oe eg $c = 180 - a$ $b = 180 - (180 - a)$ $= a$
	angles at a point and (co)interior angles	A1	
	Additional Guidance		
	Accept angles round a point for angles at a point		
	Accept allied angles for interior angles		

AQA GSCE – Thursday 2 November 2017 – Paper 1 (Non - Calculator) Higher Tier

33.

24	**Alternative method 1**		
	180 ÷ (5 + 7) or 180 ÷ 12 or 15	M1	oe
	5 × their 15 or 180 – 7 × their 15 or 75	M1dep	oe
	180 – their 75 – 20 or 180 – 95	M1dep	oe
	85	A1	
	Alternative method 2		
	$x + \frac{7x}{5} = 180$ or $\frac{5y}{7} + y = 180$ or $y = 105$	M1	oe correct elimination of a variable from equations $x + y = 180$ and $7x = 5y$
	$(x =)\ 180 \times \frac{5}{12}$ or $(x =)\ 75$	M1dep	oe
	180 – their 75 – 20 or 180 – 95	M1dep	oe
	85	A1	

AQA GSCE – Wednesday 8 November 2017 – Paper 3 (Calculator) Higher Tier

34.

8 **Alt 1 of 2**	**Alternative method 1**		
	PAB = 51 or *PAD* = 51 or *APC* = 180 – 51 or *APC* = 129	M1	
	ABP = 180 – 51 – their 51 or *ABP* = 180 – 102 or *ABP* = 78 or *ADC* = 180 – their 51 – their 51 *ADC* = 180 – 102 *ADC* = 78	M1dep	*PAB* = 51 and *PAD* = 51 or *BAD* = 102
	BCD = 180 – their 78 or *BCD* = 360 – their 129 – their 51 – their 78 or *BCD* = 360 – 258 or *BCD* = 102 or $4x$ = 180 – their 78 or $4x$ = 360 – their 129 – their 51 – their 78 or $4x$ = 360 – 258 or $4x$ = 102 or 102 ÷ 4	M1dep	oe eg *BCD* = (360 – 2 × their 78) ÷ 2 or $4x$ = (360 – 2 × their 78) ÷ 2
	25.5	A1	

8 Alt 2 of 2	**Alternative method 2**		
	$ABC = 180 - 3x - x$ or $ABC = 180 - 4x$ or $APC = 180 - 51$ or $APC = 129$	M1	
	$PAB = 2x$ or $APB = 2x$ or $2x = 51$	M1dep	
	$51 \div 2$	M1dep	
	25.5	A1	
	Additional Guidance		
	Angles must be labelled or shown on diagram		

AQA GSCE – Wednesday 8 November 2017 – Paper 3 (Calculator) Higher Tier

35.

19	65	B1	
	Alternate segment (theorem)	B1dep	
	Additional Guidance		
	65 alternative segment (theorem)		B1 B0
	65 alternate angles		B1 B0

AQA GSCE – Tuesday 13 June 2017 – Paper 3 (Calculator) Higher Tier

36.

19	**Alternative method 1**		
	$BDC = 24$	B1	May be on the diagram
	$DFC = \frac{180 - 24}{2}$ or $DCF = \frac{180 - 24}{2}$ or $\frac{156}{2}$ or 78	B1dep	May be on the diagram Finding a base angle in triangle *CDF*
	$(3x =)$ 180 – their 78 or $(3x =)$ 24 + their 78 or $(3x =)$ 102	M1	oe May be on the diagram
	34	A1	May be on the diagram
	Alternative method 2		
	$BDC = 24$	B1	May be on the diagram
	$DFC = 180 - 3x$	M1	May be on the diagram
	$2(180 - 3x) + 24 = 180$ or $360 - 6x + 24 = 180$ or $3x + 78 = 180$ or $(3x =)$ 102	M1dep	oe
	34	A1	May be on the diagram
	Additional Guidance		
	If angles in the same segment are not used ie all the working is using triangle *ABF* then award maximum of 2 marks		
	If triangle *ABF* is assumed to be isosceles and there is no evidence of angle *BDC* = 24 being used then award maximum of 2 marks		
	If triangle *ABF* is used as isosceles and correctly justified then all marks are available eg 'triangle *ABF* is similar to triangle *CDF* '		
	Answer of 34 does not imply full marks		

Additional guidance continues on the next page

19 cont	Answer of 34 with no working	B0B0M1A1
	'their 78' must come from an attempt to calculate $\frac{180 - 24}{2}$	
	Angles must be clearly identified eg $D = 24$ 24 (unless shown on diagram)	 B1 B0