

This is a non-calculator test (50 minutes).

The following marks are awarded for each question.

B	Unconditional accuracy mark
M	Method mark – the correct method must be shown but there may be an arithmetic error; the sight of the value given in brackets implies the award of the method mark
A	Accuracy mark – unless the question specifies that working <b>must</b> be shown then the sight of the correct answer implies the award of full marks (unless the answer clearly comes from incorrect working).
C	Communication mark
P	Process mark to show correct process for problem solving. Any other process of a similar standard to achieve an accurate result is acceptable to achieve this mark.
FT	Incorrect values may be <b>followed through</b> from one step to the next <b>provided</b> that the correct method is seen in each step and the only errors are arithmetic. This is shown in mark schemes by putting a number in inverted commas.
OE	Or equivalent answer mark.

Q	Answer	Mark	Comment
1	214°	M1	angle $PQR = 180 - 73 (= 107)$ or obtuse angle $POR = 73 \times 2 (= 146)$
		A1	214
3	34° with correct reasons	M1	angle $OXY = (180^\circ - 68^\circ) \div 2 (= 56^\circ)$
		M1	angle $OXT = 90^\circ$ (could be on the diagram)
		C2	for 34 and complete reasons, e.g. $OX = OY$ as they are the <u>radii</u> of the same circle (could be seen on diagram) or angle $OXY =$ angle $OYX$ because the <u>base angles</u> of an <u>isosceles triangle</u> are <u>equal</u> ; <u>angles</u> in a <u>triangle</u> add up to <u>180°</u> ; angle $OXT = 90^\circ$ because the <u>angle</u> between a <u>tangent</u> and the <u>radius</u> is <u>90°</u>  C1 for one correct and appropriate reason relating to a circle theorem

5	67.5°	M1	angle $XYZ = 90^\circ$ (could be on the diagram)
		M1	attempt to form an equation eg $3x + x + 90 = 180$
		A1	67.5 OE

7	29° with correct reason	M1	for $180 - 92 (= 88)$ (could be on the diagram)
		A1	29
		C1	for <u>opposite angles of a cyclic quadrilateral</u> total $180^\circ$ and <u>angles on a straight line</u> add up to $180^\circ$
9	57° with correct reason	M1	for angle $XYZ = 180 - 75 - 48 (= 57)$ (could be on the diagram)
		A1	angle $XZU = 57^\circ$
		C1	for reason, e.g. the angle between a tangent and a chord is equal to the angle in the <u>alternate segment</u>

11a	<u>Angles in a semicircle are <math>90^\circ</math></u>	C1	
11b	$5\sqrt{3}$ (cm)	P1	for process to work out $OX$ e.g. $10 \times \sin 30$ or $10 \times \frac{1}{2}$ OE (= 5)
		P1	for process to work out $XZ$ e.g. "5" $\times 2$ OE (= 10)
		P1	for process to work out $XY$ e.g. "10" $\times \cos 30$
		A1	$5\sqrt{3}$ OE
13	For full proof	C1	for joining $XO$ (extended to $E$ ) and considering the angles in two triangles
		C1	for using isosceles triangle properties to find angle $YOE$ e.g. $x + x = 2x$ or angle $ZOE$ e.g. $y + y = 2y$
		C1	for angle $YOZ = 2x + 2y$ [= $2 \times$ angle $YXO + 2 \times$ angle $ZXO$ ]
		C1	for completion of proof with all reasons eg base <u>angles</u> of <u>isosceles</u> triangle are <u>equal</u> and sum of <u>angles</u> at a <u>point</u> is $360^\circ$

Question	Topic	Step	Marks
1	Prove and use facts about the angle subtended at the centre and at the circumference	9th	2
3	Know that the tangent at any point on a circle is perpendicular to the radius at that point	9th	4
5	Prove and use the fact that the angle in a semicircle is a right angle	9th	3
7	Prove and use the fact that opposite angles of a cyclic quadrilateral sum to $180^\circ$	9th	3
9	Prove and use the alternate segment theorem	11th	3
11a	Know the fact that the angle in a semicircle is a right angle	9th	1
11b	Know the exact values of $\sin \theta$ and $\cos \theta$ for $\theta = 0^\circ, 30^\circ, 45^\circ, 60^\circ$ and $90^\circ$ ; Know the exact value of $\tan \theta$ for $\theta = 0^\circ, 30^\circ, 45^\circ$ and $60^\circ$ ; Use the appropriate ratio to find a length, or angle, and hence solve a two-dimensional problem	9th	4
13	Prove and use facts about the angle subtended at the centre and at the circumference	9th	4





