teachably

GCSE Mathematics

Circle Theorems

Mark Scheme - GCSE Maths Practice

M = method mark, A = accuracy mark (dependent on the preceding M mark), B = independent mark.

Edexcel-style questions

Q1 Grade 7 Edexcel style

Total: 3

Part	Mark scheme	Marks
(a)	angle ACB = 90° (angle in a semicircle is 90°)	B1
(a)	180 - 90 - 35	M1
(a)	angle BAC = 55°	A1

Q2 Grade 7 Edexcel style

Total: 1

Part	Mark scheme	Marks
(a)	angle OAT = 90° (a tangent is perpendicular to the radius at the point of contact)	B1

Q3 Grade 8 Edexcel style

Total: 1

Part	Mark scheme	Marks
(a)	angle ACB = 60° (the angle between a tangent and a chord equals the angle in the alternate segment (alternate segment theorem))	A1

Q4 Grade 8 Edexcel style

Total: 3

Part	Mark scheme	Marks
(a)	2x + 10 = 3x - 5	M1
(a)	x = 15	M1
(a)	angle ADB = 2(15) + 10 = 40°	A1

Q5 Grade 9 Edexcel style

Total: 4

Part	Mark scheme	Marks
(a)	OA = OB (radii of the same circle), so triangle OAB is isosceles, so angle OAB = angle OBA = (180 - 130) ÷ 2 = 25°	B1
(a)	angle OAT = 90° (a tangent is perpendicular to the radius at the point of contact)	B1
(a)	90 - 25	M1
(a)	angle TAB = 65°	A1

AQA-style questions

Q6 Grade 7 AQA style

Total: 2

Part	Mark scheme	Marks
(a)	70 × 2	M1
(a)	angle AOB = 140° (the angle at the centre is twice the angle at the circumference)	A1

Q7 Grade 7 AQA style

Total: 1

Part	Mark scheme	Marks
(a)	TB = 9 cm (tangents from an external point are equal in length)	B1

Q8 Grade 8 AQA style

Total: 1

Part	Mark scheme	Marks
(a)	angle TAB = 70° (the angle between a tangent and a chord equals the angle in the alternate segment (alternate segment theorem))	A1

Q9 Grade 8 AQA style

Total: 3

Part	Mark scheme	Marks
(a)	(3x + 15) + (2x + 25) = 180	M1
(a)	5x + 40 = 180, so x = 28	M1
(a)	angle DAB = 99°, angle BCD = 81°	A1

Q10 Grade 9 AQA style

Total: 3

Part	Mark scheme	Marks
(a)	angle ADB = 70° (angles in the same segment are equal)	A1
(a)	70 × 2	M1
(a)	angle AOB = 140° (the angle at the centre is twice the angle at the circumference)	A1

OCR-style questions

Q11 Grade 7 OCR style

Total: 1

Part	Mark scheme	Marks
(a)	angle ACB = 70° (angles in the same segment are equal)	A1

Q12 Grade 7 OCR style

Total: 3

Part	Mark scheme	Marks
(a)	OA = OB (radii of the same circle), so triangle OAB is isosceles, so angle OBA = angle OAB = 40°	B1
(a)	180 - 40 - 40	M1
(a)	angle AOB = 100°	A1

Q13 Grade 8 OCR style

Total: 5

Part	Mark scheme	Marks
(a)	OA = OB (radii of the same circle), so triangle OAB is isosceles, so angle OBA = angle OAB = 25°	B1
(a)	180 - 25 - 25	M1
(a)	angle AOB = 130°	A1
(a)	angle ACB = 130 ÷ 2 (the angle at the centre is twice the angle at the circumference)	M1
(a)	angle ACB = 65°	A1

Q14 Grade 8 OCR style

Total: 3

Part	Mark scheme	Marks
(a)	2x + 3 = 4x - 9	M1
(a)	x = 6	M1
(a)	TA = 2(6) + 3 = 15 cm	A1

Q15 Grade 9 OCR style

Total: 4

Part	Mark scheme	Marks
(a)	tangents from an external point are equal in length, so TA = TB and triangle TAB is isosceles	B1
(a)	(180 - 60) ÷ 2	M1
(a)	angle TAB = 60°	A1
(a)	angle ACB = 60° (the angle between a tangent and a chord equals the angle in the alternate segment (alternate segment theorem))	A1

Teachably-style questions

Q16 Grade 7 Teachably style — Total: 2

Part	Mark scheme	Marks
(a)	180 - 95	M1
(a)	angle BCD = 85° (opposite angles in a cyclic quadrilateral sum to 180°)	A1

Q17 Grade 8 Teachably style — Total: 3

Part	Mark scheme	Marks
(a)	AM = 16 ÷ 2 = 8 cm (the perpendicular from the centre of a circle to a chord bisects the chord)	M1
(a)	$OA^2 = 8^2 + 6^2 = 100$	M1
(a)	radius = $\sqrt{100}$ = 10 cm	A1

Q18 Grade 8 Teachably style — Total: 3

Part	Mark scheme	Marks
(a)	angle ABC = 90° (angle in a semicircle is 90°)	A1
(a)	180 - 70	M1
(a)	angle BAD = 110° (opposite angles in a cyclic quadrilateral sum to 180°)	A1

Q19 Grade 8 Teachably style — Total: 3

Part	Mark scheme	Marks
(a)	2x + 20 = 3x - 10	M1
(a)	x = 30	M1
(a)	angle ACB = 3(30) - 10 = 80°	A1

Q20 Grade 9 Teachably style — Total: 4

Part	Mark scheme	Marks
(a)	180 - 75	M1
(a)	angle ABC = 105° (opposite angles in a cyclic quadrilateral sum to 180°)	A1
(a)	AM = 24 ÷ 2 = 12 cm (the perpendicular from the centre of a circle to a chord bisects the chord), $OM^2 = 13^2 - 12^2 = 25$	M1
(a)	OM = $\sqrt{25}$ = 5 cm	A1

END OF PAPER