	Question		Answer	Marks	AO		Guidance
5	**(i)**		centre is (–3, 1)	**B1**	**1.1**	Correct centre of circle	Allow $x = -3$, $y = 1$
			$(x + 3)^2 - 9 + (y - 1)^2 - 1 - 10 = 0$ $(x + 3)^2 + (y - 1)^2 = 20$	**M1**	**1.1a**	Attempt to complete the square twice	Allow for $(x \pm 3)^2 \pm 9 + (y \pm 1)^2 \pm 1$ seen $(x \pm 3)^2 + (y \pm 1)^2 - 10 = 0$ is M0 as no evidence of subtracting the constant terms to complete the squares Or attempt to use $r^2 = g^2 + f^2 - c$
			radius = $2\sqrt{5}$ or $\sqrt{20}$	**A1**	**1.1**	Correct radius	From correct working only, including correct factorisation Allow $r = 4.47$, or better
				[3]			
	(ii)		$x^2 + (2x - 3)^2 + 6x - 2(2x - 3) - 10 = 0$ OR $(x + 3)^2 + (2x - 4)^2 = 20$	**M1**	**3.1a**	Substitute the linear equation into the quadratic equation	Either substitute for y, or an attempt at x Either use the given expanded equation or their attempt at a factorised equation
			$x^2 - 2x + 1 = 0$	**A1**	**1.1**	Correct three term quadratic	Must be three terms, but not necessarily on same side of equation
			$x = 1$	**A1**	**1.1**	BC, or from any valid method	A0 if additional incorrect x value
			$(1, -1)$	**A1**	**2.1**	A0 if additional points also given	Allow $x = 1$, $y = -1$
				[4]			
	(iii)		The line is a tangent to the circle at $(1, -1)$	**B1ft**	**2.2a**	Correct deduction Strict follow-through on their number of roots from **(ii)**	Allow just mention of 'tangent' Allow other correct statements such as the line and the circle only touch once
				[1]			