	Circle Graphs and Tangents Mark Scheme	
1(a)	$x^2 + y^2 = 64$	[1]
1(b)	$y = -x + 7$	[1]
1(c)	Centre, $(0,0)$	[1]
	Radius, 5	[1]
2(a)	8	[1] Correct Diameter
2(b)	$x^2 + y^2 = r^2$	[1] Correct form of equation
	Radius is 4	[1] Correct radius
	$x^2 + y^2 = 16$	[1] Correct circle equation
3(a)	$radius = \sqrt{32}$	[1] Correct radius
	$= 4\sqrt{2}$	[1] Simplified surd
3(b)	Centre was $(0,0)$	[1] Original centre
	Centre becomes $(-3,5)$	[1] Correct new position
4	Equation of the line for the radius, through $(-3,-5)$ is $y = \frac{5}{3}x$ Slope of tangent is $-\frac{3}{5}$ $y = -\frac{3}{5}x + c$	[1] Finding gradient of the tangent
	y-intercept, $-5 = -\frac{3}{5}(-3) + c$ $c = -5 - \frac{9}{5} = -\frac{34}{5}$ $y = -\frac{3}{5}x - \frac{34}{5}$	[1] find y-intercept of the tangent
	$y = -\frac{3}{5}x - \frac{34}{5}$ $5y = -3x - 34$	[1] Multiply all terms by 5 to get final equation in correct form
5	Equation of the line for the radius, through $(-3,4)$ is $y = -\frac{4}{3}x$ Slope of tangent is $\frac{3}{4}$ $y = \frac{3}{4}x + c$	[1] Finding gradient of the tangent
	y-intercept, $4 = \frac{3}{4}(-3) + c$ $c = 4 + \frac{9}{4} = \frac{25}{4} = 6\frac{1}{4}$	[1] y-intercept as 25/4 or 6.25 is equally acceptable
	$4y = 3x + 25$	[1] Final equation of the line

Turn over ►

6	Equation of the line for the radius, through $(5,13)$ is $y = \frac{13}{5}x$ Slope of tangent is $-\frac{5}{13}$ $y = -\frac{5}{13}x + c$		[1] Finding gradient of the tangent
	y-intercept, $13 = -\frac{5}{13}(5) + c$ $c = 13 + \frac{25}{13} = \frac{194}{13}$		[1] find y-intercept of the tangent
	$13y = -5x + 194$		[1] Final equation of the line
7	Equation of the line for the radius, through $(2,-2)$ is $y = -\frac{4}{3}x$ Slope of tangent is $\frac{3}{4}$ $y = \frac{3}{4}x + c$		[1] Finding gradient of the tangent
	y-intercept, $-2 = \frac{3}{4}(2) + c$ $c = -2 - \frac{3}{2} = -\frac{7}{2}$		[1] find y-intercept of the tangent
	$4y = 3x - 14$		[1] Final equation of the line
8	Given the centre of the circle is $(0,0)$, by Pythagoras, radius is c, from $a^2 + b^2 = c^2$		[1] Use of Pythagoras
	$\left(\frac{12}{5}\right)^2 + \left(-\frac{4}{5}\right)^2 = c^2$ $c^2 = 6.4, r = \sqrt{6.4}$		[1] Correct radius
	$x^2 + y^2 = 6.4$		[1] $\left(x^2 + y^2 = \frac{32}{5}\right)$

END