

Q	Marking instructions	AO	Marks	Typical solution
9(a)	Obtains $(x \pm 4)^2 \dots$ or $(y \pm 6)^2 \dots$	1.1a	M1	$x^2 + y^2 = 12y - 8x - 27$ $x^2 + 8x + y^2 - 12y = -27$ $(x + 4)^2 - 16 + (y - 6)^2 - 36 = -27$ $(x + 4)^2 + (y - 6)^2 = 25$
	Obtains $(x + 4)^2 \dots + (y - 6)^2 \dots$	1.1a	M1	
	Obtains $(x + 4)^2 + (y - 6)^2 = 25$ Accept 5^2 for 25 Condone $(x - 4)^2 \dots$ throughout	1.1b	A1	
	Subtotal		3	

Q	Marking instructions	AO	Marks	Typical solution
9(b)	States $(-4, 6)$ Follow through their squared brackets from part 9(a)	1.2	B1F	$(-4, 6)$
	Subtotal		1	

Q	Marking instructions	AO	Marks	Typical solution
9(c)	Substitutes $x = 0$ correctly into the given or their equation of circle to form a quadratic equation in y or uses their right-angled triangle correctly to find vertical distance of Q above P PI by $y = 9$ or $(0, 9)$ May be seen on diagram	3.1a	M1	$4^2 + (y - 6)^2 = 25$ $y^2 - 12y + 27 = 0$ $y = 3$ or $y = 9$ $\therefore y = 9$
	Obtains 9 Accept $(0, 9)$ Must come from centre $(-4, 6)$	2.2a	A1	
	Subtotal		2	

Q	Marking instructions	AO	Marks	Typical solution
9(d)	Uses distance formula to find QR or PR PI by their 15 for QR or their $5\sqrt{10}$ for PR OE PI by correct answer or AWFW [71.5, 72]°	1.1a	M1	$PR = \sqrt{(9 - -4)^2 + (-3 - 6)^2}$ $= 5\sqrt{10}$ $\cos QPR = \frac{5}{5\sqrt{10}}$ $QPR = 1.25$
	Substitutes all their relevant lengths correctly into an appropriate trigonometric equation PI by correct answer or AWFW [71.5, 72]°	3.1a	M1	
	Obtains AWFW [1.249, 1.25]	1.1b	A1	
	Subtotal		3	

	Question 9 Total		9	
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