

Question			Answer	Marks	AO	Guidance
9	(a)		$R^2 = 9 + 49$	M1	1.1a	Attempt correct process to find R
			$R\cos\alpha = 3, R\sin\alpha = 7$ hence $\tan\alpha = \frac{7}{3}$	M1	1.1a	Attempt correct process to find $\tan\alpha$ (or equiv with $\sin\alpha$ or $\cos\alpha$)
			$\sqrt{58} \cos(3x - 1.17)$	A1	1.1	Obtain $\sqrt{58} \cos(3x - 1.17)$
				[3]		<p>M0 for $\tan\alpha = \frac{3}{7}$</p> <p>Allow M1 even if then evaluated in degrees</p> <p>Allow $R = 7.62$, or better</p> <p>α must be in radians</p> <p>If R and α are correct then no need to see them substituted back into the expression</p>
	(b)		Stretch in the y direction by sf $\sqrt{58}$	B1FT	1.1	<p>Follow through their R (numerical or just 'R')</p> <p>Given at any point in the sequence of transformations</p>
			Translation in the x direction by 1.17 Stretch in the x direction by sf $\frac{1}{3}$	M1	3.1a	Translation by \pm their α and stretch by (sf) 3 or $\frac{1}{3}$, in either order, both in the x direction
				A1FT	1.1	Translation by their α (numerical, inc in degrees, or just ' α ')
				A1	2.5	Stretch by sf $\frac{1}{3}$
				[4]		<p>Allow BOD if no 'scale factor' or equiv ie B1 for 'stretch in y-direction by $\sqrt{58}$'</p> <p>Must be 'parallel to y-axis', 'in y direction', 'x-axis invariant' or equiv, so B0 for 'along / in / on / to y-axis', 'parallel to y' etc</p> <p>Allow informal language for this mark eg 'shift', 'move', 'compression', 'squash'</p> <p>Allow translation by $\pm\frac{1}{3}$ (their α)</p> <p>soi to be in the positive x-direction</p> <p>Must use correct language (see B1FT)</p> <p>A0A1 is possible</p> <p>For A1A1 stretch must follow translation, unless using $\frac{1}{3}$ (their α)</p> <p>Must use correct language (see B1FT)</p> <p>Must mention 'scale factor', 'factor' or 'sf'</p>

Question			Answer	Marks	AO	Guidance	
	(c)		greatest value is $\sqrt{58}$	B1FT	3.1a	FT their R	R must be numerical Allow no method shown
			when $x = 0.389$	B1	1.1	Obtain 0.389	Must be in radians 'Determine' so some method needed eg $3x - 1.17 = 0$ oe (minimum of $x = \frac{1.17}{3}$) Allow 0.39
				[2]			
	(d)		least value is $-\sqrt{58}$	B1FT	3.1a	FT their R	R must be numerical Allow no method shown
			when $x = 1.44$	B1	1.1	Obtain 1.44	Must be in radians 'Determine' so some method needed eg $3x - 1.17 = \pi$, or equiv
				[2]			