Question Number	Scheme	Marks
9 (a) (i)	<u>Stretch</u> parallel to the x-axis $\times \dfrac{1}{2}$ or <u>stretch</u> parallel to the y-axis $\times \sqrt{2}$	M1, A1
(ii)	<u>Translate</u> by the vector $\begin{pmatrix} 0 \\ 12 \end{pmatrix}$ (or translate up by 12 (units))	M1, A1
		(4)
(b) (i)	$12 - \sqrt{x} = \sqrt{2}\sqrt{x}$	
	$12 = (\sqrt{2}+1)\sqrt{x}$	M1
	$\Rightarrow \sqrt{x} = \dfrac{12}{\sqrt{2}+1} \times \dfrac{\sqrt{2}-1}{\sqrt{2}-1} = 12(\sqrt{2}-1)$ *	dM1, A1 *
Alt (i)	$12 - \sqrt{x} = \sqrt{2x} \Rightarrow (12-\sqrt{x})^2 = 2x \Rightarrow x + 24\sqrt{x} - 144 = 0$	M1
	$\Rightarrow (\sqrt{x}) = \dfrac{-24 \pm \sqrt{24^2 - 4 \times -144}}{2} = -12 \pm \dfrac{12}{2}\sqrt{4+8} = -12 \pm 12\sqrt{2}$	dM1
	$\sqrt{x} > 0 \Rightarrow \sqrt{x} = -12 + 12\sqrt{2} = 12(\sqrt{2}-1)*$	A1
(ii)	$\Rightarrow x = 12^2(\sqrt{2}-1)^2 = 144(2+1-2\sqrt{2}) = 144(3-2\sqrt{2})$	M1, A1
	$y\left\{ = 12 - \sqrt{x} = 12 - 12(\sqrt{2}-1)\right\} = 12(2-\sqrt{2})$	B1
	Or common acceptable alt forms: $P\left(432 - 288\sqrt{2}, \ 24 - 12\sqrt{2}\right)$	
		(6)
		(10 marks)

Question	Scheme	Marks
5(i)(a)	B1 Horizontal translation ← B1 Maximum at origin B1 $(-7,0)$	B1B1B1
		(3)
(b)	B1 Reflection in y-axis B1 Touches at $(-2,0)$ and passes through $(5,0)$ B1 Passes through $(0,-3)$	B1B1B1
		(3)
(ii)a	$x = 0 \Rightarrow y = k\cos\left(\frac{\pi}{6}\right) = \sqrt{3}$ $k\dfrac{\sqrt{3}}{2} = \sqrt{3} \Rightarrow k = 2$	B1
(b)	$(p=)\dfrac{\pi}{3}$ **or** $(q=)\dfrac{4\pi}{3}$ $(p=)\dfrac{\pi}{3}$ **and** $(q=)\dfrac{4\pi}{3}$	B1 B1
		(3)
		(9 marks)

Question Number	Scheme	Marks
7. (a)(i)	$P = (90°, 3)$	M1, A1
(ii)	$Q = (540°, 0)$	B1
		(3)
(b)	$(270°, 4)$	M1, A1
		(2)
		(5 marks)

Question Number	Scheme	Marks
3.(a)	Attempts to make y the subject	M1
	States $-\dfrac{3}{5}$ or exact equivalent	A1
		(2)
(b)	Uses perpendicular gradients rule $\Rightarrow$ gradient $l_2 = \dfrac{5}{3}$	M1
	Forms equation of l_2 using (6,-2) $y+2 = "\dfrac{5}{3}"(x-6)$	M1
	$y = \dfrac{5}{3}x - 12$	A1
		(3)
		(5 marks)
Alt1(a)	Eg Coordinates of two points on the line $(0,1.4)$ and $(1,0.8)$	
	Gradient $= \dfrac{0.8-1.4}{1-0}$	M1
		A1
	Gradient $= -0.6$	