

Question		Answer	Marks	Guidance	
1	(i)	$(6, -1.5)$ oe	B2 [2]	B1 for each value; allow $x = 6, y = -1.5$	SC0 for $(6, -3)$
1	(ii)	$(2, -3)$	B2 [2]	B1 for each value; allow $x = 2, y = -3$	SC0 for $(6, -3)$

2	(i)	graph from $(-1, 1)$ to $(1, 1)$ to $(2, 2)$ to $(3, 0)$	2 [2]	B1 for three points correct or for all four points correct but clearly not joined	points must be joined, but not always easy to see, so BOD if in doubt. Accept freehand drawing.
2	(ii)	graph from $(-2, 3)$ to $(2, 3)$ to $(4, 6)$ to $(6, 0)$	2 [2]	B1 for three points correct or for all four points correct but clearly not joined	points must be joined, but not always easy to see, so BOD if in doubt. Accept freehand drawing.

3	(i)	$(6, 9)$	2 [2]	1 for each co-ordinate	SC0 for $(6, 3)$
3	(ii)	$(1.5, 3)$	2 [2]	1 for each co-ordinate	SC0 for $(6, 3)$

4	crossing x -axis at 0 and 2.5	1	
	min at (1.25, -6.25)	1	
	crossing x -axis at 0 and 5	1	
	min at (2.5, -18.75)	1	

5	stretch, parallel to the y axis, sf 3	2	1 for stretch plus one other element correct	2
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6	(i) $y = 2f(x)$	2	1 if 'y=' omitted [penalise only once] M1 for $y = kf(x)$, $k > 0$	4
	(ii) $y = f(x - 3)$	2	M1 for $y = f(x + 3)$ or $y = f(x - k)$	

7	(i) 66° or 66.4 or 66.5.... 293.58 to 3 or more sf cao	B1 B1	Allow 1.16 or 73.8 Lost for extras in range. Ignore extras outside the range	5
	(ii) stretch (one way) parallel to the x -axis sf 0.5	1	Horizontal, from y axis, in x axis, oe	
		1 1		

8	(i)		$(0.8, -2)$ oe	2 [2]	B1 each coordinate	SC0 for $(4, -2)$
8	(ii)		Translation $\begin{pmatrix} 90 \\ 0 \end{pmatrix}$ oe	B1 B1 [2]	or eg 270 to left	allow B2 for rotation through 180° about $(45, 0)$ oe

9	(i)		$[y =] 2\sin x$ oe	1 [1]		
9	(ii)		$[y =] \sin(0.5x)$ oe	2 [2]	M1 for $[y =] \sin(2x)$	

10	(i) $(3, 15)$	B2	B1 for each coordinate	s.c. B0 for $(3, 5)$
10	(ii) $(1.5, 5)$	B2	B1 for each coordinate	s.c. B0 for $(3, 5)$

11	(i)	sketch of correct shape with P (-0.5,2) Q (0,4) and R (2,2)	2	1 if Q and one other are correct	4
	(ii)	sketch of correct shape with P (-1,0.5) Q (0,1) and R (4,0.5)	2	1 if Q and one other are correct	

12	(i)	graph along $y = 2$ with V at (3,2) (4,1) & (5,2)	2	M1 for correct V, or for $f(x+2)$	4
	(ii)	graph along $y = 6$ with V at (1,6) (2,3) & (3,6)	2	B1 for (2,k) with all other elements correct	

13	(i)	line along $y = 6$ with V (1, 6), (2, 2), (3, 6)	2	1 for two points correct	4
	(ii)	line along $y = 3$ with V (-2,3), (-1,1), (0,3)	2	1 for two points correct	

14	(i)	sketch of $\cos x$; one cycle, sketch of $\cos 2x$; two cycles, Both axes scaled correctly	1 1 D1		5
	(ii)	(1-way) stretch parallel to y axis sf 3	1 D1		