Question			Answer	Marks	Guidance	
1	(i)		clear diagram or explanation starting with equilateral triangle correctly showing 30 as half angle and sides 1 and 2 or multiples of these lengths	B1		units for sides and angle not required
			correct use of Pythagoras *and* adjacent and hypotenuse correctly identified to obtain given result $\cos 30° = \frac{\sqrt{3}}{2}$	B1 [2]	adjacent and hypotenuse may be identified on diagram	condone abbreviations
1	(ii)		$\pm\frac{\pi}{6}$ or $-\frac{5\pi}{6}$ soi	M1	may be implied by correct answer or ±0.523598775…, or may appear on quadrant diagram or graph	condone ±30° or − 150°
			$\frac{11\pi}{6}$	A1	if **A0A0**, **SC1** for 1.8333333π and 1.16666666π to 3 or more sf or **SC1** for 330° and 210° www	ignore extra values outside the range if full marks or **SC1** awarded, subtract 1 for extra values *in* the range
			$\frac{7\pi}{6}$	A1 [3]		

2	using Pythagoras to show that hyp. of right angled isos. triangle with sides *a* and *a* is $\sqrt{2}a$ completion using definition of cosine	M1 A1	www *a* any letter or a number NB answer given	2

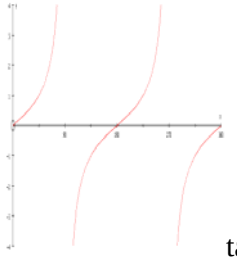
3	(i)sketch of cos*x* ; one cycle, sketch of cos2*x*; two cycles, Both axes scaled correctly (ii) (1-way) stretch parallel to *y* axis sf 3	1 1 D1 1 D1		5

4	$1/\sqrt{15}$ i.s.w. not +/–	3	M2 for $\sqrt{15}$ seen M1 for rt angled triangle with side 1 and hyp 4, or $\cos^2\theta = 1 - 1/4^2$.	3

5	(**i**) sketch of correct sh correct period and amplitude period halved for *y* = cos 2*x*; amplitude unchanged (**ii**) 30, 150, 210,	G1 G1 G1 B2	Not ruled lines need 1 and –1 indicated; nos. on horiz axis not needed if one period shown B1 for 2 of these, ignore extras outside range.	5

6	(**i**) correct sine shape throug amplitude of 1 and period 2π shown (ii) $\pi/6$ and $11\pi/6$	1 1 3	 B2 for one of these; 1 for $-\pi/6$ found	5

7	At least one cycle from (0, 0) amplitude 1 and period 360[°] indicated 222.8 to 223 and 317 to 317.2 [°]	G1 G1dep 2	 1 each, ignore extras	 4

8	(i)  tan x = ¾ (ii) 36.8 to 36.9 and 216.8 to 216.9	2 M1 A1A1	no numbers required on axes unless more branches shown. G1 for a correct first sweep Allow 37, 217	 5

9	At least 1 period of sine curve Sine curve from 0 to 360 191.537 rot to 3 or more sf 348.463 rot to 3 or more sf	G1 G1 B1 B1	 ± 1 indicated After B1 B1, -1 for extras in the range SC1 for 192.8 and 347.2 (grads) SC1 for 180.2 and 359.8 (radians)	 4