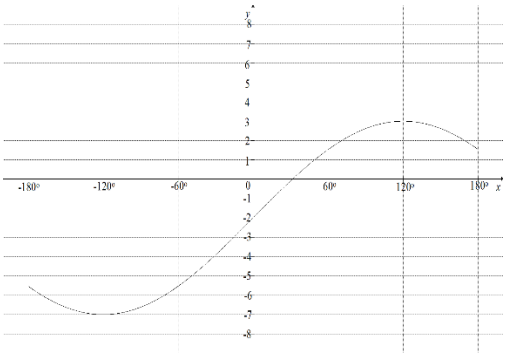
Question	Answer	Marks	Guidance
1(a)	$\left(\text{f}\left(x\right) \text{ or } y=\right)\ -3(3x+1)(x-1)(2x-5)$	**3**	**B1** for $k\left(x+\frac{1}{3}\right)(x-1)\left(x-\frac{5}{2}\right)$ and no other work that would gain marks. **B2** for $m(3x+1)(x-1)(2x-5)$ and no other work that would gain marks.
1(b)	$-\frac{1}{3}<x<1$	**B1**	Must be in terms of x
	$x>\frac{5}{2}$	**B1**	Must be in terms of x
2(a)	5	**B1**	
2(b)	480^{o}	**B1**	
2(c)		**3**	**To obtain any marks the graph must be a curve with one min in the third quadrant and one max in the first quadrant.** **B1** for the shape, starting in the 3rd quadrant and ending in the 1st quadrant. Must cross the x-axis only once, between 0^{o} and 60^{o}. Must extend for the complete domain starting with $-6<y<-5$ and ending with $1<y<2$ **B1** for passing through $(0,\ -2)$ **B1** for passing though $(120^{\text{o}},\ 3)$ and $(-120^{\text{o}},\ -7)$ soi
3	$\ln(y+2)=mx^2+c$ soi	**B1**	
	Either of: $9.37=2.25m+c$ $3.92=4.75m+c$	**M1**	For at least one correct equation involving m and c
	$m=-2.18,\ -\frac{109}{50}$ oe $c=14.3,\ 14.28,\ 14.275,\ \frac{571}{40}$	**2**	**Dep M1** for attempt to solve for at least one unknown. **A1** for both.
	$y=\text{e}^{\left(14.3-2.18x^2\right)}-2$ oe	**A1**	**FT** on the first **M1** for *their* m and c

Question	Answer	Marks	Guidance
3	**Alternative**		
	$\ln(y+2) = mx^2 + c$ soi	**(B1)**	
	Gradient = –2.18, $-\frac{109}{50}$ oe	**(B1)**	
	$9.37 = 2.25m + c$ $3.92 = 4.75m + c$	**(M1)**	Use of a correct equation with *their* gradient and *c*
	$c = 14.3,\ 14.28,\ 14.275,\ \frac{571}{40}$	**(A1)**	
	$y = e^{(14.3 - 2.18x^2)} - 2$ oe	**(A1)**	**FT** on *their m* and *c*
4(a)	$n = 16$	**B1**	
	$+\frac{n(n-1)}{2!}\left((-)\frac{x}{2}\right)^2$, ${}^nC_2\left((-)\frac{x}{2}\right)^2$ oe $\frac{n(n-1)}{8} = p,\ p = 30$	**2**	**M1** for attempt at third term allow unsimplified in terms of *n* or *their n*, but not just as part of an expansion unless used to find *p* **A1** for *p*.
	$+\frac{n(n-1)(n-2)}{3!}\left((-)\frac{x}{2}\right)^3$, ${}^nC_3\left((-)\frac{x}{2}\right)^3$ $\frac{n(n-1)(n-2)}{48} = q,\quad q = -70$	**2**	**M1** for attempt at fourth term, allow unsimplified in terms of *n* or *their n*, but not just as part of an expansion unless used to find *q* **A1** for *q*.
4(b)	${}^6C_4\left(\frac{2}{x^2}\right)^2\left(\frac{x}{3}\right)^4$	**B1**	For identifying the correct term and attempting to evaluate.
	$\frac{20}{27}$	**B1**	
5	$\cos\left(2\theta + \frac{\pi}{6}\right) = (\pm)\frac{\sqrt{3}}{2}$ oe or $\tan\left(2\theta + \frac{\pi}{6}\right) = (\pm)\frac{1}{\sqrt{3}}$ oe	**B1**	
	$\theta = -\frac{\pi}{6},\ 0,\ \frac{\pi}{3}$ oe	**4**	**M1** for a correct order of operations, may be implied by one correct solution. **A1** for 1 correct solution. **A1** for a 2nd correct solution **A1** for a 3rd correct solution with no extra solutions in the range. All solutions must be from correct working.