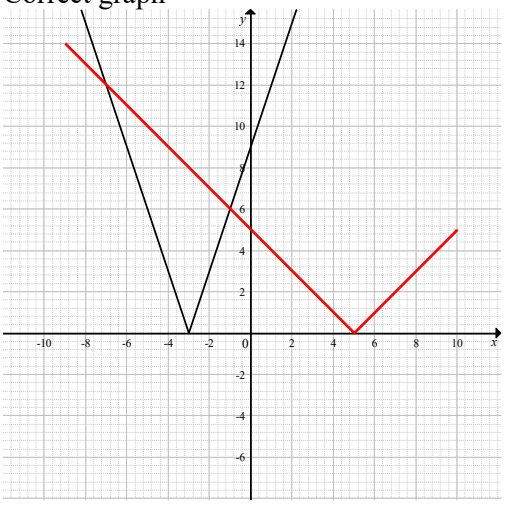
Question	Answer	Marks	Partial Marks
1(b)	Correct graph  AND $-7 \leqslant x \leqslant -1$	**3**	**B1** for correct graph and **B2 dep** for $-7 \leqslant x \leqslant -1$; dependent on a correct graph for $-7 \leqslant x \leqslant -1$ or **B1 STRICT FT** for *their* critical values from the two intersections of *their* straight-line section of graph providing it has negative gradient
2	$\dfrac{7\sqrt{2}x^6\left(3-\sqrt{2}\right)}{\left(3+\sqrt{2}\right)\left(3-\sqrt{2}\right)}$	**M2**	**M1** for $7\sqrt{2}x^6$ or $\dfrac{\sqrt{98x^{12}}\left(3-\sqrt{2}\right)}{\left(3+\sqrt{2}\right)\left(3-\sqrt{2}\right)}$ or $\dfrac{\sqrt{98}x^6\left(3-\sqrt{2}\right)}{\left(3+\sqrt{2}\right)\left(3-\sqrt{2}\right)}$ or $\dfrac{\textit{their}\,7\sqrt{2}x^6\left(3-\sqrt{2}\right)}{\left(3+\sqrt{2}\right)\left(3-\sqrt{2}\right)}$
	$\dfrac{21\sqrt{2}x^6-14x^6}{9-2}$ or $\dfrac{7x^6(3\sqrt{2}-2)}{9-2}$ oe	**A1**	
	$(3\sqrt{2}-2)x^6$	**A1**	
	Alternative method		
	$\dfrac{\sqrt{98x^{12}}}{3+\sqrt{2}}\times\dfrac{3-\sqrt{2}}{3-\sqrt{2}}$ or $\dfrac{\sqrt{98}x^6}{3+\sqrt{2}}\times\dfrac{3-\sqrt{2}}{3-\sqrt{2}}$	**(M1)**	
	$\dfrac{3\sqrt{98x^{12}}-\sqrt{196x^{12}}}{9-2}$ or $\dfrac{3\sqrt{98}x^6-\sqrt{196}x^6}{9-2}$	**(M1)**	
	$\dfrac{3\sqrt{98x^{12}}-\sqrt{196x^{12}}}{\sqrt{49}}$ or $\dfrac{3\times7\sqrt{2}x^6-14x^6}{7}$ oe	**(A1)**	
	$(3\sqrt{2}-2)x^6$	**(A1)**	

Question	Answer	Marks	Partial Marks
3(a)	$\frac{3(x+2)}{x(x+3)}$ or $\frac{3x+6}{x^2+3x}$ or simplified equivalent;	**2**	mark final answer **B1** for $\frac{3x^2+6x}{x^3+3x^2}$ oe
3(b)	$\frac{1}{3}\ln(x^3+3x^2)\ +c$	**2**	**B1** for $\frac{1}{3}\ln(x^3+3x^2)$
4(a)	$2(-4)^3+11(-4)^2+22(-4)+40=0$ oe	**1**	
4(b)	$(x+4)(2x^2+3x+10)$	**B2**	**B1** for $2x^2+3x+10$ with two terms out of three correct
	Correct use of b^2-4ac for *their* 3-term quadratic factor	**M1**	
	$3^2-4(2)(10)<0$ isw or $3^2-4(2)(10)=-71$ oe, cao	**A1**	
5(a)(i)	35700	**2**	**M1** for ${}^{20}C_6-{}^{18}C_4$ or ${}^{18}C_6+{}^{18}C_5\times{}^{2}C_1$ oe
5(a)(ii)	32400	**2**	**M1** for ${}^{6}P_4\times{}^{10}P_2$ or (6 × 5 × 4 × 3) × (10 × 9) oe
5(b)(i)	Correct algebraic method to show $(n-3)\,{}^{n}C_3$ is the same as $4\times{}^{n}C_4$ oe	**2**	**B1** for ${}^{n}C_3=\frac{n!}{3!(n-3)!}$ or ${}^{n}C_4=\frac{n!}{4!(n-4)!}$
5(b)(ii)	$\frac{n(n-1)(n-2)}{6}=5n$ or $n(n-1)(n-2)=30n$ and completion to given answer: $n^2-3n-28=0$	**B2**	**B1** for $\left[{}^{n}C_3=\right]\frac{n(n-1)(n-2)}{6}$ or $n(n-1)(n-2)=30n$ seen
	$(n-7)(n+4)=0$ oe	**M1**	
	$n=7$	**A1**	