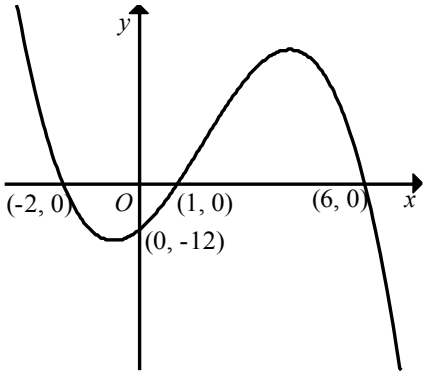
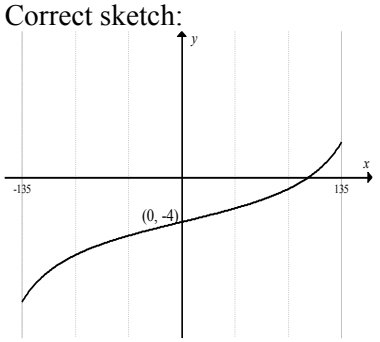
Question	Answer	Marks	Partial Marks
1	Coordinates of mid-point $(-2, 1)$	**B1**	
	$m_{AB} = \frac{9--7}{-8-4}\left[=-\frac{16}{12}\right]$	**B1**	
	$m_{\perp} = \frac{-1}{-16/12}$	**M1**	
	$y-1=\frac{3}{4}(x+2)$ oe	**A1**	
2	Uses b^2-4ac $(-4k)^2-4(4)(2k+3)$ soi	**M1**	
	Correctly simplifies $16k^2-32k-48$	**A1**	**FT** provided of equivalent difficulty
	$16(k+1)(k-3)$ oe	**M1**	
	CV -1, 3	**A1**	
	$-1 < k < 3$	**A1**	**FT** *their* lower CV $< k <$ *their* upper CV
3(a)	Correct sketch  	**B2**	**B1** for correct shape **B1** for correct coordinates (–2, 0), (1, 0), (6, 0) and (0, –12)
3(b)	$-2 \leqslant x \leqslant 1$ and $x \geqslant 6$	**B2**	**B1** for $-2 \leqslant x \leqslant 1$ or $x \geqslant 6$ with no contradictions
4(a)(i)	6720	**B2**	**B1** for $8\times7\times6\times5\times4$ or ${}^8P_5$
4(a)(ii)	2520	**B2**	**B1**for $3\times7\times6\times5\times4$ or ${}^3P_1\times{}^7P_4$
4(b)	${}^4C_1\times{}^5C_2+{}^5C_3$	**M1**	
	50	**A1**	

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Question	Answer	Marks	Partial Marks
5(a)	$\frac{\sqrt{128}}{\sqrt{72}}=\frac{\sqrt{64\times2}}{\sqrt{36\times2}}$ or simplifies $\sqrt{\frac{128}{72}}$ to $\sqrt{\frac{16}{9}}$	**M1**	
	correct completion to $\frac{4}{3}$	**A1**	
5(b)	$\frac{3+2\sqrt{3}-\sqrt{3}\left(1+\sqrt{3}\right)}{\left(1+\sqrt{3}\right)\left(3+2\sqrt{3}\right)}$	**M1**	
	$\frac{\sqrt{3}}{3+2\sqrt{3}+3\sqrt{3}+6}$	**M1**	
	$\frac{\sqrt{3}}{9+5\sqrt{3}}\times\frac{9-5\sqrt{3}}{9-5\sqrt{3}}$	**M1**	
	$\frac{9\sqrt{3}-15}{6}$ or equivalent	**A1**	
			Alternative method **M1** for $\frac{1-\sqrt{3}}{(1+\sqrt{3})(1-\sqrt{3})}-\frac{\sqrt{3}(3-2\sqrt{3})}{(3+2\sqrt{3})(3-2\sqrt{3})}$
			M1 for $\frac{1-\sqrt{3}}{1-3}-\frac{3\sqrt{3}-6}{9-12}$
			M1 for writing with a common denominator
			A1 for $\frac{9\sqrt{3}-15}{6}$ or equivalent
6(a)	$a=20$ $b=2$ $c=-3$	**B3**	**B1** for each
6(b)	Correct sketch: 	**B2**	**B1** for correct tan shape with one continuous section only **B1** for correct y-intercept (0, –4)