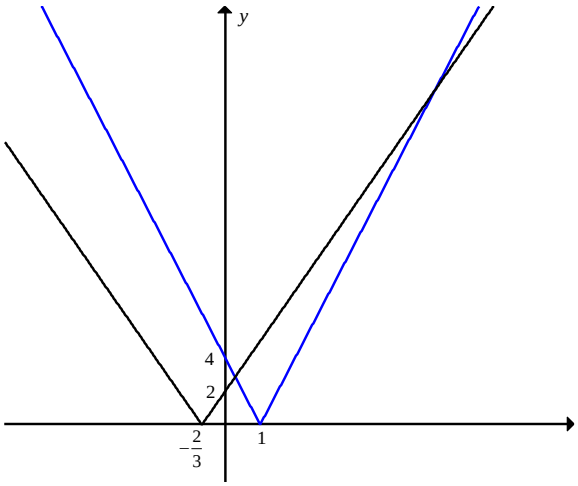
Question	Answer	Marks	Partial Marks
1(a)	Fully correct, ruled graphs with all intercepts indicated 	**3**	**M2** for a graph of correct shape with vertex on the x-axis and 1 and 4 oe appropriately indicated or a graph of correct shape with vertex on the x-axis and $-\frac{2}{3}$ and 2 oe appropriately indicated or **M1** for a graph of correct shape with vertex on the x-axis and 1 or 4 oe appropriately indicated or a graph of correct shape with vertex on the x-axis and $-\frac{2}{3}$ or 2 oe appropriately indicated
1(b)	$4(x-1) * 3x + 2$ oe and $4(x-1) * -3x - 2$ oe OR $7x^2 - 44x + 12 \quad [*0]$ where * is = or any inequality sign	**M2**	**M1** for $4(x-1) * -3x - 2$ oe OR **M1** for $(4(x-1))^2 = (3x+2)^2$ oe
	Critical values $\frac{2}{7}$ and 6	**A1**	
	$\frac{2}{7} \leqslant x \leqslant 6$ mark final answer	**A1**	
2	$a = 5$	**B1**	
	$b = 3$	**B1**	
	$c = -2$	**B1**	

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Question	Answer	Marks	Partial Marks
3	$(x-2)^2+(y+1)^2=74$ oe nfww or $x^2+y^2-4x+2y-69=0$ oe nfww	**4**	**M1** for centre: $\left(\frac{-3+7}{2},\frac{6-8}{2}\right)$ or $(2,-1)$ soi **M2** for [r =] $\sqrt{74}$ or [r^2 =] 74 or [diameter =] $2\sqrt{74}$ or $c=-69$ or **M1** for $\left[AB^2=\right](-3-7)^2+(6--8)^2$ oe or $\left[r^2=\right](-3-their2)^2+(6-their(-1))^2$ oe or $\left[r^2=\right](7-their2)^2+(-8-their(-1))^2$ oe **Alternative method** **M2** for $\frac{y-6}{x-(-3)}\times\frac{y-(-8)}{x-7}=-1$ or **M1** for e.g. $P(x, y)$ on the circumference means $AP\perp BP\rightarrow m_{AP}\times m_{BP}=-1$ **M1** for $\frac{y^2+2y-48}{x^2-4x-21}=-1$ oe **FT** $their\left(\frac{y-6}{x-(-3)}\times\frac{y-(-8)}{x-7}\right)$ with at most one sign error
4(a)	$a^2\left(-\frac{1}{2}\right)^3+2a\left(-\frac{1}{2}\right)^2+a\left(-\frac{1}{2}\right)+2=0$ oe, soi	**M1**	
	Simplifies and solves for a	**M1**	**FT** *their* quadratic in a providing $p\left(-\frac{1}{2}\right)=0$ oe attempted
	$a=4$	**A1**	
4(b)	$2(2x+1)(4x^2+1)$ mark final answer	**2**	**M1** for $(2x+1)\left(\frac{their\ a^2}{2}x^2\ldots+2\right)$ or $(8x^2+2)$ found as quadratic factor
4(c)	Discriminant of $4x^2+1$ is $0-16<0$ oe and no real roots oe or $4x^2+1=0\rightarrow 4x^2=-1$ oe and therefore no solution oe [statement that only solution is $x=-\frac{1}{2}$]	**1**	

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