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**	

© Cambridge University Press & Assessment 2025

Question	Answer	Marks	Partial Marks
5(a)	$2\left(x-\frac{1}{2}\right)^2+\frac{5}{2}$	**3**	**B2** for $2\left(x-\frac{1}{2}\right)^2$ or **B1** for $\left(x-\frac{1}{2}\right)^2$ or $a = 2$ and $b = –0.5$ oe **B1** for $\frac{5}{2}$ or $c = 2.5$ oe
5(b)	$\frac{1}{2}$	**B1**	**FT** *–their b*
5(c)	$f \geqslant \frac{5}{2}$	**B1**	**FT** *their c*
5(d)	$\left[f^{-1}(x) =\right] \frac{1}{2}-\sqrt{\frac{1}{2}\left(x-\frac{5}{2}\right)}$ oe or $\left[f^{-1}(x) =\right] \frac{2-\sqrt{8x-20}}{4}$ oe	**3**	**M1 FT** for a complete method to find the inverse with a correct order of operations **FT** an expression of the form $f(x) = a(x+b)^2+c$ **A1 FT** for $\left[f^{-1}(x) =\right] \frac{1}{2} \pm \sqrt{\frac{1}{2}\left(x-\frac{5}{2}\right)}$ oe **FT** *their* $\frac{1}{2}$ and *their* $\frac{5}{2}$
6(a)	$\cos\theta = -\sqrt{\frac{5}{6}}$ oe, isw	**B2**	**B1** for $\cos\theta = \sqrt{\frac{5}{6}}$ oe or $\cos\theta = \pm\sqrt{\frac{5}{6}}$ oe
6(b)	$\sin\theta = -\sqrt{\frac{1}{6}}$ oe, isw	**B1**	
6(c)	$\frac{5-[1]\sqrt{6}}{\sqrt{5}}$	**2**	**M1** for $[\sec\theta + \cot\theta =] \frac{1}{\cos\theta}+\frac{1}{\tan\theta}$ or $\frac{1}{\cos\theta}+\frac{\cos\theta}{\sin\theta}$ soi or for $\frac{1}{their\cos\theta}+\frac{5}{\sqrt{5}}$ oe or $\frac{1}{their\cos\theta}+\frac{their\cos\theta}{their\sin\theta}$

© Cambridge University Press & Assessment 2025