Solution	Marks

REG-2425-MOCK-SET 7-MATH-EP(M2)
Suggested solutions

1. (a) $\overrightarrow{OC} = \dfrac{3}{4}\overrightarrow{OA} + \dfrac{1}{4}\overrightarrow{OB}$

$= \dfrac{3}{4}\mathbf{a} + \dfrac{1}{4}\mathbf{b}$ — 1A

(b) $\left|\overrightarrow{OC}\right|^2 = \overrightarrow{OC} \cdot \overrightarrow{OC}$

$= \dfrac{9}{16}|\mathbf{a}|^2 + \dfrac{3}{8}\mathbf{a} \cdot \mathbf{b} + \dfrac{1}{16}|\mathbf{b}|^2$

$= \dfrac{9}{16}(1)^2 + \dfrac{3}{8}(1)(5)\cos\dfrac{\pi}{3} + \dfrac{1}{16}(5)^2$ — 1M

$= \dfrac{49}{16}$

$\left|\overrightarrow{OC}\right| = \dfrac{7}{4}$ — 1A

2. (a) $\lim\limits_{t\to0}\dfrac{1}{t}\sin\dfrac{\sqrt{1+t}-1}{2} = \lim\limits_{t\to0}\dfrac{\sin\frac{\sqrt{1+t}-1}{2}}{\frac{\sqrt{1+t}-1}{2}} \times \dfrac{\sqrt{1+t}-1}{2t}$ — 1M

$= \lim\limits_{t\to0}\left(\dfrac{\sin\frac{\sqrt{1+t}-1}{2}}{\frac{\sqrt{1+t}-1}{2}} \times \dfrac{\sqrt{1+t}-1}{2t} \times \dfrac{\sqrt{1+t}+1}{\sqrt{1+t}+1}\right)$

$= \lim\limits_{t\to0}\left(\dfrac{\sin\frac{\sqrt{1+t}-1}{2}}{\frac{\sqrt{1+t}-1}{2}} \times \dfrac{t}{2t(\sqrt{1+t}+1)}\right)$

$= \lim\limits_{t\to0}\left(\dfrac{\sin\frac{\sqrt{1+t}-1}{2}}{\frac{\sqrt{1+t}-1}{2}} \times \dfrac{1}{2(\sqrt{1+t}+1)}\right)$ — 1M

$= 1 \cdot \dfrac{1}{2(1+1)}$

$= \dfrac{1}{4}$ — 1A

(b) $f'(1) = \lim\limits_{h\to0}\dfrac{\cos\sqrt{1+h} - \cos\sqrt{1}}{h}$ — 1M

$= \lim\limits_{h\to0}\dfrac{-2\sin\frac{\sqrt{1+h}+1}{2}\sin\frac{\sqrt{1+h}-1}{2}}{h}$ — 1M

$= -2\lim\limits_{h\to0}\left(\dfrac{1}{h}\sin\dfrac{\sqrt{1+h}-1}{2}\sin\dfrac{\sqrt{1+h}+1}{2}\right)$

$= -2 \times \dfrac{1}{4} \times \sin\dfrac{1+1}{2}$

$= -\dfrac{1}{2}\sin 1$ — 1A

Solution	Marks
3. $(1+ax)^n = 1 + C_1^n(ax) + C_2^n(ax)^2 + \ldots$	1M
$= 1 + nax + \dfrac{n(n-1)}{2}a^2x^2 + \ldots$	1A
We have $na = -\dfrac{3}{2}n$ and $\dfrac{n(n-1)}{2}a^2 = 63$.	1M
From the first equation, we have $a = -\dfrac{3}{2}$.	1A
$\dfrac{n(n-1)}{2}\left(-\dfrac{3}{2}\right)^2 = 63$	
$\dfrac{n^2}{2} - \dfrac{n}{2} - 112 = 0$	
$n = 8 \quad \text{or} \quad -7 \text{ (rejected)}$	1A
4. (a) $\dfrac{\cos A + \cos B}{\sin A + \sin B}$	
$= \dfrac{2\cos\frac{A+B}{2}\cos\frac{A-B}{2}}{2\sin\frac{A+B}{2}\cos\frac{A-B}{2}}$	1M
$= \dfrac{\cos\frac{A+B}{2}}{\sin\frac{A+B}{2}}$	
$= \cot\dfrac{A+B}{2}$	1
(b) $5\sin A - 3\cos A = 3\cos B - 5\sin B$	
$5(\sin A + \sin B) = 3(\cos A + \cos B)$	
$\dfrac{5}{3} = \dfrac{\cos A + \cos B}{\sin A + \sin B} \qquad (\sin A + \sin B \neq 0)$	
$\cot\dfrac{A+B}{2} = \dfrac{5}{3}$	
$\tan\dfrac{A+B}{2} = \dfrac{3}{5}$	1A
$\cot(A+B) = \dfrac{1-\tan^2\frac{A+B}{2}}{2\tan\frac{A+B}{2}}$	1M
$= \dfrac{1-\left(\frac{3}{5}\right)^2}{2\left(\frac{3}{5}\right)}$	
$= \dfrac{8}{15}$	1A

Solution	Marks
5. (a) $a(\sin x + 2\cos x)b(\cos x - 2\sin x) = (2a+b)\cos x + (a-2b)\sin x$	
We have $2a + b = 13$ and $a - 2b = -6$.	1M
Solving, we have $a = 4$ and $b = 5$.	1A
(b) Let $u = \sin x + 2\cos x$. Then $\mathrm{d}u = (\cos x - 2\sin x)\,\mathrm{d}x$.	1M
$\int_0^{\frac{\pi}{4}} \frac{13 - 6\tan x}{\tan x + 2}\,\mathrm{d}x$	
$= \int_0^{\frac{\pi}{4}} \frac{13\cos x - 6\sin x}{\sin x + 2\cos x}\,\mathrm{d}x$	
$= \int_0^{\frac{\pi}{4}} \frac{4(\sin x + 2\cos x) + 5(\cos x - 2\sin x)}{\sin x + 2\cos x}\,\mathrm{d}x$	
$= 4\int_0^{\frac{\pi}{4}} \mathrm{d}x + 5\int_0^{\frac{\pi}{4}} \frac{\cos x - 2\sin x}{\sin x + 2\cos x}\,\mathrm{d}x$	1M
$= 4\Big[x\Big]_0^{\frac{\pi}{4}} + 5\int_2^{\frac{3\sqrt{2}}{2}} \frac{\mathrm{d}u}{u}$	
$= \pi + 5\Big[\ln\lvert u\rvert\Big]_2^{\frac{3\sqrt{2}}{2}}$	1M
$= \pi + 5\ln\frac{3\sqrt{2}}{4}$	1A
6. $\frac{\mathrm{d}}{\mathrm{d}x}\left(4x + y^2\right) = \frac{\mathrm{d}}{\mathrm{d}x}(16)$	
$4 + 2y\frac{\mathrm{d}y}{\mathrm{d}x} = 0$	1M
$\frac{\mathrm{d}y}{\mathrm{d}x} = -\frac{2}{y}$	
Let the coordinates of the point of contact of L and the curve be $(a,\ b)$.	
$\frac{b-0}{a-8} = -\frac{2}{b}$	1M
$b^2 = 16 - 2a$	
$(16 - 4a) = 16 - 2a$	1M
$a = 0$	
The coordinates of the point of contact are $(0,\ 4)$ and $(0,\ -4)$.	1A
Equation of tangent to the curve at $(0,\ 4)$ is	
$y - 4 = -\frac{2}{4}(x - 0)$	
$y = -\frac{x}{2} + 4$	1A
Equation of tangent to the curve at $(0,\ -4)$ is	
$y + 4 = -\frac{2}{(-4)}(x - 0)$	
$y = \frac{x}{2} - 4$	1A
The equation of L is $y = -\frac{x}{2} + 4$ or $y = \frac{x}{2} - 4$.	

Solution	Marks
7. (a) $\begin{vmatrix} a & 1 & 1 \\ 2 & -1 & -1 \\ 1 & -3 & 2 \end{vmatrix}$	
$= a\begin{vmatrix} -1 & -1 \\ -3 & 2 \end{vmatrix} - 2\begin{vmatrix} 1 & 1 \\ -3 & 2 \end{vmatrix} + \begin{vmatrix} 1 & 1 \\ -1 & -1 \end{vmatrix}$	
$= -5(a+2)$	
(E) has infinitely many solutions.	
$-5(a+2) = 0$	1M
$a = -2$	1A
The augmented matrix of (E) becomes	
$\left(\begin{array}{ccc\|c} -2 & 1 & 1 & 6 \\ 2 & -1 & -1 & b \\ 1 & -3 & 2 & 2 \end{array}\right) \sim \left(\begin{array}{ccc\|c} 1 & -3 & 2 & 2 \\ 2 & -1 & -1 & b \\ -2 & 1 & 1 & 6 \end{array}\right) \sim \left(\begin{array}{ccc\|c} 1 & -3 & 2 & 2 \\ 0 & 5 & -5 & b-4 \\ 0 & 0 & 0 & b+6 \end{array}\right)$	1M
(E) has infinitely many solutions.	
$b + 6 = 0$	
$b = -6$	1A
(b) When $b = -6$, the augmented matrix of (E) becomes	
$\left(\begin{array}{ccc\|c} 1 & -3 & 2 & 2 \\ 0 & 5 & -5 & -10 \\ 0 & 0 & 0 & 0 \end{array}\right) \sim \left(\begin{array}{ccc\|c} 1 & 0 & -1 & -4 \\ 0 & 1 & -1 & -2 \\ 0 & 0 & 0 & 0 \end{array}\right)$	1M
The solution set is $\{(t-4,\ t-2,\ t) : t \in \mathbb{R}\}$.	1A

Solution	Marks
8. (a) When $n = 1$,	
L.H.S. $= \frac{1}{(1)(3)} + \frac{2^2}{(3)(5)} = \frac{3}{5}$	
R.H.S. $= \frac{1(3)}{5} = \frac{3}{5} =$ L.H.S.	
It is true for $n = 1$.	1
Assume $\sum_{k=1}^{2p} \frac{k^2}{(2k-1)(2k+1)} = \frac{p(2p+1)}{4p+1}$, where $p \in \mathbb{Z}^+$.	1
$\sum_{k=1}^{2p+2} \frac{k^2}{(2k-1)(2k+1)}$	
$= \sum_{k=1}^{2p} \frac{k^2}{(2k-1)(2k+1)} + \frac{(2p+1)^2}{(4p+1)(4p+3)} + \frac{(2p+2)^2}{(4p+3)(4p+5)}$	
$= \frac{p(2p+1)}{4p+1} + \frac{(2p+1)^2}{(4p+1)(4p+3)} + \frac{(2p+2)^2}{(4p+3)(4p+5)}$	1M
$= \frac{(2p+1)[p(4p+3)+(2p+1)]}{(4p+1)(4p+3)} + \frac{4(p+1)^2}{(4p+3)(4p+5)}$	
$= \frac{(2p+1)(4p^2+5p+1)}{(4p+1)(4p+3)} + \frac{4(p+1)^2}{(4p+3)(4p+5)}$	
$= \frac{(2p+1)(4p+1)(p+1)}{(4p+1)(4p+3)} + \frac{4(p+1)^2}{(4p+3)(4p+5)}$	
$= \frac{(2p+1)(p+1)}{4p+3} + \frac{4(p+1)^2}{(4p+3)(4p+5)}$	
$= \frac{(p+1)[(2p+1)(4p+5)+4(p+1)]}{(4p+3)(4p+5)}$	
$= \frac{(p+1)(8p^2+18p+9)}{(4p+3)(4p+5)}$	
$= \frac{(p+1)((4p+3)(2p+3))}{(4p+3)(4p+5)}$	
$= \frac{(p+1)(2p+3)}{4p+5}$	
It is true for $n = p + 1$.	
By M.I., it is true $\forall n \in \mathbb{Z}^+$.	1
(b) $\sum_{k=11}^{20} \frac{k^2}{(2k-1)(2k+1)}$	
$= \sum_{k=1}^{20} \frac{k^2}{(2k-1)(2k+1)} - \sum_{k=1}^{10} \frac{k^2}{(2k-1)(2k+1)}$	1M
$= \frac{10(21)}{41} - \frac{5(11)}{21}$	1M
$= \frac{2155}{861}$	1A

Solution	Marks
9. (a) $\left(\dfrac{x}{2}\right)^2 + y^2 = 13^2$	
$x^2 + 4y^2 = 676$	1A
(b) When $y = 12$, we have $x = 10$.	1M
$\dfrac{\mathrm{d}}{\mathrm{d}t}\left(x^2 + 4y^2\right) = \dfrac{\mathrm{d}}{\mathrm{d}t}(676)$	
$2x\dfrac{\mathrm{d}x}{\mathrm{d}t} + 8y\dfrac{\mathrm{d}y}{\mathrm{d}t} = 0$	1M
$x\dfrac{\mathrm{d}x}{\mathrm{d}t} + 4y\dfrac{\mathrm{d}y}{\mathrm{d}t} = 0$	
Put $x = 10$, $y = 12$ and $\dfrac{\mathrm{d}y}{\mathrm{d}t} = \dfrac{1}{3}$.	
$10\dfrac{\mathrm{d}x}{\mathrm{d}t} + 4(12)\left(\dfrac{1}{3}\right) = 0$	
$\dfrac{\mathrm{d}x}{\mathrm{d}t} = -\dfrac{8}{5}$	1A
Let S m^2 be the area of $\triangle ABH$.	
$S = \dfrac{1}{2}xy$	
$\dfrac{\mathrm{d}S}{\mathrm{d}t} = \dfrac{1}{2}\left(y\dfrac{\mathrm{d}x}{\mathrm{d}t} + x\dfrac{\mathrm{d}y}{\mathrm{d}t}\right)$	1M
$= \dfrac{1}{2}\left[10(4) + 12\left(-\dfrac{8}{5}\right)\right]$	
$= \dfrac{52}{5}$	1A
Required rate is $\dfrac{52}{5}$ m^2/s.	

Solution	Marks

10. (a) $f'(x) = \dfrac{2x(x-3)-(x^2+a)(1)}{(x-3)^2}$ 1M

$= \dfrac{x^2-6x-a}{(x-3)^2}$

$f'(5) = 0 = \dfrac{5^2-6(5)-a}{(5-3)^2}$ 1M

$a = -5$ 1A

(b) $f'(x) = \dfrac{(x-1)(x-5)}{(x-3)^2}$

$f'(x) = 0$ when $x = 1$ or 5. 1M

x	$x<1$	$1<x<3$	$3<x<5$	$x>5$
$f'(x)$	$+$	$-$	$-$	$+$

1M

The maximum point of C is $(1,\ 2)$. 1A

(c) The vertical asymptote is $x = 3$. 1A

$f(x) = \dfrac{x^2-5}{x-3}$

$= x+3+\dfrac{4}{x-3}$ 1M

The oblique asymptote is $y = x+3$. 1A

(d) Area $= \displaystyle\int_{-\sqrt{5}}^{\sqrt{5}} f(x)\,\mathrm{d}x$ 1M+1A

$= \displaystyle\int_{-\sqrt{5}}^{\sqrt{5}} \left(x+3+\frac{4}{x-3}\right)\mathrm{d}x$

$= \left[\dfrac{x^2}{2}+3x+4\ln|x-3|\right]_{-\sqrt{5}}^{\sqrt{5}}$ 1A

$= \left(\dfrac{5}{2}+3\sqrt{5}+4\ln\left(3-\sqrt{5}\right)\right)-\left(\dfrac{5}{2}-3\sqrt{5}+4\ln\left(\sqrt{5}+3\right)\right)$

$= 6\sqrt{5}+4\ln\dfrac{3-\sqrt{5}}{3+\sqrt{5}}$ 1A

Solution	Marks
11. (a) $\displaystyle\int g(x)\,\mathrm{d}x = \sin^2 x\left(\frac{\sin 2x}{2}\right) - \frac{1}{2}\int (2\sin x\cos x)\sin 2x\,\mathrm{d}x$	1M
$\displaystyle= \frac{1}{2}\sin^2 x\sin 2x - \frac{1}{2}\int \sin^2 2x\,\mathrm{d}x$	1
(b) $\displaystyle\int_0^{\pi} g(x)\,\mathrm{d}x = \frac{1}{2}\Big[\sin^2 x\sin 2x\Big]_0^{\pi} - \frac{1}{2}\int_0^{\pi}\sin^2 2x\,\mathrm{d}x$	
$\displaystyle= 0 - \frac{1}{4}\int_0^{\pi}(1-\cos 4x)\,\mathrm{d}x$	1M
$\displaystyle= -\frac{1}{4}\left[x - \frac{\sin 4x}{4}\right]_0^{\pi}$	
$\displaystyle= -\frac{\pi}{4}$	1A
(c) Let $u = \pi - x$. Then $\mathrm{d}u = -\,\mathrm{d}x$.	1M
$\displaystyle\int_0^{\pi} xg(x)\,\mathrm{d}x = -\int_{\pi}^{0}(\pi-u)g(\pi-u)\,\mathrm{d}u$	
$\displaystyle= \int_0^{\pi}(\pi-u)\sin^2(\pi-u)\cos(2\pi-2u)\,\mathrm{d}u$	1M
$\displaystyle= \int_0^{\pi}(\pi-x)\sin^2 x\cos 2x\,\mathrm{d}x$	
$\displaystyle= \pi\int_0^{\pi} g(x)\,\mathrm{d}x - \int_0^{\pi} xg(x)\,\mathrm{d}x$	
$\displaystyle= \frac{\pi}{2}\int_0^{\pi} g(x)\,\mathrm{d}x$	1M
$\displaystyle= \frac{\pi}{2}\left(-\frac{\pi}{4}\right)$	
$\displaystyle= -\frac{\pi^2}{8}$	1A
(d) Note that $(-x)g(-x) = -x\sin^2(-x)\cos(-2x) = -x\sin^2\cos 2x = -xg(x)$.	1M
Thus, $xg(x)$ is an odd function.	
Let $u = x - \pi$. Then $\mathrm{d}u = \mathrm{d}x$.	1M
$\displaystyle\int_{-\pi}^{2\pi} xg(x)\,\mathrm{d}x = \int_{-\pi}^{\pi} xg(x)\,\mathrm{d}x + \int_{\pi}^{2\pi} xg(x)\,\mathrm{d}x$	
$\displaystyle= 0 + \int_{\pi}^{2\pi} xg(x)\,\mathrm{d}x$	
$\displaystyle= \int_0^{\pi}(u+\pi)\sin^2(u+\pi)\cos(2u+2\pi)\,\mathrm{d}u$	
$\displaystyle= \int_0^{\pi}(\pi+x)g(x)\,\mathrm{d}x$	1M
$\displaystyle= \pi\int_0^{\pi} g(x)\,\mathrm{d}x + \int_0^{\pi} xg(x)\,\mathrm{d}x$	
$\displaystyle= \pi\left(-\frac{\pi}{4}\right) + \left(-\frac{\pi^2}{8}\right)$	
$\displaystyle= -\frac{3\pi^2}{8}$	1A

Solution	Marks
12. (a) $\overrightarrow{OC} = \frac{3}{5}\overrightarrow{OA} + \frac{2}{5}\overrightarrow{OB}$	1M
$= 3\mathbf{i} + \mathbf{j} - \mathbf{k}$	1A
(b) A required vector	
$= \overrightarrow{OB} \times \overrightarrow{OC}$	
$= \begin{vmatrix} \mathbf{i} & \mathbf{j} & \mathbf{k} \\ -3 & -2 & 5 \\ 3 & 1 & -1 \end{vmatrix}$	1M
$= -3\mathbf{i} + 12\mathbf{j} + 3\mathbf{k}$	1A
Required area	
$= \frac{1}{2}\left\lvert \overrightarrow{OB} \times \overrightarrow{OC} \right\rvert$	
$= \frac{1}{2}\sqrt{3^2 + 12^2 + 3^2}$	1M
$= \frac{9\sqrt{2}}{2}$	1A
(c) (i) Let $\mathbf{n} = \overrightarrow{OB} \times \overrightarrow{OC} = -3\mathbf{i} + 12\mathbf{j} + 3\mathbf{k}$.	
$\overrightarrow{ED} = \frac{\overrightarrow{OD} \cdot \mathbf{n}}{\mathbf{n} \cdot \mathbf{n}}\mathbf{n}$	1M
$= \frac{-6 - 48}{3^2 + 12^2 + 3^2}(-3\mathbf{i} + 12\mathbf{j} + 3\mathbf{k})$	
$= \mathbf{i} - 4\mathbf{j} - \mathbf{k}$	
$\overrightarrow{BE} = \overrightarrow{BD} - \overrightarrow{ED}$	1M
$= (5\mathbf{i} - 2\mathbf{j} - 5\mathbf{k}) - (\mathbf{i} - 4\mathbf{j} - \mathbf{k})$	
$= 4\mathbf{i} + 2\mathbf{j} - 4\mathbf{k}$	
$\overrightarrow{BC} = \overrightarrow{OC} - \overrightarrow{OB}$	
$= 6\mathbf{i} + 3\mathbf{j} - 6\mathbf{k}$	
$= \frac{3}{2}\overrightarrow{BE}$	
Thus, B, C and E are collinear.	1A
(ii) $\overrightarrow{OE} \cdot \overrightarrow{BC} = (\mathbf{i} + \mathbf{k}) \cdot (6\mathbf{i} + 3\mathbf{j} - 6\mathbf{k}) = 0$	
We have $OE \perp BC$.	1M
Required angle is $\angle ODE$.	1M
$\sin \angle ODE = \frac{OE}{OD}$	1M
$= \frac{\sqrt{1^2 + 1^2}}{2^2 + 4^2}$	
$= \frac{1}{\sqrt{10}}$	
$\angle ODE \approx 18.4°$	1A

Solution	Marks
13. (a) (i) $f(0) = I + 0A + (1-1)A^2$	
$= I$	1A
(ii) $A(A^3 + A) = A(\mathbf{0})$	
$A^4 + A^2 = \mathbf{0}$	
$A^4 = -A^2$	1
(iii) $f(\alpha)f(\beta)$	
$= [I + (\sin\alpha)A + (1-\cos\alpha)A^2][I + (\sin\beta)A + (1-\cos\beta)A^2]$	
$= I + (\sin\alpha + \sin\beta)A + [(1-\cos\beta) + \sin\alpha\sin\beta + (1-\cos\alpha)]A^2$	
$+ [\sin\alpha(1-\cos\beta) + (1-\cos\alpha)\sin\beta]A^3 + (1-\cos\alpha)(1-\cos\beta)A^4$	
$= I + (\sin\alpha + \sin\beta)A + (2 - \cos\alpha - \cos\beta + \sin\alpha\sin\beta)A^2$	
$+ (\sin\alpha + \sin\beta - \sin\alpha\cos\beta - \cos\alpha\sin\beta)(-A)$	
$+ (1 - \cos\alpha - \cos\beta + \cos\alpha\cos\beta)(-A^2)$	1M
$= I + (\sin\alpha\cos\beta + \cos\alpha\sin\beta)A + (1 - \cos\alpha\cos\beta + \sin\alpha\sin\beta)A^2$	1M
$= I + \sin(\alpha+\beta)A + [1 - \cos(\alpha+\beta)]A^2$	
$= f(\alpha+\beta)$	1
(iv) Note that $f(\theta)f(-\theta) = f(-\theta)f(\theta) = f(0) = I$.	1M
$f(\theta)$ is invertible.	1
$[f(\theta)]^{-1} = f(-\theta)$	1A
(b) $B^2 = \begin{pmatrix} 0 & -1 \\ 1 & 0 \end{pmatrix}\begin{pmatrix} 0 & -1 \\ 1 & 0 \end{pmatrix} = \begin{pmatrix} -1 & 0 \\ 0 & -1 \end{pmatrix}$	
$B^3 = \begin{pmatrix} -1 & 0 \\ 0 & -1 \end{pmatrix}\begin{pmatrix} 0 & -1 \\ 1 & 0 \end{pmatrix} = \begin{pmatrix} 0 & 1 \\ -1 & 0 \end{pmatrix}$	
$B^3 + B = \begin{pmatrix} 0 & 1 \\ -1 & 0 \end{pmatrix} + \begin{pmatrix} 0 & -1 \\ 1 & 0 \end{pmatrix} = \begin{pmatrix} 0 & 0 \\ 0 & 0 \end{pmatrix}$	1M
Put $A = B$ and $\theta = \frac{\pi}{2}$.	
$f\left(\frac{\pi}{2}\right) = I + \left(\sin\frac{\pi}{2}\right)B + \left(1 - \cos\frac{\pi}{2}\right)B^2$	1A
$= I + B + B^2$	
$(I + B + B^2)^{-1} = f\left(-\frac{\pi}{2}\right)$	
$= I + \left(\sin\frac{-\pi}{2}\right)B + \left(1 - \cos\frac{-\pi}{2}\right)B^2$	1M
$= I - B + B^2$	
We have $p = -1$ and $q = 1$.	
The claim is correct.	1A

END OF PAPER