香 港 考 試 局
HONG KONG EXAMINATIONS AUTHORITY

一九八八年香港中學會考
HONG KONG CERTIFICATE OF EDUCATION EXAMINATION, 1988

附加數學 (卷二)
Additional Mathematics (Paper II)

評卷參考
Marking Scheme

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本評卷參考並非標準答案，故極不宜落於學生手中，以免引起誤會。

遇有學生求取此文件時，閱卷員應嚴予拒絕。閱卷員在任何情況下披露本評卷參考內容，均有違閱卷員守則及「一九七七年香港考試局法例」。

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RESTRICTED 內部文件

SOLUTIONS	MARKS	REMARKS
1. $(1 + 3x)^4(1 - 2x)^5$		
$= [1 + 4(3x) + 6(3x)^2 + \ldots][1 + 5(-2x) + 10(-2x)^2 + \ldots]$	1A+1A	If '...' omitted, withhold 1 mark.
$= [1 + 12x + 54x^2 + \ldots][1 - 10x + 40x^2 + \ldots]$		
$a = 2$	1A	
$b = 40 + 54 - 120$		
$= -26$	2A / 5	
2. (a) P is the point $\left(\frac{7k + 1}{k + 1}, \frac{4k + 2}{k + 1}\right)$	1A+1A	
		Alt. Solution:
(b) Sub. the coordinates of P in $7x - 3y - 28 = 0$,		Intersection of AB and $7x - 3y - 28 = 0$ is $Q(\frac{11}{2}$,
$7\left(\frac{7k + 1}{k + 1}\right) - 3\left(\frac{4k + 2}{k + 1}\right) - 28 = 0$	2M	$\frac{7k+1}{k+1} = \frac{11}{2}$ or $\frac{4k+2}{k+1} = \frac{7}{2}$ ...
$7 + 49k - 6 - 12k - 28k - 28 = 0$		$k = 3$ ....
$9k = 27$		NOTE: No marks awarded for
$k = 3$	1A	$\frac{AQ}{QB} = \frac{3\sqrt{10}/2}{\sqrt{10}/2} = 3$
The ratio is $3 : 1$.	5	
3. The two curves intersect when		
$x(x + 3) = x(5 - x)$		
$x = 0$ or $x = 1$	1A	
Area of shaded region $= \int_0^1 [x(5 - x) - x(x + 3)]dx$	1M+1A	1M for $\int_a^b (f_2(x) - f_1(x))dx$
$= \int_0^1 (2x - 2x^2)dx$		Alt. Solution:
		$\int_0^1 x(5 - x)dx = \frac{13}{6}$
$= [x^2 - \frac{2}{3}x^3]_0^1$	1A	$\int_0^1 x(x + 3)dx = \frac{11}{6}$ ....
$= \frac{1}{3}$	1A	Area $= \frac{13}{6} - \frac{11}{6}$
		$= \frac{1}{3}$ 1
4. $\sqrt{x^2 + y^2} + \sqrt{(x - 6)^2 + y^2} = 10$	1A	
$(10 - \sqrt{x^2 + y^2})^2 = (\sqrt{(x - 6)^2 + y^2})^2$	1M	
$100 - 20\sqrt{x^2 + y^2} + x^2 + y^2 = (x - 6)^2 + y^2$		
$20\sqrt{x^2 + y^2} = 12x + 64$		
$(5\sqrt{x^2 + y^2})^2 = (3x + 16)^2$	1M	
$16x^2 + 25y^2 - 96x - 256 = 0$	2A / 5	

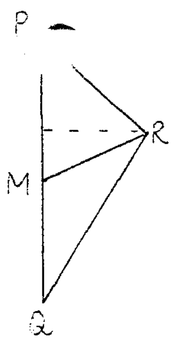
SOLUTIONS	MARKS	REMARKS
5. $n = 1$, L.S. $= 1^2 = 1$		
R.S. $= \frac{1(2-1)(2+1)}{3} = 1$		
The equality holds for $n = 1$.	1	
Assume $1^2+3^2+\ldots+(2k-1)^2 = \frac{k(2k-1)(2k+1)}{3}$ for some positive integer k.	1	
$n = k + 1$,		Alt. Solution:
L.S. $= 1^2 + 3^2 + \ldots + (2k-1)^2 + [(2(k+1) - 1]^2$	1	L.S. $= \ldots$
$= \frac{k(2k-1)(2k+1)}{3} + (2k+1)^2$	1	$= \frac{4k^3+12k^2+11k+3}{3}$
$= \frac{(2k+1)}{3}[2k^2 - k + 3(2k+1)]$		R.S. $= \frac{1}{3}(k+1)(2k+1)(2k+3)$
$= \frac{1}{3}(2k+1)(2k^2+5k+3)$		$= \frac{1}{3}(4k^3+12k^2+11k$
$= \frac{1}{3}(2k+1)(2k+3)(k+1)$		$=$ L.S.
$= \frac{1}{3}(k+1)(2k+1)(2k+3)$	1	
Therefore equality holds for $n = k + 1$.		
By the Principle of Mathematical Induction, the equality holds for all positive integers n.	1 6	Award this mark only if a candidate has scored the first 5 marks.

SOLUTIONS	MARKS	REMARKS
		Alt. Solution:
6. Put $u = 9 - x^3$	1A	Put $v^2 = 9 - x^3$ 1
$du = -3x^2dx$	1A	$2vdv = -3x^2dx$ 1
When $x = 0$, $u = 9$) $x = 2$, $u = 1$)	1A	When $x = 0$, $v = 3$) $x = 2$, $v = 1$)
$\int_0^2 \frac{x^2dx}{\sqrt{9-x^3}}$		$\int_0^2 \frac{x^2dx}{\sqrt{9-x^3}} = \int_3^1 \left(-\frac{2}{3}\right)dv$
		$= [\frac{2}{3}v]_1^3$ 1
$= \int_9^1 \frac{-du}{3\sqrt{u}}$	1A	$= \frac{4}{3}$ 1
$= \frac{1}{3}[\frac{\sqrt{u}}{\frac{1}{2}}]_1^9$	1A	Alt. Solution: Put $x^3 = 9\sin^2\theta$ 1 $3x^2dx = 18\sin\theta\cos\theta d\theta$ 1
$= \frac{4}{3}$	1A 6	When $x = 0$, $\theta = 0$ $x = 2$, $\theta = 1.231$ } 1
		$\int_0^2 \frac{x^2dx}{\sqrt{9-x^3}}$
		$= \int_0^{1.231} 2\sin\theta d\theta$ 1
		$= [-2\cos\theta]_0^{1.231}$ 1
		1.33 1

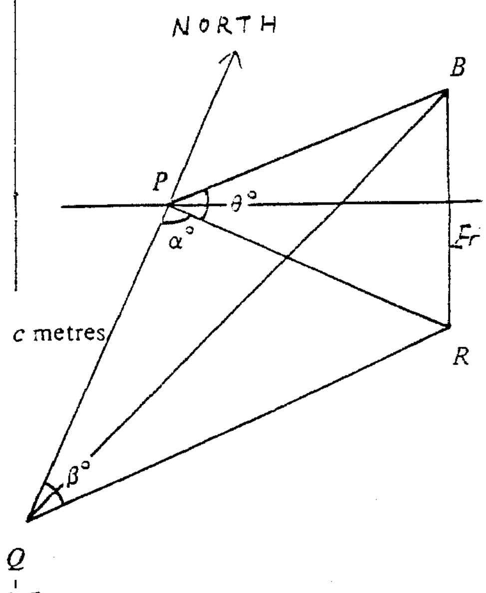
SOLUTIONS	MARKS	REMARKS
7. (a) $\cos\frac{3\pi}{10} = \sin(\frac{\pi}{2} - \frac{3\pi}{10})$	1A	**Alt. Solution:**
$= \sin\frac{2\pi}{10}$	1	$\cos 3\theta = \sin 2\theta$
$\frac{\pi}{10}$ is a root of $\cos 3\theta = \sin 2\theta$.		$\cos 3\theta = \cos(\frac{\pi}{2} - 2\theta)$ 1
Alt. Solution: $\sin\frac{2\pi}{10} = \cos(\frac{\pi}{2} - \frac{2\pi}{10})$ 1A		$3\theta = 2n\pi \pm (\frac{\pi}{2} - 2\theta)$
$= \cos\frac{3\pi}{10}$ 1		$5\theta = 2n\pi + \frac{\pi}{2}$
		$\theta = 2n\pi - \frac{\pi}{2}$
		$\theta = \frac{\pi}{10}$ 1
(b) $\cos 3\theta = \sin 2\theta$		
$4\cos^3\theta - 3\cos\theta = 2\sin\theta\cos\theta$	1A	
$\cos\theta \neq 0$ for $\theta = \frac{\pi}{10}$.		
Therefore, $4\cos^2\theta - 3 - 2\sin\theta = 0$		
$4\sin^2\theta + 2\sin\theta - 1 = 0$	2A	
$\sin\theta = \frac{-2 \pm \sqrt{4 + 16}}{8}$	1A	
As $\sin\frac{\pi}{10} > 0$,		
$\sin\frac{\pi}{10} = \frac{\sqrt{5} - 1}{4}$	1A	
	7	
8. (a) $u = \sin x$		
$du = \cos x\, dx$	1A	
$x = 0$, $u = 0$; $x = \frac{\pi}{2}$, $u = 1$	1A	
$\int_0^{\frac{\pi}{2}} \cos^7 x dx = \int_0^1 (1 - u^2)^3 du$	1A	
$= \int_0^1 (1 - 3u^2 + 3u^4 - u^6) du$	1M	For expanding integrand.
$= [\, u - u^3 + \frac{3}{5}u^5 - \frac{1}{7}u^7 \,]_0^1$		
$= \frac{16}{35}$	1A	
	5	
(b) $\frac{dy}{dx} = \cos^{2n}x + (2n - 1)\cos^{2n-2}x\,(-\sin x)\sin x$	1A	
$= \cos^{2n}x - (2n - 1)\cos^{2n-2}x\sin^2 x$	1A	
Integrating,		
$\int [\cos^{2n}x - (2n-1)\cos^{2n-2}x\sin^2 x] dx = \sin x\cos^{2n-1}x + C$	1M	
$\int [\cos^{2n}x - (2n-1)\cos^{2n-2}x(1 - \cos^2 x)] dx = \sin x\cos^{2n-1}x + C$		
$2n\int\cos^{2n}x dx - (2n-1)\int\cos^{2n-2}x dx = \sin x\cos^{2n-1}x + C$	1	
	4	

SOLUTIONS	MARKS	REMARKS
8. (c) (i) From (b), $2n\int_0^{\frac{\pi}{2}}\cos^{2n}x\,dx-(2n-1)\int_0^{\frac{\pi}{2}}\cos^{2n-2}x\,dx$		
$=[\sin x\cos^{2n-1}x]_0^{\frac{\pi}{2}}$	1A	OR $[\sin x\cos^{2n-1}x+C]_0^{\frac{\pi}{2}}$
$2n\int_0^{\frac{\pi}{2}}\cos^{2n}x\,dx-(2n-1)\int_0^{\frac{\pi}{2}}\cos^{2n-2}x\,dx=0$	1A	For R.S.
$\int_0^{\frac{\pi}{2}}\cos^{2n}x\,dx=\frac{2n-1}{2n}\int_0^{\frac{\pi}{2}}\cos^{2n-2}x\,dx$	1	
(ii) $\int_0^{\frac{\pi}{2}}\cos^6x\,dx=\frac{5}{6}\int_0^{\frac{\pi}{2}}\cos^4x\,dx$	1A	
$=\frac{5}{6}\cdot\frac{3}{4}\int_0^{\frac{\pi}{2}}\cos^2x\,dx$	1A	Alt. Solution:
$\int_0^{\frac{\pi}{2}}\cos^2x\,dx=\frac{1}{2}\int_0^{\frac{\pi}{2}}dx$		$\int_0^{\frac{\pi}{2}}\cos^2x\,dx=\int_0^{\frac{\pi}{2}}\frac{1}{2}(\cos2x+1)dx$
$=\frac{1}{2}[x]_0^{\frac{\pi}{2}}$		$=\frac{1}{2}[\frac{1}{2}\sin2x+x]_0^{\frac{\pi}{2}}$
$=\frac{\pi}{4}$	1A	$=\frac{\pi}{4}$ 1
Therefore, $\int_0^{\frac{\pi}{2}}\cos^6x\,dx=\frac{5}{6}\cdot\frac{3}{4}\cdot\frac{\pi}{4}$		
$=\frac{5}{32}\pi$	1A / 7	
(d) Put $v=\frac{\pi}{2}-x$	1A	
$dv=-dx$; $x=0,\ v=\frac{\pi}{2}$; $x=\frac{\pi}{2},\ v=0$	1A	
$\int_0^{\frac{\pi}{2}}\sin^6x\,dx=\int_{\frac{\pi}{2}}^{0}\sin^6(\frac{\pi}{2}-v)(-dv)$		NOTE: If a cand. claims
$=\int_0^{\frac{\pi}{2}}\cos^6v\,dv$	1A	$\int_0^{\frac{\pi}{2}}\sin^6x\,dx=\int_0^{\frac{\pi}{2}}\cos^6x\,dx$ 1
$=\frac{5}{32}\pi$	1A / 4	$=\frac{5}{32}\pi$ 1
Alt. Solution:		
$\int_0^{\frac{\pi}{2}}\sin^6x\,dx=\int_0^{\frac{\pi}{2}}(1-\cos^2x)^3dx$	1A	
$=\int_0^{\frac{\pi}{2}}(1-3\cos^2x+3\cos^4x-\cos^6x)dx$	1A	
$=[x]_0^{\frac{\pi}{2}}-\frac{3}{2}\cdot\frac{\pi}{2}+3\cdot\frac{3}{4}\cdot\frac{1}{2}\cdot\frac{\pi}{2}-\frac{5}{32}\pi$	1M	For using (c).
$=\frac{5}{32}\pi$	1A	

SOLUTIONS	MARKS	REMARKS
9. (a) In $\triangle PQR$, $\dfrac{PR}{\sin\beta^\circ} = \dfrac{c}{\sin\angle PRQ}$	2A	Accept expressions with no degree measure
$\sin\angle PRQ = \sin(180^\circ - \alpha^\circ - \beta^\circ)$		
$= \sin(\alpha^\circ + \beta^\circ)$	2A	
In $\triangle PBR$, $h = PR\tan\theta^\circ$	1M	
$= \dfrac{c\tan\theta^\circ\sin\beta^\circ}{\sin(\alpha^\circ+\beta^\circ)}$	1 / 6	
(b) (i) In $\triangle PQR$, $\dfrac{QR}{\sin\alpha^\circ} = \dfrac{c}{\sin\angle PRQ}$	1A	
$QR = \dfrac{c\sin 54^\circ}{\sin 80^\circ}$ $(= 0.8215c)$		
$\tan\angle BQR = \dfrac{h}{QR}$	2M	$h = 0.6129c$
$= \dfrac{c\sin 46^\circ\tan 40^\circ}{\sin 100^\circ} \cdot \dfrac{\sin 80^\circ}{c\sin 54^\circ}$		
$\angle BQR = 36.7^\circ$	2A	
(ii) In $\triangle QMR$, $MR^2 = QM^2 + QR^2 - 2QM\cdot QR\cdot\cos 46^\circ$	2M	Alt. Solution:
$MR = 0.5951c$		In $\triangle PQR$, $PR = \dfrac{c\sin 46^\circ}{\sin 80^\circ}$
		$MR^2=PM^2+PR^2-2PM\cdot PR\cos 54^\circ$ 2:
$\tan\angle BMR = \dfrac{BR}{MR}$	1M	
$= \dfrac{c\tan 40^\circ\sin 46^\circ}{\sin 100^\circ} \cdot \dfrac{1}{0.5951c}$		
$\angle BMR = 45.8^\circ$	2A	
In $\triangle PMR$, $\dfrac{\sin\angle PMR}{PR} = \dfrac{\sin 54^\circ}{MR}$	1M	for $\angle PMR$
$\sin\angle PMR = \sin 54^\circ \cdot \dfrac{0.7304c}{0.5951c}$		
$\angle PMR = 83.2^\circ$ or 96.8° (rejected) (Accept $\angle PMR = 83.2^\circ$)	2A	
The bearing of B from M is N83.2°E.	1A / 14	



Alt. Solution:	
In $\triangle QMR$,	
$\dfrac{\sin\angle QMR}{QR} = \dfrac{\sin 46^\circ}{MR}$	1M
$\angle QMR = 96.8^\circ$ or 83.2°	2A
Rejecting 83.2°, the bearing of B from M is N83.2°E .	1A



SOLUTIONS	MARKS	REMARKS
10.(a) $x = a\sin\theta$		
$dx = a\cos\theta d\theta$	1A	
When $x = 0$, $\theta = 0$; $x = a$, $\theta = \frac{\pi}{2}$	1A	
$\int_0^a \sqrt{a^2 - x^2}\, dx = \int_0^{\frac{\pi}{2}} a^2\cos^2\theta d\theta$	1A	
$= \frac{a^2}{2}\int_0^{\frac{\pi}{2}} (1 + \cos2\theta)d\theta$		
$= \frac{1}{2}a^2\,[\theta + \frac{1}{2}\sin2\theta]_0^{\frac{\pi}{2}}$		
$= \frac{\pi a^2}{4}$	1A	
Area of ellipse $= 2\int_{-a}^{a} y dx$	1A	
$= 4\int_0^a b\sqrt{1 - \frac{x^2}{a^2}}\, dx$		
$= \frac{4b}{a}\int_0^a \sqrt{a^2 - x^2}\, dx$		
$= \pi ab$	1A	
	6	
(b) (i) Volume of pebble $= \int_{-1}^{1} \pi y^2 dx$	1A+1M	1A for limits 1M for $\int_a^b \pi y^2 dx$
$= \int_{-1}^{1} \pi(\frac{3}{4})^2(1 - x^2)dx$	1A	
$= \frac{9}{16}\pi[\,x - \frac{x^3}{3}\,]_{-1}^{1}$		
$= \frac{3}{4}\pi$	1A	
(ii) (1) $V = \int_{-b}^{-(b-h)} \pi x^2 dy$	1M+1A	1A for limits 1M for $\int_a^b \pi x^2 dy$
$= \int_{-b}^{-b+h} \pi\cdot 4b^2(1 - \frac{y^2}{b^2})dy$	1A	
$= 4\pi b^2[y - \frac{y^3}{3b^2}]_{-b}^{-b+h}$		
$= 4\pi b^2[-b + h - \frac{(-b+h)^3}{3b^2} + b - \frac{b^3}{3b^2}]$		
$= 4\pi b^2[h - \frac{b}{3} + \frac{b^3 - 3b^2h + 3bh^2 - h^3}{3b^2}]$	1M	for expanding $(b-h)^3$
$= 4\pi b^2[\frac{3bh^2 - h^3}{3b^2}]$		
$= \frac{4\pi h^2}{3}(3b - h)$	1	
$\frac{dV}{dh} = 8\pi bh - 4\pi h^2$	1A	
When $h = \frac{b}{2}$, $\frac{dV}{dh} = 4\pi b^2 - \pi b^2$		
$= 3\pi b^2$	1A	
(2) $\delta V \approx \frac{dV}{dh}\cdot\delta h$	1M	
$\frac{3}{4}\pi \approx 3\pi(5)^2\cdot\ \delta h$	1M	For δV = vol. of pebble in (b)(i)
$\delta h \approx 0.01$ (unit)	1	
	14	

SOLUTIONS	MARKS	REMARKS
11. (a) S lies on the perpendicular through K,		
slope of KS = −5	1A	
$\frac{y-12}{x-1} = -5$	1A	
$5x + y - 17 = 0$		Alt. Solution:
S also lies on the perpendicular bisector of HK:		HS = KS
Mid-point of HK is (−1, 9); Slope of HK = $\frac{12-6}{1-(-3)} = \frac{3}{2}$	1A	$\sqrt{(x+3)^2 + (y-6)^2} = \sqrt{(x-1)^2 + (y-12)^2}$ 1M+
$\frac{y-9}{x+1} = -\frac{2}{3}$	1M+1A	$8x + 12y - 100 = 0$ ....
$-3y + 27 = 2x + 2$		$2x + 3y - 25 = 0$
$2x + 3y - 25 = 0$		
Solving the two equations,		
$x = 2,\ y = 7$	1A	
S is the point (2, 7).		
Equation of C: $(x-2)^2 + (y-7)^2 = (2-1)^2 + (7-12)^2$	1M	
$(x-2)^2 + (y-7)^2 = 26$	1A	
$x^2 + y^2 - 4x - 14y + 27 = 0$		
	8	

Alt. Solution:

Let the equation of C be

$x^2 + y^2 + 2gx + 2fy + c = 0$ 1M

This passes through (1, 12) and (−3, 6).

$1^2 + 12^2 + 2g + 24f + c = 0$ 1A

$9 + 36 - 6g + 12f + c = 0$ 1A

Differentiating the equation of C,

$2x + 2yy' + 2g + 2fy' = 0$ 1M

$2 + 24(\frac{1}{5}) + 2g + 2f(\frac{1}{5}) = 0$ 1A

$5g + f + 17 = 0$

Solving the three equations,

$g = -2,\ f = -7,\ c = 27$ 1A

S is (2, 7). 1A

Equation of C is $x^2+y^2-4x-14y+27 = 0$ 1A

Alt. Solution (Remarks):

$\frac{12+f}{1+g} = -5$ 1M+

$5g + f + 17 = 0$

SOLUTIONS	MARKS	REMARKS
11.(b) Equation of family of circles through A and B:		**Alt. Solution:**
$x^2 + y^2 - 4x - 14y + 27 + k(3x-2y-5) = 0$	1M+1A	Solving eqts. of L and C, $x^2 - 10x + 21 = 0$, $(x-3)(x-7) = 0$
$x^2 + y^2 + (3k-4)x - (14+2k)y + (27-5k) = 0$		$\begin{cases}x=3\\y=2\end{cases}$ or $\begin{cases}x=7\\y=8\end{cases}$
The centre is at $\left(\frac{4-3k}{2}, \frac{14+2k}{2}\right)$	1A	A, B are (3, 2), (7, 8).
This lies on L, therefore $3\left(\frac{4-3k}{2}\right) - 2\left(\frac{14+2k}{2}\right) - 5 = 0$	2M	Radius $= \sqrt{\left(\frac{3k-4}{2}\right)^2+\left(\frac{14+2k}{2}\right)^2-(27-5k)}$ $= \frac{1}{2}AB$ $= \frac{1}{2}\sqrt{(7-3)^2+(8-2)^2}$ $= \sqrt{13}$
$k = -2$	1A	
Required equation is $x^2+y^2-10x-10y+37 = 0$ ...(*)	1A	
	7	
(c) Showing that S lies on the circle (*).	2A	
$\angle ASB = 90°$ ($\angle$ in a semi-circle)	1	

Alt. Solution (1):

A and B are (3, 2) and (7, 8).
S is (2, 7).

$AS^2 + BS^2 = (8-7)^2 + (7-2)^2 + (7-2)^2 + (2-3)^2$
$= 52$ 1A

$AB^2 = (7-3)^2 + (8-2)^2 = 52$ 1A

$AS^2 + BS^2 = AB^2$, $\angle ASB = 90°$ 1

Alt. Solution (2):

A(7, 8), B(3, 2)

slope of AS $= \frac{8-7}{7-2} = \frac{1}{5}$ 1A

slope of BS $= \frac{7-2}{2-3} = -5$ 1A

slope of AS slope of BS = -1, therefore $\angle ASB = 90°$ 1

SOLUTIONS	MARKS	REMARKS
$\angle APB = \frac{1}{2}\angle ASB$ or $180° - \frac{1}{2}\angle ASB$		
$= 45°$ or $135°$	1A+1A	
	5	

SOLUTIONS	MARKS	REMARKS
12.(a) Equation of L: $\frac{y-0}{x+2} = m$	1A	
$y = m(x+2)$		
$y = mx + 2m$		
Since A and B are the intersecting points of L and the parabola $y^2 = 8x$, the coordinates of A and B satisfies the equations of L and the parabola, i.e.		
$y = mx + 2m$ and $y^2 = 8x$.		
Eliminating y, $(mx + 2m)^2 = 8x$	1M	
$m^2x^2 + (4m^2 - 8)x + 4m^2 = 0$	1 3	
$x_1 + x_2 = \frac{8-4m^2}{m^2}$)) .... $x_1x_2 = 4$)	1A	
$(x_1 - x_2)^2 = (x_1 + x_2)^2 - 4x_1x_2$	1A	
$= (\frac{8-4m^2}{m^2})^2 - 16$	1M+1A	
$= 16[\frac{(2-m^2)}{m^2}]^2 - 16$		
$= \frac{16(4-4m^2)}{m^4}$	1A	
$= \frac{64(1-m^2)}{m^4}$	5	

Alt. Solution:

$x = \frac{-(4m^2-8) \pm \sqrt{(4m^2-8)^2 - 4(4m^2)(m^2)}}{2m^2}$	1A
$(x_1 - x_2)^2 = [\frac{2\sqrt{(4m^2-8^2)^2 - 16m^4}}{2m^2}]^2$	2M+1A
$= \frac{64(1-m^2)}{m^4}$	1A

SOLUTIONS	MARKS	REMARKS
12.(c) $y_1 = mx_1 + 2m$) $y_2 = mx_2 + 2m$)	1A	Can be omitted.
$y_1 - y_2 = m(x_1 - x_2)$	2A	
$AB^2 = (x_1 - x_2)^2 + (y_1 - y_2)^2$ $= (x_1 - x_2)^2 + m^2((x_1 - x_2)^2$	1M	
$= (1 + m^2)(x_1 - x_2)^2$) $= \frac{64(1 + m^2)(1 - m^2)}{m^4}$)	1	
	5	

Alt. Solution:

Eliminating x from $y = mx + 2m$ and $y^2 = 8x$.

$my^2 - 8y + 16m = 0$ 1A

$y_1 + y_2 = \frac{8}{m}$)
$y_1y_2 = 16$) 1A

$(y_1 - y_2)^2 = (y_1 + y_2)^2 - 4y_1y_2$

$= (\frac{8}{m})^2 - 64$ 1M

$= \frac{64(1 - m^2)}{m^2}$ 1A

$AB^2 = (x_1 - x_2)^2 + (y_1 - y_2)^2$

$= \frac{64(1 - m^2)}{m^4} + \frac{64(1 - m^2)}{m^2}$

$= \frac{64(1 - m^2)(1 + m^2)}{m^4}$ 1

SOLUTIONS	MARKS	REMARKS
(d) From (c), $AB^2 = 0$ or from (a), D= 0.	1M	
$m^2 - 1 = 0$ $m = \pm 1$	1A+1A	
	3	
(e) L: $y = \frac{\sqrt{3}}{3}x + \frac{2\sqrt{3}}{3}$ $x - \sqrt{3}y + 2 = 0$		
Distance from C to L $= \left\| \frac{2 - \sqrt{3}(0) + 2}{\sqrt{1 + 3}} \right\|$	1M	Absolute value sign optiona
$= 2$	1A	
Length of AB $= \sqrt{\frac{64(1 + \frac{1}{3})(1 - \frac{1}{3})}{\frac{1}{9}}}$ $= 16\sqrt{2}$	1A	
$\triangle ABC = \frac{1}{2}(2)(16\sqrt{2})$ $= 16\sqrt{2}$	1A	
	4	