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Mark Scheme (Results)
January 2009

GCE O Level

AO Level Pure Mathematics (7362) Paper 2

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Pure Mathematics 7362

Paper 2

1	$2x+12=8-2x-x^2$ $x^2+4x+4=0$ $(x+2)^2=0$ Equal roots $\therefore$ tangent.	M1 M1A1 A1 (4)
2	$6(1-\cos^2\theta)-7\cos\theta=1$ $6\cos^2\theta+7\cos\theta-5=0$ $(2\cos\theta-1)(3\cos\theta+5)=0$ $\cos\theta=0.5$, $\theta=\pm 60°$	M1 M1 A1,A1 (4)
3	$3t-t^2=0$ $t=0,\ t=3$ $s=\int_0^3 (3t-t^2)\,\mathrm{d}t=\left[\frac{3t^2}{2}-\frac{t^3}{3}\right]_0^3$ $=13\frac{1}{2}-9=4\frac{1}{2}\,\mathrm{m}$	M1A1 M1A1 A1 (5)
4	(a) $a=3\ \ d=5\ \ \sum=\frac{n}{2}\{6+5(n-1)\}$ $=\frac{n}{2}(5n+1)$ (b) $\frac{n}{2}(5n+1)=648$ $5n^2+n-1296=0$ $(5n+81)(n-16)=0$ (or formula) $n=\frac{-81}{5}$ (not poss as n must be a pos. integer) $\therefore n=16$	M1A1 A1 (3) M1 M1 A1 (3)

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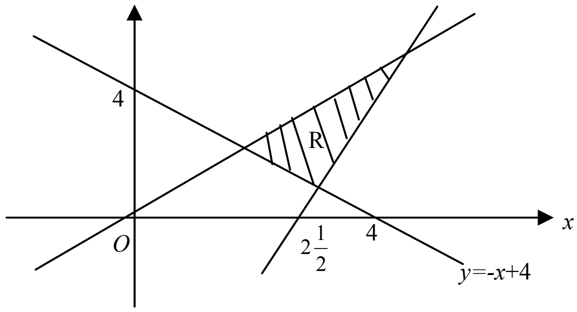
<td>
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G1
G1 (3)</td>
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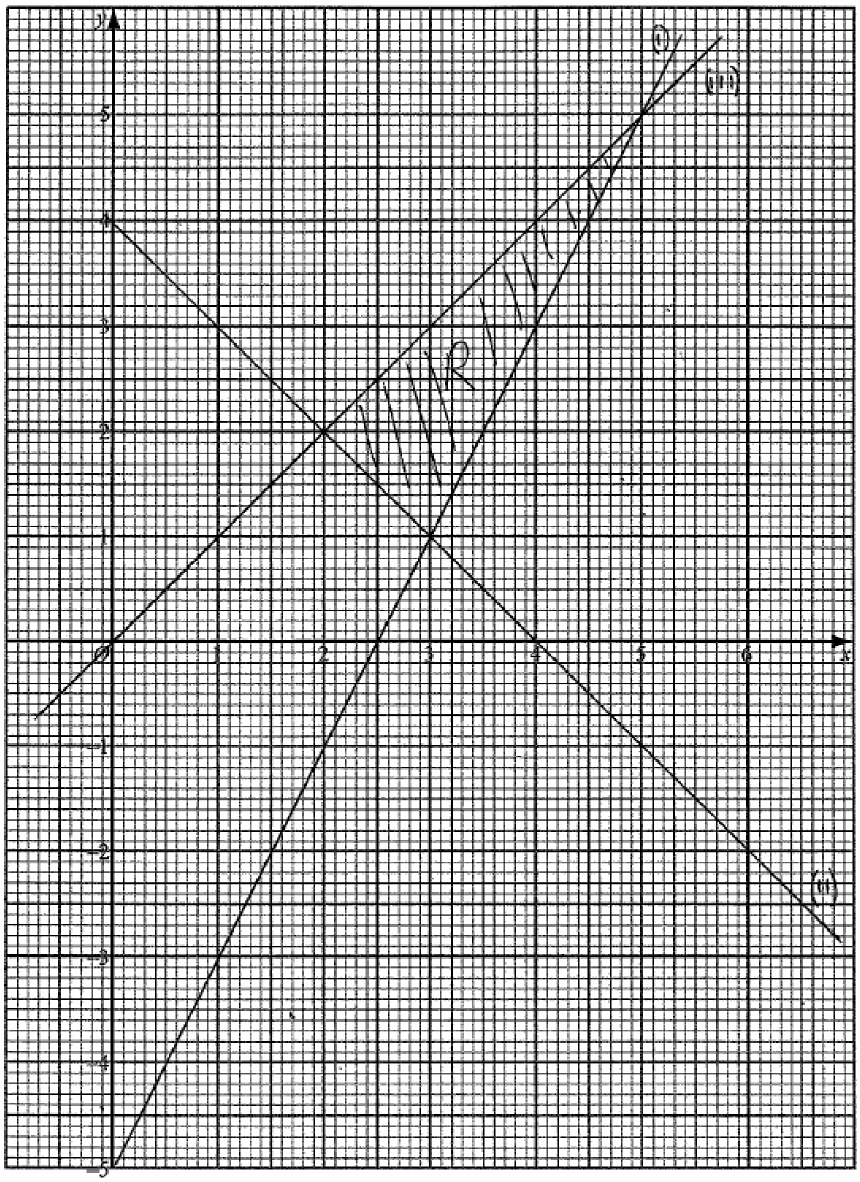
<td>
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6	(a) $y=\frac{1}{8}\left(\frac{y^2}{8}\right)$ $\quad 8^3 y = y^4 \quad y=8 \quad (y=0)$	M1A1 (2)
	(b) 8	B1 (1)
	(c) $V=\pi\int_0^8 8x\,dx-\pi\int_0^8\left(\frac{1}{8}x^2\right)^2 dx, \quad =\pi\int_0^8\left(8x-\frac{1}{64}x^4\right)dx$	M1,A1
	$=\pi\left[4x^2-\frac{1}{5\times64}x^5\right]_0^8$	M1
	$=\pi\left[4\times64-\frac{1}{5\times64}8^5-0\right]=64\pi\times\frac{12}{5}=\frac{768}{5}\pi$	M1A1 (5)
7	(a) $\alpha+\beta=7 \quad \alpha\beta=3$	B1
	$(\alpha^2+1)(\beta^2+1)=\alpha^2\beta^2+(\alpha^2+\beta^2)+1$	M1
	$=\alpha^2\beta^2+(\alpha+\beta)^2-2\alpha\beta+1$	M1
	$=9+49-6+1=53$	A1 (4)
	(b) $\frac{\alpha\beta}{(\alpha^2+1)(\beta^2+1)}=\frac{3}{53}$	B1ft
	$\frac{\alpha}{(\alpha^2+1)}+\frac{\beta}{(\beta^2+1)}=\frac{\alpha\beta^2+\alpha+\beta\alpha^2+\beta}{(\alpha^2+1)(\beta^2+1)}$	M1
	$=\frac{\alpha\beta(\beta+\alpha)+(\alpha+\beta)}{(\alpha^2+1)(\beta^2+1)}=\frac{3\times7+7}{53}=\frac{28}{53}$	M1A1
	$x^2-\frac{28}{53}x+\frac{3}{53}=0$	B1ft (5)
8	(a) $\log_5 p=4 \quad p=5^4=625$	B1 (1)
	(b) $\frac{2}{\log_8 m}+3\log_8 m=7$	M1
	$2+3(\log_8 m)^2=7\log_8 m$	M1
	$3(\log_8 m)^2-7\log_8 m+2=0$	
	$(3\log_8 m-1)(\log_8 m-2)=0$	M1
	$\log_8 m=\frac{1}{3} \quad m=\sqrt[3]{8}=2$	M1A1
	$\log_8 m=2 \quad m=8^2=64$	A1 (6)
	(c) $10\log_x 4-4\log_9 y=38$	
	$3\log_x 16+4\log_9 y=14$	
	$13\log_x 16=52 \quad \log_x 16=4 \quad \log_9 y=\frac{1}{2}$	M1A1A1
	$16=x^4 \quad x=2\,, \quad y=Ö\,9=3$	M1A1,A1 (6)

9				Marks

x	-2	-1	0	0.5	1	1.5	2	2.5
y	-4	**-3.5**	-4	**-3.69**	-2.5	**-0.06**	4	10.06

B2,1,0 (2)

(b) Graph drawn

G2 (2)

x	0.15	0.5	0.75	1	1.25	1.5	1.75	2	2.5
y	-5.54	**-1.58**	-0.11	1	**1.92**	2.72	**3.43**	4.08	5.25

B2,1,0 (2)

(d) Graph drawn — G2 (2)

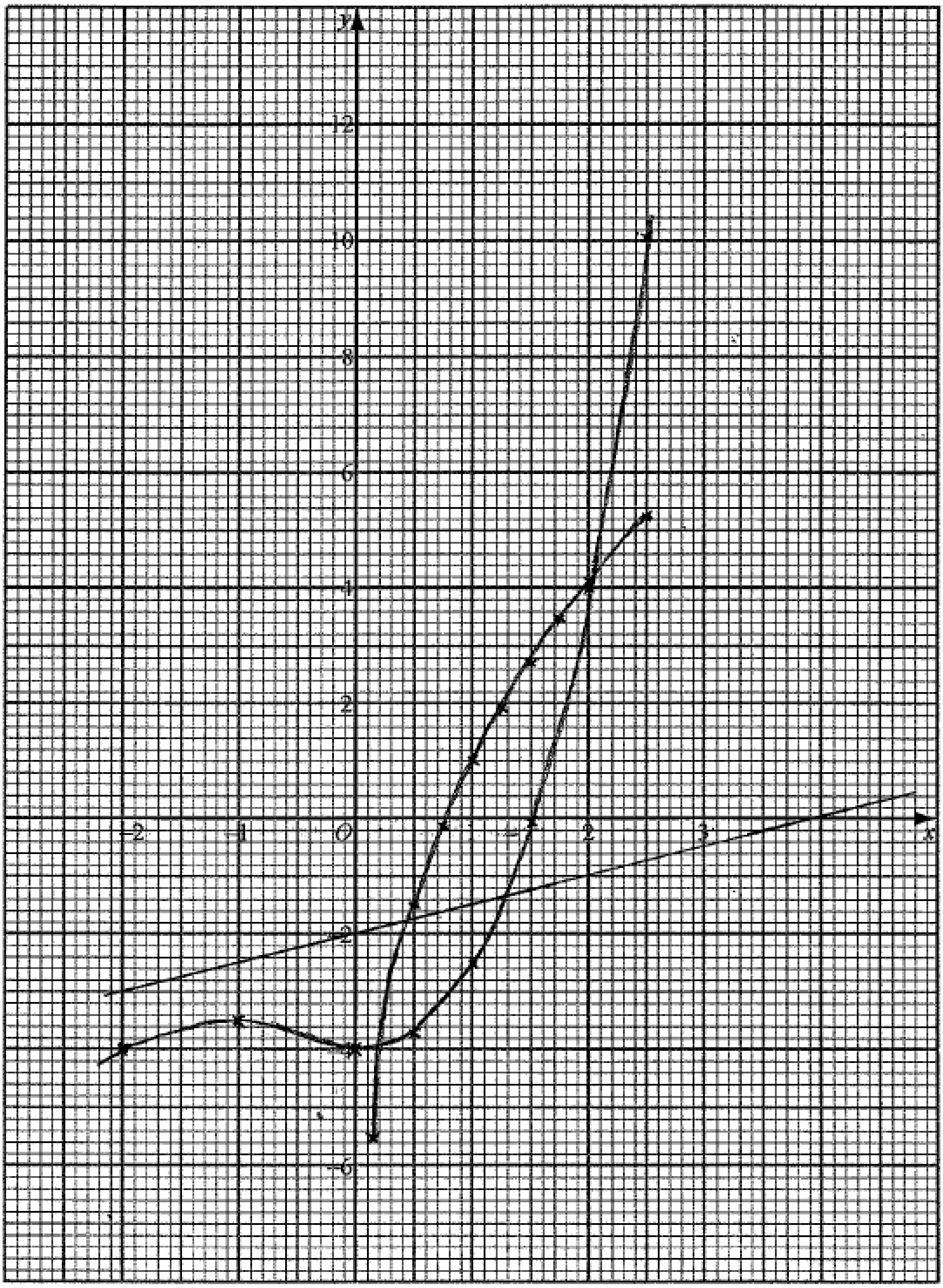
(e) Method to show points of intersection required. — M1

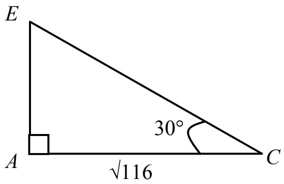
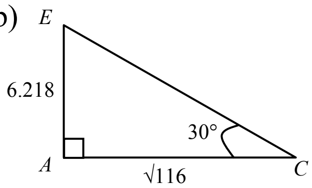
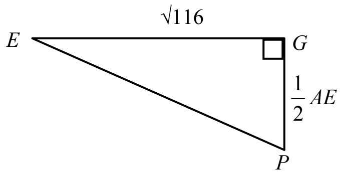
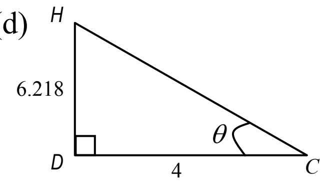
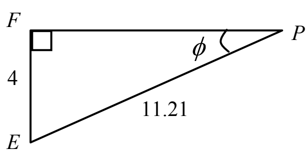
$x = 0.2, \quad 2.0 \ (0.25, \ 2.01)$ — A1 (2)

(f) $\frac{1}{2}x^3 + x^2 - 4 = \frac{1}{2}x - 2,$ — M1A1

draw $y = \frac{1}{2}x - 2 \quad x = 1.3 \quad (1.27)$ — M1A1 (4)

Q9(d)
Graph



10	(a) $\left(1-6x\right)^{\frac{1}{3}}=1-\frac{1}{3}\times 6x+\dfrac{\frac{1}{3}\left(-\frac{2}{3}\right)\left(-6x\right)^2}{2!}+\ldots$	M1
	$=1-2x-4x^2$	A2,1,0 (3)
	(b) $x=\frac{1}{27}\quad 1-\frac{2}{27}-\frac{4}{27^2}=0.920438957$	M1A1
	$\left(1-\frac{6}{27}\right)^{\frac{1}{3}}=\frac{1}{3}\sqrt[3]{21},\quad \sqrt[3]{21}=2.761316=2.76132$	M1A1 (4)
	(c) % error $=\dfrac{\sqrt[3]{21}-\text{ans (b)}}{\sqrt[3]{21}}\times 100\%=(-)0.0868\ldots\%=(-)0.087\%$	M1A1A1 (3)
	(d) $\left(1-2x-4x^2\right)\left(1+x\right)^{-3}\equiv\left(a+bx+cx^2+\ldots\right)$	
	$\left(1-2x-4x^2\right)\left(1-3x+6x^2+\ldots\right)$	M1A1
	$=1-5x+8x^2+\ldots$	M1
	$a=1,\quad b=-5,\quad c=8$	A1A1 (5)
	(e) $\lvert 6x\rvert<1\quad \lvert x\rvert<\frac{1}{6}$	B1
11	(a)  $AC=\sqrt{\left(10^2+4^2\right)}=\sqrt{116}$	M1A1
	$\tan 30°=\dfrac{AE}{\sqrt{116}}$	M1
	$AE=\sqrt{116}\tan 30°=6.218\ldots=6.22\text{ cm}$	A1 (4)
	(b)  $CE=\dfrac{\sqrt{116}}{\cos 30}$	M1A1
	$=12.4\text{ cm}$	A1 (3)
	or $CE^2=116+(6.218)^2$	
	(c)  $EP=\sqrt{\left(116+\left(\dfrac{6.218}{2}\right)^2\right)}$	M1A1
	$=11.21\ldots=11.2\text{ cm}$	A1 (3)
	(d)  $\tan\theta=\dfrac{6.218\ldots}{4}$	M1A1
	$\theta=57.24=57.2°$	A1 (3)
	(e)  right angle at F	B1
	$\sin\phi=\dfrac{4}{11.21}$	M1A1
	$\phi=20.9°$	A1 (4)