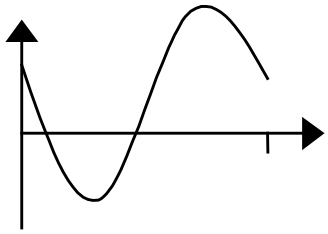
EDEXCEL PURE MATHEMATICS P1 (6671)
PROVISIONAL MARK SCHEME NOVEMBER 2003

Question Number	Scheme	Marks
1.	**(a)** 77 74	B1 B1 (2)
	(b) $d = 74 - 77 = -3$	B1√ (1)
	(c) $S_{50} = \frac{1}{2}n\left[2a + (n-1)d\right] = 25\left[(2\times 77) + (49\times -3)\right]$ $= 175$	M1 A1√ (3) A1 **6**
2.	**(a)** $4x(x+3)$ *or* $x(4x+12)$ (or use of quadratic formula)	M1
	$x = 0$ $x = -3$	A1 A1 (3)
	(b) Using $b^2 - 4ac = 0$ $144 - 16c = 0$ $c = 9$	M1 A1
	$(2x+3)(2x+3) = 0$ $x = \ldots$ (or quadratic formula)	M1
	$x = -\frac{3}{2}$	A1 (4) **7**
3.	$x = 3y - 1$	M1
	$(3y-1)^2 - 3y(3y-1) + y^2 = 11$ $y^2 - 3y - 10 = 0$	M1 A1
	$(y-5)(y+2) = 0$ $y = 5$ $y = -2$	M1 A1
	$x = 14$ $x = -7$	M1 A1√ (7) **7**

Question Number	Scheme	Marks
4.	**(a)** $4x+9, \quad +12\sqrt{x}$	B1, B1 (2)
	(b) $\int\left(4x+12x^{1/2}+9\right)dx = 2x^2+8x^{3/2}+9x$ ($\surd$ dep. on 3 terms)	M1 A1$\surd$
	(c) $[\ldots\ldots]_1^2 = \left(8+(8\times 2^{3/2})+18\right)-(2+8+9)$	M1
	$= 7+16\sqrt{2}$	M1 A1 (5)
		7
5.	**(a)**  Shape	B1
	Position	B1 (2)
	(b) $\left(0,\frac{1}{\sqrt{2}}\right), \quad \left(\frac{\pi}{4},0\right), \quad \left(\frac{5\pi}{4},0\right)$	B1 B1 B1 (3)
	(c) $\left(x+\frac{\pi}{4}=\right) \quad \frac{\pi}{3}$	B1
	Other value $\left(2\pi-\frac{\pi}{3}=\right) \quad \frac{5\pi}{3}$	M1
	Subtract $\frac{\pi}{4} \qquad x=\frac{\pi}{12}, x=\frac{17\pi}{12}$	M1 A1 (4)
		9

Question Number	Scheme	Marks
6.	**(a)** $V = \pi r^2 h = 500, \qquad A = 2\pi rh + \pi r^2$	B1 M1
	$A = 2\pi r\left(\frac{500}{\pi r^2}\right) + \pi r^2 = \pi r^2 + \frac{1000}{r}$ *	M1 A1 (4)
	(b) $\frac{\mathrm{d}A}{\mathrm{d}r} = 2\pi r - 1000r^{-2}$	M1 A1
	$2\pi r - 1000r^{-2} = 0 \qquad r = \sqrt[3]{\frac{500}{\pi}} \qquad (\approx 5.42)$	M1 A1 (4)
	(c) $\frac{\mathrm{d}^2A}{\mathrm{d}r^2} = 2\pi + 2000r^{-3}, \qquad > 0$ therefore minimum	M1 A1√ (2)
	(d) $A = \pi r^2 + \frac{1000}{r} = 277$ (nearest integer)	M1 A1 (2)
		12

Question Number	Scheme	Marks
7.	**(a)** $\frac{5-(-3)}{8-2}=\frac{4}{3}$	M1 A1 (2)
	(b) $M:\ \left(\frac{x_1+x_2}{2},\frac{y_1+y_2}{2}\right)$ $(5,1)$	M1 A1
	Gradient of CM is $-\frac{3}{4}$	B1$\surd$
	Equation of CM: $y-1=-\frac{3}{4}(x-5)$	M1 A1
	$(4y=-3x+19)$	(5)
	(c) When x=4, $y=\frac{7}{4}$	M1 A1$\surd$ (2)
	(d) Radius $=\sqrt{(4-2)^2+\left(\frac{7}{4}+3\right)^2}$	M1 A1$\surd$
	$=\sqrt{4+\frac{361}{16}}=\sqrt{\frac{425}{16}}=\sqrt{\frac{25}{16}}\sqrt{17}=\frac{5\sqrt{17}}{4}$ *	M1 A1 (4)
		13

Question Number	Scheme	Marks
8.	**(a)** $x\left(x^2-6x+5\right)$	M1
	$=x\left(x-1\right)\left(x-5\right)$	M1 A1 (3)
	(b) 1 and 5	B1$\surd$ (1)
	(c) $\dfrac{\mathrm{d}y}{\mathrm{d}x}=3x^2-12x+5$	M1 A1
	At $x=1$. $\dfrac{\mathrm{d}y}{\mathrm{d}x}=3-12+5=-4$	A1 (3)
	(d) $\int\left(x^3-6x^2+5x\right)\mathrm{d}x=\dfrac{x^4}{4}-\dfrac{6x^3}{3}+\dfrac{5x^2}{2}$	M1 A1
	$\left[\ldots\ldots\right]_0^1=\dfrac{1}{4}-2+\dfrac{5}{2}\quad\left(=\dfrac{3}{4}\right)\qquad R$	M1 A1$\surd$
	Evaluating at 5: $\dfrac{625}{4}-250+\dfrac{125}{2}\quad\left(=-31\dfrac{1}{4}\right)$	A1
	To find S: $-31\dfrac{1}{4}-\dfrac{3}{4}=-32$	M1
	Total Area $=32+\dfrac{3}{4}=32\dfrac{3}{4}$	A1 (7)
		14