

June 2006 Intake Paper 1 (FM1) [Examination date: 30 August 2007]

1.	$(xy)^{2n} = (x^2 + y^2)^{n-1} (x^n + y^n)^2$
2.	$128n^4 + 576n^3 + 908n^2 + 585n$
3.	$\frac{e+1}{4}$
4.	$y = e^{-3x} (A \cos 4x + B \sin 4x) + e^x$
5.	SHOW
6.	$\mathbf{r} = s \begin{pmatrix} 0 \\ -1 \\ 1 \end{pmatrix}, \quad \mathbf{r} = s \begin{pmatrix} -1 \\ 0 \\ 1 \end{pmatrix}$
7.	$2605u^4 - 2331u^3 + 847u^2 - 142u + 9 = 0$
8.	$357 \frac{1095}{3136} \pi$
9.	$I_3 = \frac{1}{2} \tan x \sec x + \frac{1}{2} \ln \sec x + \tan x + C ;$ $I_4 = \frac{2}{3} \tan x + \frac{1}{3} \tan x \sec^2 x + C \quad \text{OR} \quad I_4 = \frac{1}{3} \tan^3 x + \tan x + C$
10.	<p>Asymptotes : $y = 5$, $x = 1$ and $x = -9$.</p> <p>Turning points : Minimum $\left(-1, 12\frac{1}{2}\right)$ and Maximum $\left(4\frac{1}{3}, 7\frac{7}{10}\right)$.</p> <p>The curve crosses the axes at points : $\left(0, 13\frac{1}{3}\right)$, $\left(\frac{-17 + \sqrt{385}}{2}, 0\right)$ and $\left(\frac{-17 - \sqrt{385}}{2}, 0\right)$.</p>
11E.	$\frac{\cos \frac{(n+1)\theta}{2} \sin \frac{n\theta}{2}}{\sin \frac{\theta}{2}}$
11O.	a) $y = x\sqrt{2} + \frac{\pi}{4}(1 - \sqrt{2})$; (b) -1