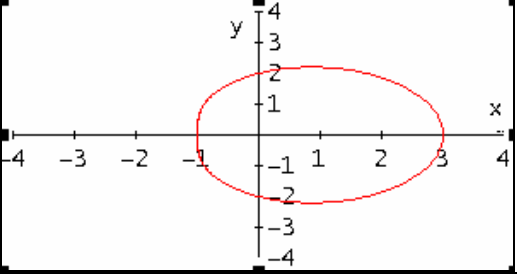
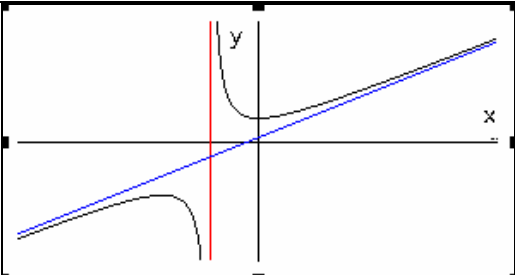


**June 2005 Intake Paper 1 (FM1) [Examination date: 29 August 2006]**

1.	$4\pi a^2$
2.	$\frac{1}{r} - \frac{2}{r+2} + \frac{1}{r+3}$ ; $\frac{7}{6} - \frac{1}{n+1} - \frac{1}{n+2} + \frac{1}{n+3}$
3.	ii) $\frac{16}{15\pi}$
4.	PROVE
5.	$\frac{1}{12}$
6.	$\frac{5\pi}{8}$
7.	i) $y = \frac{3}{a}e^{ax} + \frac{1}{a}e^{ax}$ ; (ii) $y = Ae^x + Be^{2x} + 3\cos x + \sin x$
8.	<div> <div>i) -12</div> <div>(ii)</div> <div>  </div> <div>Area = <math>\frac{9\pi}{2}</math></div> </div>
9.	PROVE
10.	<div> <div> i) <math>y = 2x + 1</math> ; <math>x = -2</math>  ii) Max. <math>(-4, -11)</math> ; Min. <math>(0, 5)</math>  iii) Intersection <math>(0, 5)</math> </div> <div>  </div> </div>
11E.	i) $\frac{15}{\sqrt{62}}$ (ii) $\begin{pmatrix} \frac{71}{31} \\ \frac{40}{31} \\ \frac{58}{31} \end{pmatrix} + \lambda \begin{pmatrix} 2 \\ 7 \\ -3 \end{pmatrix}$ (iii) $\frac{\sqrt{60294}}{62}$
11O.	a) 3 ; $\left\{ \begin{pmatrix} 1 \\ 1 \\ 1 \\ -1 \end{pmatrix} \right\}$ (b) i) $\lambda_1 = 1, \mathbf{e}_1 = \begin{pmatrix} 1 \\ 0 \\ 0 \end{pmatrix}$ ; $\lambda_2 = 2, \mathbf{e}_2 = \begin{pmatrix} 3 \\ 1 \\ 0 \end{pmatrix}$ ; $\lambda_3 = -3, \mathbf{e}_3 = \begin{pmatrix} 1 \\ 8 \\ 5 \end{pmatrix}$