The Open University of Sri Lanka
Foundation Course in Science – Level 02
Open Book Test (OBT) 2004/2005
MAF 2301/MAE 2301 - Pure Mathematics

Duration :- One and Half Hours.

Date :- 13-02-2006 **Time:- 1.30 p.m. – 3.00 p.m.**

Answer All Questions.

01. (a) Prove that $\frac{d}{dx}\left(2\sqrt{ax^2+bx+c}\right)=\frac{2ax+b}{\sqrt{ax^2+bx+c}}$.

Hence show that $\int \frac{2ax+b}{\sqrt{ax^2+bx+c}}dx=\left(2\sqrt{ax^2+bx+c}\right)+k$.

Hence evaluate $\int \frac{2x+1}{\sqrt{x^2+x-1}}dx$.

02. (a) Evaluate,

(i) $\int_0^1 \left(x^2-1\right)\left(\sqrt{x}-\frac{1}{\sqrt{x}}\right)^2 dx.$

(ii) $\int_0^{\pi/4} \sin 3x(1+\cos 3x)dx.$

(iii) $\int_0^{3/4} 2x\sqrt{1+x^2}\,dx.$

03 (a) Prove by Induction $1+2+3+4+\ldots+n=\frac{n}{2}(n+1)$.

(b) Hence find the sum $\sum_{r=1}^{n} r(r+1)$.