Math 102
Calculus B

Second Exam

Summer 2005
Time: 75 mins.

Use of calculators is not allowed in this exam. Please switch off your mobile phones.

1. Evaluate the following integrals:

a. $\displaystyle\int e^{\sqrt{x}}\, dx$ [4 pts]

b. $\displaystyle\int \cos^3 x \, \sqrt{\sin^3 x}\, dx$ [4 pts]

c. $\displaystyle\int \frac{1}{x\sqrt{x^4-9}}\, dx$ [4 pts]

d. $\displaystyle\int \frac{1}{2\cos x + \sin x - 2}\, dx$ [4 pts]

e. $\displaystyle\int_{-\infty}^{-1} \frac{1}{\sqrt[3]{(x-7)^4}}\, dx$ [3 pts]

2. Show that $f(x) = \pi + \ln(\cos x)$, where $x \in \left(0, \frac{\pi}{6}\right)$, represents a curve of length $\ln\sqrt{3}$. [3 pts]

3. Let $y = f(x) = \tan^{-1}(1+x)$, where $x \in [0, -1+\sqrt{3}]$. Set up the integral that gives the area of the resulting surface when the graph of $f(x)$ is revolved around the y-axis – do NOT evaluate the integral. [3 pts]