Integrated Calculus II: Quiz 2 January 28th 2005

Name: Signature:

Show your work

Question 1

Plot the parabolas $y = x^2 - 4x + 3$ and $y = 9 - x^2$, find where they meet and find the area enclosed between them.

Question 2

Consider the integral $\int_{1}^{4} xe^{4x} \, dx$.
Write out the integration by parts procedure for this integral and hence evaluate the integral:

- $u =$
- $dv =$
- $du =$
- $v =$
Question 3

A body of mass $m = 6$ kilograms is initially (at time zero) at rest at the origin. The body is acted upon by a force vector $\vec{F}$ given as follows, at any time $t$ seconds (units are metric):

$$\vec{F} = \left[ \frac{12t}{(t^2 + 1)^2}, \ 24 \cos(t) \right].$$

- Find its velocity and position vectors at time $t$.
- Find its speed after 5 seconds.