TECHNICAL CALCULUS

Exam 1

February 18, 1994

1. Find the slope of a line tangent to $y = \dfrac{2\sin 3x}{x}$ at $x = \dfrac{\pi}{6}$.

2. $\tan(\arcsin \dfrac{1}{\sqrt{2}}) =$

3. Find the magnitude and direction of the velocity of the object which moves so that $x = \sin(2\pi t)$, $y = 2\cos^2(\pi t)$ at $t = \dfrac{13}{12}$.

4. Find the area of the largest rectangle which can be inscribed under the curve $y = e^{-x^2}$ in the first quadrant.

5. $y = x^2(e^{\cos 2x})^2\,,\ y' =$

6. $\int_0^{\pi/6} \frac{\tan x}{\cos^2 x}\ dx$

7. $\int \frac{2x + \sin 2x}{x^2 + \sin^2 x}\ dx$

8. $\int \frac{1 - \sin x}{x + \cos x}\ dx$

9. $\int (\sin x + \cos x)^2 dx$

10. $\int \frac{4x dx}{\sqrt{3 - 2x^2}}$