Exam 5a Calculus I 804-231-005 Spring 2009 /100

Name _____

Each problem is worth 25 points. To receive full credit you **must show** or attach your work!

1. Evaluate the following intgrals:

a) $\int_0^4 \frac{2t}{\sqrt{4t^2+36}}\,dt$ = _____

b) $\int \frac{\tan(\sqrt{x})}{\sqrt{x}}\,dx$ = _____

c) $\int e^{-\cos(2x)}\sin(2x)dx$ = _____

2. Given the following functions, compute the derivatives:

a) $F(z) = \frac{1}{\sqrt{2\pi}}\int_0^z e^{-t^2/2}dt = \frac{1}{\sqrt{2\pi}}\int_0^z \exp(-\frac{t^2}{2})dt$ $F'(z)$ = _____

b) $H(x) = \int_0^{\cos(x)} \frac{\cos^{-1}(t)}{t^2+1}\,dt$ $H'(x)$ = _____

3 Evaluate the following limits by equating them to definite integrals:

a) $\lim_{n \to \infty} \sum_{j=1}^{n} \frac{\pi}{n} \sin\left(\frac{j\pi}{n}\right)$ = _____

b) $\lim_{n \to \infty} \sum_{k=1}^{n} \frac{2}{n} \left(\frac{2k}{n}\right)^7$ = _____

4. Solve the following differential equation subject to the given condition and sketch the solution:

$\frac{dy}{dx} = -2xy$ with $y = 4$ when $x = 0$