Math 105 Practice Midterm1, Spring 2011

1. Short answer questions

(1) Let $f(x) = \int_x^{x^2} \sqrt{t^4+1}\, dt$. Compute $f'(1)$.

(2). Find the numbers b such that average value of the function $f(x) = 3x^2 - 6x + 2$ on $[0,\, b]$ is equal to 0.

(3). Write out the Trapezoid Rule approximation for $\int_1^4 x \cdot \cos(\frac{\pi}{x})\, dx$ with $n = 3$.

2. Find $\int_0^1 e^{(2x+e^x)}\, dx$.

3. Find the average value of $|\sin\theta - \cos\theta|$ on $[0,\, \frac{\pi}{2}]$.

4. Evaluate (1). $\int x(\ln x)^2\, dx$, (2). $\int \frac{4x+4}{x(x+1)^2}\, dx$.

5. Find a function $f(x)$ whose graph goes through the point $(0,\, 3)$ and whose slope at any point $(x,\, f(x))$ is

$$\lim_{n\to\infty}[(1+(1+2\frac{x}{n})^3+(1+2\frac{2x}{n})^3+(1+2\frac{3x}{n})^3+...+(1+2\frac{(n-1)x}{n})^3)]\cdot\frac{x}{n}.$$