MATH 273 CALCULUS III FALL 2008 WORKSHEET III NAME:_____
(please print legibly)

1. Find the following:

A. $\int \frac{2x-5}{x^2+4}dx$

B. $(\frac{d}{dx}\left(\int_1^x (7t^2-5t+3)dt\right)$

C. $\int (\frac{x^5-3x^4}{2x^3})dx$

D. $\int x^2 \sin(x)dx$

E. $\int_2^{\infty} \frac{1}{(4x-1)^3}dx$

2. Find the following:

A. $\lim_{x\longrightarrow\infty} \frac{4x^2}{e^x}$

B. $\lim_{x\longrightarrow\infty} \frac{e^x}{4x^2}$

C. $\lim_{x\longrightarrow\infty} (1+\frac{5}{2x})^{\frac{5x}{2}}$

3. Claim: Let us consider the well defined sequence such that $f: \mathbb{N} \longrightarrow \mathbb{R}$ where *f* is defined by $\left\{\frac{k(\cos(k\pi))}{2k+1}\right\}_{k=1}^{\infty}$. f is monotone and bounded. Show it is so or it is not so.

4. Claim: Let *g* be a well defined sequence such that $g: \mathbb{N} \longrightarrow \mathbb{R}$ where $g_n = \frac{1}{(n-0.5)^3}$.

g is monotone and bounded. Show it is so or it is not so.

5. Consider $\{h_n\}_{n=1}^{\infty}$ э $h_n = \frac{5}{n^2(n+1)}$

A. Find the first four terms of $\{h_n\}_{n=1}^{\infty}$ in simplified form.

B. Now consider $\sum_{n=1}^{\infty} h_n$ э $h_n = \frac{5}{n^2(n+1)}$. Does $\sum_{n=1}^{\infty} h_n$ converge or diverge?

C Let P be the sequence of partial sums from $\sum_{n=1}^{\infty} h_n$ Find the first four terms of the sequence of partial sums

6. Consider $\{j_n\}_{n=1}^{\infty}$ ∋ $j_n = \frac{8}{10^n}$

A. Find the first four terms of $\{j_n\}_{n=1}^{\infty}$ in simplified form.

B. Now consider $\sum_{n=1}^{\infty} j_n$ ∋ $j_n = \frac{8}{10^n}$. Does $\sum_{n=1}^{\infty} j_n$ converge or diverge? If it converges, to where does it converge?

C. Let P be the sequence of partial sums from $\sum_{n=1}^{\infty} j_n$ Find the first four terms of the sequence of partial sums

7. Consider the following series. Show each either converges or diverges. Cite the test used.

A. $\sum_{k=5}^{\infty} \frac{3}{(k-1)(k-2)}$

B. $\sum_{n=1}^{\infty} \frac{6^n}{7^n+1}$

C. $\sum_{n=2}^{\infty} \frac{n+1}{n^4-1}$

D. $\sum_{k=1}^{\infty} \frac{5}{k^2(k+1)}$