Math 2320 - Quiz 5

Name:_____

1. $\int \frac{x^3+2x^2-4x+4}{(x^2+4)x^2}\,dx$
2. $\int_1^\infty \frac{1}{x}\,dx$
3. $\int_1^\infty \frac{1}{\sqrt{x}}\,dx$
4. $\int_1^\infty \frac{1}{x^2}\,dx$
5. Some Sequences: Find the following limits
   (a) $\lim_{n\to\infty} \frac{n^3}{n^2}$
   (b) $\lim_{n\to\infty} \frac{n^3}{2^n}$
   (c) $\lim_{n\to\infty} \left[\frac{n^3+1}{3n^3-n+1}\right]^{1/n}$
   (d) $\lim_{n\to\infty} \left[1-\frac{1}{n}\right]^n$
   (e) $\lim_{n\to\infty} \left[1-\frac{1}{n^2}\right]^n$
   (f) $\lim_{n\to\infty} \left[1-\frac{1}{n}\right]^{n^2}$
   (g) $\lim_{n\to\infty} \left[1+\frac{1}{n}\right]^{n^2}$
6. Some Series
   (a) $\sum_{k=1}^{\infty} \frac{1}{k} - \frac{1}{k+2}$
   (b) $\sum_{k=1}^{\infty} 3^{-k}$
   (c) $\sum_{k=1}^{\infty} \frac{1}{3^{-k}}$

(d) $\displaystyle\sum_{k=17}^{\infty} 11 \cdot 3^{-k}$

(e) $\displaystyle\sum_{k=1}^{\infty} \frac{2^k + 3^k}{4^k}$

(f) $\displaystyle\sum_{k=1}^{\infty} \frac{4^k}{2^k + 3^k}$

(g) $9, -3, 1, -\frac{1}{3}, -\frac{1}{9}, \ldots$

(h) $\displaystyle\sum_{k=1}^{\infty} \frac{1}{1 + k^2}$ Use the integral test

(i) $\displaystyle\sum_{k=17}^{\infty} \frac{1}{k \ln(k)}$ Use the integral test

(j) $\displaystyle\sum_{k=17}^{\infty} \frac{k^3 + 1}{3k^3 - k + 1}$

(k) $\displaystyle\sum_{k=17}^{\infty} \left[1 + \frac{1}{k}\right]^{2k}$