MATH 2320 Test 3

Name:_____

No calculators, no phones, no electronics allowed.

1. $\displaystyle\int \frac{2x^2 - 7x - 14}{(x-5)(x^2+1)}\,dx$

2. Compute the following limits

(a) $\lim_{x \to 0^+} (1 + 3x^2)^{x^2}$

(b) $\lim_{n \to \infty} \frac{\ln(n^2 + 1)}{\sqrt{n} + 1}$

3. State whether or not the following series converge or diverge, what test you used, what criteria was satisfied and show your work.

(a) $\displaystyle\sum_{n=1}^{\infty} \frac{n+1}{n+2} - \frac{n}{n+1}$

(b) $\displaystyle\sum_{n=1}^{\infty} \left(\frac{5}{6}\right)^n$

(c) $\displaystyle\sum_{n=1}^{\infty} \frac{n+1}{n+2}$

(d) $\displaystyle\sum_{n=1}^{\infty} ne^{-n^2}$

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

(f) $\displaystyle\sum_{n=1}^{\infty} \frac{1}{n}$

(g) $\displaystyle\sum_{n=1}^{\infty} (-1)^n \frac{1}{n}$

(h) $\displaystyle\sum_{n=1}^{\infty} \frac{2^n}{n!}$

(i) $\displaystyle\sum_{n=1}^{\infty} \left(1 - \frac{3}{n}\right)^{n^2}$