Math 2320 - Practice Test 2

1. $\int \frac{1}{x(\ln(x)+5)}dx$

2. $\int x^2 \ln(x) dx$

3. $\int \sin^4(3x)dx$

4. $\int \frac{1}{\sqrt{x^2-4}} dx$

5. Determine if the series converges or diverges, state the test used, the criteria satisfied and, as always, show your work. If the series converges, what is the sum?

(a) $\sum_{k=1}^{\infty} 2^k$

(b) $\sum_{k=1}^{\infty} \frac{1}{k} - \frac{1}{k+2}$

6. Determine if the series converges or diverges, state the test used, the criteria satisfied and, as always, show your work.

(a) $\displaystyle\sum_{n=1}^{\infty} \frac{\sqrt{k}+1}{\sqrt{4k^2+1}}$

(b) $\displaystyle\sum_{k=1}^{\infty} ke^{-k}$ Use integral test.

(c) $\sum_{k=1}^{\infty} \frac{1}{k^{11}}$

(d) $\sum_{k=1}^{\infty} \frac{k}{k^3+1}$

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

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

(g) $\displaystyle\sum_{n=1}^{\infty} \left(1 + \frac{4}{n^2}\right)^{n^2}$

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

7. What are the radii and intervals of convergence of the following power series.

$$\sum_{n=1}^{\infty} \frac{n+1}{2n^3+5} x^n$$

8. Find the Taylor series from the definition

$f(x) = e^{3x}$ at $x = 0$