Math 1b Sum. 2019 - 8/7/19

Final Review 2 - General review **Name:**

Solve the following integrals

(1) $\int e^x \sin x \, dx$

(2) $\int \frac{x^4 + x^3 - x^2 + 1}{(x^2+1)(x+2)} \, dx$

(3) $\int \cos x \sqrt{1 + \sin^2 x} \, dx$

(4) $\int \frac{1}{1 + \sin x} \, dx$

(5) $\int \sin^4 x \cos^3 x \, dx$

Determine whether the following **sequences** converge or diverge. If the sequence converges determine its limit.

(1) $a_n = \dfrac{\log n}{n}$

(2) $a_n = \dfrac{n^4}{3^n}$

(3) $a_n = \sin(n+1)$

(4) $a_n = \dfrac{3^n - n^2}{2^n + n^5 - n}$

(5) $a_n = \arctan\left(\dfrac{n^2+1}{n}\right)$

Determine whether the following **series** converge absolutely, converge conditionally or diverge.

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

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

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

(4) $\sum_{n=1}^{\infty} \frac{1}{\sqrt{1+n^8}}$

(5) $\sum_{n=1}^{\infty}(-1)\frac{3^n + n}{3^{n+1} - 1}$

Determine the Taylor series for the given function about the indicated center.

(1) $f(x) = \dfrac{x}{e^{x^2}}, \quad x = 0$

(2) $f(x) = \log\left(\sqrt{1-3x}\right), \quad x = 0$

(3) $f(x) = \dfrac{x^2}{3-x}, \quad x = 2$

(4) $f(x) = (1+x)e^x, \quad x = 0$

(5) $f(x) = \dfrac{1}{x^2+1}, \quad x = 1$