Math 232 Calculus 2 Fall 21 Sample midterm 2

(1) Find $\int \sin^3 3x \; dx$.

(2) Find $\int \cos 8x \cos 3x \; dx$.

(3) Find $\int \dfrac{x}{\sqrt{x^2+9}} dx$.

(4) Find $\int \dfrac{x^2+5}{(x+1)^2(x-2)} dx$.

(5) Find $\int_0^1 x^2 \ln x^3 \; dx$.

(6) Find $\int_0^2 \dfrac{x}{x-1} \; dx$.

(7) Find $\int_0^\infty \dfrac{1}{16x^2+1} \; dx$.

(8) Can you find the degree three Taylor polynomial centered at $x = 0$ for the function $f(x) = \sqrt[3]{x}$, why or why not? Find the degree three Taylor polynomial for this function centered at $x = 1$. Find an error bound for the approximation for $\sqrt[3]{2}$.

(9) Does the sequence $a_n = \dfrac{3^n}{n!}$ converge or diverge?

(10) Does the series $\sum_{n=1}^{\infty} e^{-2n}$ converge or diverge? If it converges, find the exact value.

(11) Does the series $\sum_{n=1}^{\infty} \dfrac{1}{n^2+5n+6}$ converge or diverge? If it converges, find the exact value.

(12) Does the series $\sum\limits_{n=1}^{\infty} \cos(\frac{1}{n^2})$ converge or diverge?

(13) Does the series $\sum\limits_{n=1}^{\infty} \frac{(\ln n)^2}{n^3}$ converge or diverge?

(14) Does the series $\sum\limits_{n=1}^{\infty} \frac{3^n}{n!}$ converge or diverge?

(15) Does the series $\sum\limits_{n=1}^{\infty} \frac{n\cos n}{n^4 + 1}$ converge or diverge?

(16) Does the series $\sum\limits_{n=1}^{\infty} \frac{n^3}{n^4 + 1}$ converge or diverge?

(17) For which values of x does the series $\sum\limits_{n=1}^{\infty} \frac{x^n}{n^3}$ converge?

(18) Find the first three terms for the power series for $\sin(\sqrt{x})$ centered at $x = 1$.

(19) Find the first three non-zero terms of the power series centered at 0 for $x^3 e^{-x^3}$.