

Math 232 Calculus 2 Spring 25 Sample midterm 2

- (1) Find $\int \cos^3 3x \, dx$.
- (2) Find $\int \cos 6x \sin 5x \, dx$.
- (3) Find $\int \frac{x}{\sqrt{x^2 + 16}} dx$.
- (4) Find $\int \frac{4 - x^2}{(x + 2)^2(x - 1)} dx$.
- (5) Find $\int_0^1 x^3 \ln x^4 \, dx$.
- (6) Find $\int_0^2 \frac{x}{1 - x} \, dx$.
- (7) Find $\int_0^\infty \frac{1}{4x^2 + 1} \, dx$.
- (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 $a_n = \frac{3^n}{n!}$ converge or diverge?
- (10) Does the series $\sum_{n=1}^{\infty} \frac{3^n}{n!}$ converge or diverge?
- (11) Does the series $\sum_{n=1}^{\infty} e^{-3n}$ converge or diverge? If it converges, find the exact value.

- (12) Does the series $\sum_{n=1}^{\infty} \frac{1}{n^2 + 3n + 2}$ converge or diverge? If it converges, find the exact value.
- (13) Does the series $\sum_{n=1}^{\infty} \cos(\frac{1}{n^3})$ converge or diverge?
- (14) Does the series $\sum_{n=1}^{\infty} \frac{(\ln n)^2}{n^3}$ converge or diverge?
- (15) Does the series $\sum_{n=1}^{\infty} \frac{n \sin n}{n^4 + 1}$ converge or diverge?
- (16) Does the series $\sum_{n=1}^{\infty} \frac{\sqrt{n}}{n + 1}$ converge or diverge?
- (17) For which values of x does the series $\sum_{n=1}^{\infty} \frac{x^n}{n^3}$ 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 $x^3 e^{-x^3}$.
- (20) Find the power series for $\sin(x^2)/x$.
- (21) Find the first three terms of the power series for \sqrt{x} centered at $x = 4$ and use this to estimate $\sqrt{3}$. Find an error bound for your estimate.