

Calculus II

Name: \_\_\_\_\_

Study Guide 32

Class: \_\_\_\_\_

Due Date: \_\_\_\_\_

Score: \_\_\_\_\_

No Work  $\Leftrightarrow$  No Points

Use Pencil Only  $\Leftrightarrow$  Be Neat & Organized

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1. Use the power series  $\frac{1}{1-x} = \sum_{n=0}^{\infty} x^n, |x| < 1$  to express the following functions as power series and give the interval of convergence.

(a) (3 points)  $f(x) = \frac{2}{1-4x^2}$ .

(a) \_\_\_\_\_

(b) (4 points)  $f(x) = \frac{x}{10+x}$ .

(b) \_\_\_\_\_

2. (5 points) Use partial fractions to express  $f(x) = \frac{x+2}{2x^2-x-1}$  as the sum of power series. Give the interval of convergence.

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2. \_\_\_\_\_

3. Consider  $f(x) = \frac{1}{1-x}$ .

(a) (3 points) Find  $f'(x)$ .

(a) \_\_\_\_\_

(b) (5 points) Express  $f'(x)$  as a power series. Determine the radius of convergence.

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(b) \_\_\_\_\_

4. Consider  $f(x) = \frac{1}{1+x^2}$ .

(a) (3 points) Find  $\int f(x) dx$ .

(a) \_\_\_\_\_

(b) (5 points) Express  $\int f(x) dx$  as a power series. Determine the radius of convergence.

(b) \_\_\_\_\_

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5. (6 points) Express  $\int \frac{\tan^{-1} x}{x} dx$  as a power series. Give the interval of convergence.

5. \_\_\_\_\_

6. Find a power series representation for the following functions and determine the radius of convergence.

(a) (5 points)  $f(x) = \ln(4 - x)$ .

(a) \_\_\_\_\_

(b) (5 points)  $f(x) = \tan^{-1} x^2$ .

(b) \_\_\_\_\_

(c) (6 points)  $f(x) = \left(\frac{x}{1-x}\right)^3$ .

(c) \_\_\_\_\_

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