

MiniTest 4 - MTH 1420

Dr. Graham-Squire, Spring 2012

Name: _____

ID Number: _____

I pledge that I have neither given nor received any unauthorized assistance on this exam.

(signature)

DIRECTIONS

1. Show all of your work and use correct notation. A correct answer with insufficient work or incorrect notation will lose points.
2. Clearly indicate your answer by putting a box around it.
3. Cell phones and computers are not allowed on this test. Calculators are needed for certain questions.
4. Give all answers in exact form, not decimal form (that is, put π instead of 3.1415, $\sqrt{2}$ instead of 1.414, etc) unless otherwise stated.
5. Make sure you sign the pledge and write your ID on both pages.
6. Number of questions = 5. Total Points = 50.

1. (10 points)

(a) Use known power series to determine the power series representation for

$$p(x) = \frac{-5x}{(2 + 5x)^2}.$$

(b) State the radius of convergence.

2. (10 points) Find the Taylor series for $f(x) = \sin x$ at $a = \pi$. (Note: Assume that f has a power series expansion. Do not show that $R_n \rightarrow 0$.)

3. (10 points) Use MacLaurin series to evaluate

$$\int x \cdot e^{-x^3} dx$$

Leave your answer as a power series.

4. (10 points) Solve the differential equation

$$y' - e^y = e^y \cos x.$$

Simplify your answer and write it in the form $y = \underline{\hspace{2cm}}$.

5. (10 points) Is the family of equations

$$f(x) = \frac{c \ln x}{x}$$

a solution to the differential equation $x^2y' + xy = c$? Justify your answer.

Extra Credit(1 point) Find a solution to the differential equation

$$y''' = -8y + 5.$$