_____ / 54 total points (both parts)

Test #2 (Part 1, No Calculator)

Name: _____

Math 181, Prof. Beydler

Wednesday, October 24, 2018

Directions: Show all work. No calculator, books, or notes. Your desk and lap must be clear (no phones, no smart watches, etc.). If you have a phone in your lap or on your chair, it is considered cheating, and you will receive a zero on this test. Write your answers in the indicated places, or box your answers. When you're finished with Part 1, please turn it in, take a bathroom break, get your calculator out, and start Part 2. Good luck!

1. Find the following integrals. If the integral diverges, write "diverges."

   a. (5 points) $\int \sqrt{x} e^{\sqrt{x}}\, dx$

Answer: _____

   b. (4 points) $\int_2^{\infty} \frac{\ln x}{x}\, dx$

Answer: _____

c. (4 points) $\int_1^3 \frac{dx}{x-2}$

Answer: _____

2. (2 points) Show that the following integral either converges or diverges using the Comparison Test.

$\int_2^\infty \frac{\sqrt{x^4+3x+1}}{2x^3-5}\,dx$

converges diverges (circle one)

3. (4 points) Solve the following initial value problem. Be sure to solve explicitly for y.

$y' = xy^2 \sin 2x,\ y(0) = \frac{1}{2}$

$y =$ _____

4. (4 points) Find the orthogonal trajectories of the family of curves $y = kx^3$, where k is an arbitrary constant. No need to solve explicitly for y.

Answer: _____

Here are a couple of formulas I promised to give you:

$$\int \sec x\, dx = \ln|\sec x + \tan x| + C$$
$$\int \csc x\, dx = -\ln|\csc x + \cot x| + C$$