

Quiz #3

Name: _____

Math 181, Section 4, Prof. Beydler

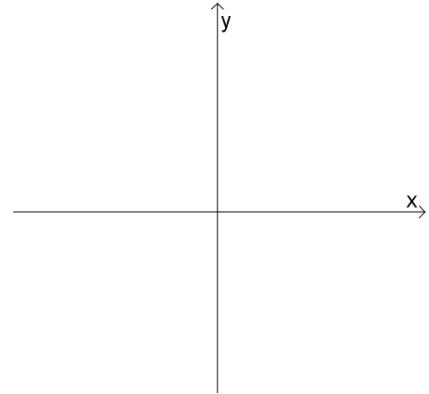
Wednesday, November 8, 2017

Directions: Show all work. No books or notes. A **scientific calculator** is allowed. 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. Good luck!

1. (2 points) Eliminate the parameter to find a Cartesian equation of the curve. Then sketch the curve and indicate with an arrow the direction in which the curve is traced as the parameter increases.

$$x = \sin t, \quad y = \frac{1}{\sin^2 t}, \quad 0 < t < \frac{\pi}{2}$$

Cartesian equation of curve: _____



2. (3 points) Find the equation of the tangent line of the following curve at $t = 1$.

$$x = 1 + \ln t, \quad y = t^2 + 2$$

Equation of tangent line: _____

3. (2 points) Show that $y = 3e^{2x} + 2e^{-x}$ is a solution to the following initial-value problem.
 $y' = 2y - 6e^{-x}$, $y(0) = 5$

4. (4 points) Solve the following initial-value problem. Be sure to explicitly solve for y as a function of x .
 $y' = \frac{xy}{x^2+1}$, $y(0) = 4$

$y =$ _____

5. (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: _____