

MATH 2120 – Quiz 1 Thursday September 25, 2014

1. (a) Find the solution of the initial value problem

$$2\frac{dy}{dt} - y = e^{t/3}, \quad y(0) = a.$$

- (b) There exists a critical value a_0 for which $a < a_0$ and $a > a_0$ produce qualitatively different behaviors as $t \rightarrow \infty$. Determine the value of a_0 and the corresponding behaviors in the cases $a < a_0$ and $a > a_0$.

2. Solve the initial value problem

$$y'(x) = 4 \frac{xy^3}{\sqrt{1+2x^2}}, \quad y(0) = 1,$$

and determine the interval on which the solution exists.