Quiz 1, Math 246, Professor David Levermore
Thursday, 3 September 2020

This formative assessment helps you see how well you understand the material. To get an accurate assessment please do not use books, notes, or electronic aids. Show your reasoning for full credit. Good luck!

(1) [4] For each of the following ordinary differential equations, determine its order and whether it is linear or nonlinear. If it is nonlinear, write down term that makes it so.

   (a) $v''' + e^v v' = 2\cos(3t)v + 4e^{5t}$

   (b) $u'''' + 3\sin(2t)u' = 2\cos(4t)$

(2) [2] What is the interval of definition for the solution of the initial-value problem
$$\frac{\mathrm{d}w}{\mathrm{d}x} + \frac{e^x}{x^2 - 4}\, w = \frac{\sin(x)}{x^2 - 36}\,, \qquad w(3) = -7\,.$$
(You do not need to solve the differential equation, but you must give your reasoning!)

(3) [4] Solve the initial-value problem
$$(1 + t)\frac{\mathrm{d}y}{\mathrm{d}t} + 2\, y = 6t^2\,, \qquad y(0) = 5\,.$$