

Quiz 2, Math 246, Professor David Levermore
Thursday, 10 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) [5] Find the explicit solution of the initial-value problem

$$\frac{dv}{dx} = \cos(x) \frac{v^2 + 9}{2v}, \quad v(0) = -3.$$

- (2) [5] Consider the equation

$$\frac{du}{dt} = \frac{(u + 3)^3(u - 1)(u - 5)^2}{(u^2 + 4)^2(u + 7)}.$$

- (a) [3] Sketch its phase-line portrait and identify each stationary point as being either stable, unstable, or semistable. (You do not have to find the solution!)
- (b) [2] How does $u(t)$ behave as $t \rightarrow \infty$ if $u(2) = 0$? if $u(-2) = 4$?