Quiz 2, Math 246, Professor David Levermore
Tuesday, 11 September 2018

Your Name:

Discussion Instructor (circle one):   Sid Sharma   Anqi Ye
Discussion Time (circle one):   8:00   9:00   10:00

No books, notes, calculators, or any electronic devices.
Show your reasoning for full credit. Good luck!

(1) [6] Sketch the phase-line portrait for the equation
$$
\frac{\mathrm{d}u}{\mathrm{d}t} = \frac{(u-5)(u+1)^3(u+4)^2}{(u-2)^2} \,.
$$
Classify each stationary point as being either stable, unstable, or semistable. (You do not have to find the solution!)

(2) [4] In the absence of predators the population of mosquitoes in a certain area would increase at a rate proportional to its current population such that it would triple every five weeks. There are 200,000 mosquitoes in the area when a flock of birds arrives that eats 40,000 mosquitoes per week. Write down an initial-value problem that governs the population of mosquitoes in the area after the flock of birds arrives. (Do not solve the initial-value problem!)