Math 2C03: Quiz #2 Information

QUIZ: MONDAY, JULY 6TH, 7PM (FIRST 10 MINUTES OF CLASS)
McMaster University

Potential Quiz Questions:

Your quiz on Monday will consist of one or two of the questions listed below.

1. In class last Monday we discussed three types of differential equations: homogeneous, Bernoulli's equation, and DE's of the form $f(Ax + By + C)$, for $A, B, C \in \mathbb{R}$, $B \neq 0$. These equations can all be solved by making an appropriate substitution which transforms them into a separable or linear equation.
   (a) Define each type of equation.
   (b) In each case, what substitution should be made to solve it?
   (c) For each, which type of equation does the DE become after making that substitution?
   (d) Give an example of each type of equation.
2. Why is it sometimes useful to analyze differential equations in a geometric way, using direction fields, phase portraits, etc.?
3. (a) What is an autonomous differential equation?
   (b) How would you analyze the solutions of an autonomous DE? Please discuss critical points, phase portraits, and how you would sketch solution curves (constant solutions, translation property, etc.).
   (c) Give an example of an autonomous differential equation and list its stable, unstable, and semi-stable solutions.