

### MATH 341 – QUIZ # 3

**Instructions.** Show all your work. You may *not* use calculators, notes, or any other form of assistance on this quiz.

(1) (3 points) State whether the indicated value is a regular singular point of the following differential equations:

(a)  $t(t - 2)^2y'' + ty' + y = 0; t = 2$

(b)  $t^3y'' + \sin(t^2)y' + ty = 0; t = 0$

(c)  $(e^t - 1)y'' + e^ty' + y = 0; t = 0$

(2) (6 points) Find a particular solution of

$$LQ'' + RQ' + \frac{Q}{C} = E_0 \cos(\omega t)$$

where  $L, R, C, E_0, \omega$  are constants. Hint: try the real part of  $Ae^{i\omega t}$ .

(3) (6 points) Use a series expansion to find the solution to

$$y'' - 2ty' - 2y = 0, \quad y(0) = 2, \quad y'(0) = 0$$