HW 4 (Quiz in week 5)

1. Prove that the solutions arising from the Frobenius method are linearly independent in all cases.

2. Consider $t^2y'' + aty' + by = 0$. Find two linearly independent solutions using Frobenius in each of the following cases.

   (a) $a = \frac{1}{2}, b = -\frac{1}{2}$.

   (b) $a = -5, b = 9$.

3. In each of the following equations, locate the singular points and describe whether they are regular or not.

   (a) $(t-2)(t+3)^2y'' + 3t^2y' - 2(t+3)y = 0$.

   (b) $t^2y'' + (\sin(t))y' + \cos(t)y = 0$.

   (c) $(e^t - 1)^2y'' + 2\sin(t)y' + 3y = 0$.

   (d) $y'' + 3y' + t^{1/2}y = 0$ when $t \geq 0$.