Math 274 Homework   **Name:** _____

Sections: 4.6,4.7   Point Values in $\boxed{\text{boxes}}$.

Due: 23 May 2018

1. $\boxed{1}$ The Bessel equation of order one-half

$$t^2 y'' + t y' + \left(t^2 - \frac{1}{4}\right) y = 0, \quad t > 0$$

has solutions $y_1 = t^{-1/2} \cos t$ and $y_1 = t^{-1/2} \sin t$. Use the Wronskian to verify that y_1 and y_2 are linearly independent for $t > 0$.

2. $\boxed{4}$ Using the above, find a general solution to

$$t^2 y'' + t y' + \left(t^2 - \frac{1}{4}\right) y = t^{5/2}, \quad t > 0$$

3. **5** Find a general solution for
$$ty'' - (t+1)y' + y = t^2$$

provided that $y_1 = e^t$ solves
$$ty'' - (t+1)y' + y = 0$$

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HINT: Start by finding a second linearly independent solution to the homogeneous equation, then apply Variation of Parameters.