Math 275 – HW for 7.x **Name: _____**

1. Determine the inverse Laplace transform of the given functions by using partial fractions.

a) $F(s) = \dfrac{2+3s}{\left(s^2+1\right)(s+2)(s+1)}$

b) $F(s) = \dfrac{3s+2}{(s-2)\left(s^2+2s+5\right)}$

2. Given $F(s) = \mathcal{L}\{\cos bt\}$, apply the formula $\mathcal{L}\left\{t^n f(t)\right\} = (-1)^n \frac{d^n F(s)}{ds^n}$ to determine:

a) $\mathcal{L}\{t\cos bt\}$

b) $\mathcal{L}\left\{t^2 \cos bt\right\}$

3. Solve the given initial value problem using the method of Laplace transforms.

a) $y'' - y' - 6y = 2 \quad , \quad y(0) = 1 \quad , \quad y'(0) = 0$

b) $y'' + 3y' + 2y = 2e^{t} \quad , \quad y(0) = 0 \quad , \quad y'(0) = -1$

c) $y'' + y = 4\sin t + 6\cos t \quad , \quad y(0) = -6 \quad , \quad y'(0) = 2$