MATH 2850: TEST 02 (25 points.)

NAME: _____

DUE: Wednesday, January 31st, at the beginning of class.

DIRECTIONS: Show all work.

For the IVPs in # 1 – 2:

- Explain why the DE is **linear** and find an integrating factor, $\mu(x)$.
- Find an **explicit** solution to the IVP. Include an interval of validity.

1. $x\,y' = 2(x + y)$, $y(1) = 3$.

2. $y' = 4xy + 1$, $y(0) = 4$.

3. The temperature in $^\circ F$ $T(t)$ of a cup of coffee t minutes after it is served is modeled by the IVP:

$$T'(t) = 0.1(70 - T(t)),\ T(0) = 160.$$

(a) This equation is linear! Put the equation into standard form and solve using an integrating factor.

Don't forget to impose the initial conditions!

(b) Find $\lim_{t\to\infty} T(t)$. What does this mean in terms of the temperature of the coffee?