MAT 16C: Quiz 1 - Practice
Friday, June 24

Write legibly and neatly. Show all your work for full credit.

1. (10 points)

Verify that the function:

$$y(x) = x^2 + 2x + \frac{C}{x}$$

Is a solution to the differential equation:

$$xy' + y = x(3x + 4)$$
2. **(5 points)** The management of a factory has found that a worker can produce at most 30 units per day. The number of units \( N \) per day produced by a new employee will increase at a rate proportional to the difference between 30 and \( N \). Write a differential equation that models this situation. (No need to solve it).
3. **(10 points)**
a. (5pts) Find the general solution of the following differential equation:

\[ x(y + 4) + y' = 0 \]
b. (5pts) Find the particular solution given that $y = -5$ when $x = 0$. 