Math 2150 - Test 1 - Fall 2024

Name:_____

Directions:

Show steps for full credit.
Also so I can give you partial credit if needed.

Score			
1		2	
3		4	
5		6	
Total			

1. [**10 points**] Consider the following ODE:

$$5xy''' - 3y'' + y = 10x$$

(a) What is the order of the equation?

(b) Is it linear or not linear?

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2. [**10 points**] Let c be a constant. Let $f(x) = cx^4$.

(a) Verify that f solves the ODE:

$$xy' - 4y = 0$$

(b) Find a solution to the following initial-value problem:

$$xy' - 4y = 0, \quad y(2) = 4$$

3. [**10 points**] Show that the following initial value problem has a unique solution on some interval containing the initial point x_0.

$$y' = 2xy, \quad y(0) = 0$$

4. **[10 points]** Solve

$$x^2y' + xy = 1$$

on $I = (0, \infty)$

5. [**10 points**] Find a solution to the separable ODE

$$\frac{dy}{dx} = -\frac{x}{y} \qquad y(4) = 3$$

Solve for y in terms of x in your solution.

6. [10 points]

(a) Show that

$$5x + 4y + (4x - 8y^3)y' = 0$$

is an exact equation.

(b) Find an implicit solution to the equation above in part (a).