

Show your work! Answers without supporting work will not be given credit. Print this assignment and write your work in the spaces provided.

1

1. Solve  $\frac{dy}{dx} = \frac{3 - \cos x}{2 + \sin y}$ .

Method:

Solution:

2. Find the **initial value** solution for  $(5x^2 + y - e^x)dx - (4y - x)dy = 0$ ,  $y(1) = 0$ .

Method:

Solution:

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<sup>1</sup>My suggestion: Run recognition process for the methods of solving **first order** odes in this order: (1)Linear. (2)Separable. (3)Exact. (4)Bernoulli. (5)Homogeneous.

3. Solve

$$xy' = (2x - 1)y - x^3y^3, \quad x > 0$$

$$y(1) = -\frac{1}{2}.$$

Method:

Solution:

4.  $y' = \epsilon y - \delta y^3$ ,  $\epsilon > 0$  and  $\delta > 0$  occurs in the study of stability of fluid flow.  $\epsilon$  and  $\delta$  are specified constants.

Method:

Solution:

5. Solve  $(e^x + 1) \frac{dy}{dx} = y^2 - y^2 e^x$ .<sup>2</sup>

Method:

Solution:

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<sup>2</sup>I suggest a u-substitution for the difficult and then a partial fraction.

6. Find an integrating factor for  $y^2 dx + (3xy - e^y) dy = 0$  as a function of  $y$  only and then solve the exact equation.

$$\mu(y) = \boxed{\phantom{\hspace{2cm}}}$$

Solution: