

**MATH 2850: TAKE HOME 04 (25 points.)**

**NAME:** \_\_\_\_\_

**DUE:** Wednesday, February 14th, at the beginning of class.

**DIRECTIONS:** Show all work.

1. Consider the IVP:  $y' = \frac{x - y}{x + y}$ ,  $y(4) = 2$ .

(a) Show the DE is homogeneous.

(b) Find an implicit solution to the IVP using the substitution shown in class.



2. Consider the IVP:  $(y^4 - y) dx - x dy = 0$ ,  $y(2) = -1$ .

(a) Show the DE is not exact.

(b) Find an integrating factor of the form  $\mu(y)$  and show that it works.

**HINT:**  $y^4 - y = y(y^3 - 1)$

(c) Find a solution to the IVP.

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