

QUIZ1 SPRING 2005

Problem 1. Find a solution to the initial value problem

$$\sqrt{1+x^2} \frac{dy}{dx} = xy^5, \quad y(0) = 2$$

(Hint: This equation is separable.)

Problem 2. Find a general solution to the ordinary differential equation

$$(x^2 + 2xy + y^2) - x^2 \frac{dy}{dx} = 0.$$

(Hint: This equation is homogeneous.)

Problem 3. Find a general solution to the ordinary differential equation

$$\frac{dy}{dx} = -\frac{y \cos(x) + 2xe^y + 1}{\sin(x) + x^2 e^y - 1}.$$

(Hint: This equation might be reduced to exact.)

Problem 4. A tank with the capacity of 400 gal, originally is empty. A water containing 1 lb salt per gallon is entering at rate of 2 gal/min and the mixture is allowed to flow out of the tank at the rate 1gal/min. Find the concentration of salt in the tank when it is on the point of overflowing.