

Name: _____

1. Find general solutions of the following differential equations.

a. $xy' + y = 3xy$

b. $(1 + x)y' + y = \cos(x)$

c. $(x^2 + 4)y' + 3xy = x$

2. A 400-gal tank initially contains 100 gal of brine containing 50 lb of salt. Brine containing 1 lb of salt per gallon enters the tank at the rate of 5 gal/s, and the well-mixed brine in the tank flows out at the rate of 3 gal/s. How much salt will the tank contain when it is full of brine?

3. Solve the following differential equations using the substitution $\nu = \frac{y}{x}$.

a. $xy^2y' = x^3 + y^3$

b. $(x^2 - y^2)y' = 2xy$