

Math 217 - September 14, 2010

- Exact equations
- Population models

1. Use the given integrating factors to turn the equation into an exact equation. Solve.

(a) $y \, dx - x \, dy = 0$, $I = -1/x^2$.

(b) $y \, dx - x \, dy = 0$, $I = 1/y^2$.

(c) $y \, dx - x \, dy = 0$, $I = 1/(xy)$.

(d) $y \, dx - x \, dy = 0$, $I = -1/(x^2 + y^2)$.

2. Find A and B :

$$\frac{1}{P(100 - P)} = \frac{A}{P} + \frac{B}{100 - P}$$

3. Compute

$$\int \frac{1}{P} \, dP =$$
$$\int \frac{1}{100 - P} \, dP =$$

4. Solve for P :

$$\frac{P}{100 - P} = -3e^{t/20}$$

Lecture Problems

5. Solve and determine $\lim_{t \rightarrow \infty} x$.

$$\frac{dx}{dt} = 20x - 5x^2, \quad x(0) = 2$$