

Math 2315 - Calculus II
Quiz #12 - 2010.04.19
Solutions

Solve the initial value problem $y' = ty$ with $y(-1) = 1$.

We separate variables to get

$$\frac{dy}{y} = t dt,$$

and then we integrate:

$$\int_1^y \frac{dy}{y} = \int_{-1}^1 t dt.$$

This gives

$$\ln(y) \Big|_1^y = \frac{1}{2} t^2 \Big|_{-1}^1.$$

Evaluating at the limits gives

$$\ln(y) = \frac{1}{2} (t^2 - 1),$$

and solving for y gives our final solution:

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