

# Math 2315 - Calculus II

Quiz #12 - 2010.04.19

## Solutions

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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:

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