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Quiz 2 427J

1. Use the method of separable equations to solve

$$\frac{dy}{dt} = \frac{e^y}{t^2 + 1}$$

NOTE: Leave your solution implicit.

2. Compute

$$\frac{2-3i}{1+i}$$

$$1). \frac{dy}{dt} = \frac{e^y}{t^2+1} \cdot \frac{1}{e^y}$$

$$\int \frac{1}{e^y} dy = \int \frac{1}{t^2+1} dt + C$$

$$\int e^{-y} = \tan^{-1}(t) + C$$

$$\boxed{-e^{-y} = \tan^{-1}(t) + C}$$

$$2.) \text{ Compute } \frac{2-3i}{1+i}$$

$$\frac{2-3i}{1+i} \cdot \frac{(1-i)}{(1-i)} = \frac{2-5i+3i^2}{1-i^2}$$

$$= \frac{2-5i-3}{2}$$

$$= \frac{-5i-1}{2}$$

$$\boxed{z = -\frac{1}{2} + i\left(\frac{-5}{2}\right)}$$

Let  $z = \alpha + i\beta$  where  $\alpha, \beta \in \mathbb{R}$  and

$$\operatorname{Re}(z) = \alpha,$$

$$\operatorname{Im}(z) = \beta$$

$$\begin{array}{r} 2-3i \\ 1 \quad 2 \quad -3i \\ -i \quad -2i \quad 3i^2 \end{array}$$

$$\begin{array}{r} i+i \\ 1 \quad 1 \quad ii \\ -i \quad -i \quad -i^2 \end{array}$$