

6.1, 6.3 Differential Equations and Slope Fields

Diff EQ: contains an unknown function and some of its derivatives

To Solve ...

- 1) separate x and y variables
- 2) integrate both sides (don't forget cookies!)
- 3) use initial value to solve for C (for particular solution)

$$\textcircled{1} \quad \frac{dy}{dx} = \frac{e^x}{e^x+1}$$
$$\int dy = \int \frac{e^x}{e^x+1} dx \quad \begin{array}{l} u = e^x+1 \\ du = e^x dx \end{array}$$

$$y = \int \frac{1}{u} du$$

$$y = \ln |e^x+1| + C$$

$$\textcircled{2} \quad \frac{dy}{dx} = x \cdot \cos x^2$$
$$\int dy = \int x \cdot \cos x^2 dx$$

$$\begin{array}{l} u = x^2 \\ du = 2x dx \\ \frac{1}{2} du = x dx \end{array}$$

$$y = \frac{1}{2} \sin(x^2) + C$$