

Section 2.2

Separable Variables

SEPARABLE DIFFERENTIAL EQUATION

A differential equation of the form

$$\frac{dy}{dx} = \frac{g(x)}{h(y)} \quad \text{or} \quad \frac{dy}{dx} = g(x)h(y) \quad \text{or} \quad \frac{dy}{dx} = \frac{h(y)}{g(x)}$$

is said to be [separable](#) or to have [separable variables](#).

SOLVING A SEPARABLE DIFFERENTIAL EQUATION

To solve a separable differential equation:

1. "Separate" the variables by rewriting the differential equation in the form $h(y)dy = g(x)dx$.
2. Integrate both sides of the equation in Step 1.
3. Solve the equation in Step 2 for y if the solution is unique; that is, if y is an explicit function of x .
4. If the problem is an initial-value problem, find the particular solution.