

Separation of Variables (5.3)

December 20th, 2018

Separation of Variables

*Recall that a differential equation can only be solved through separation of variables by multiplication or division (no addition or subtraction).

Ex. 1: Find the general solution of the differential equation.

a. $\frac{dy}{dx} = 3y^2$

b. $xy' = y \ln x$

Ex. 2: Find the particular solution that satisfies the initial condition.

a. $\sqrt{x} + \sqrt{y}y' = 0; y(1) = 4$

b. $\frac{dr}{ds} = e^{r-2s}; r(0) = 0$

Orthogonal Trajectories

*Two families of curves are mutually orthogonal, and each curve in one of the families is called an orthogonal trajectory of the other family if it forms a right angle with one of the curves in the other family.

Ex. 3: Find the orthogonal trajectories of the family of curves given by $x^2 - 2y^2 = C$.