Definitions

- **Separable Equations**
  An ODE is separable if it is possible by elementary algebraic manipulation to arrange the equation so that all the dependent and independent variables are all at one side
  The technique is called separation of variables

Example Problems

1. $y' + y^2 \sin(x) = 0$
   Rewrite the equation in Leibinz notation and move all the variables to one side such that the new rewritten equation is:

   $$\frac{dy}{y^2} = -\sin(x)dx$$

   Integrate the equation to its respective variables such that

   $$\int_y \frac{dy}{y^2} = \int_x -\sin(x)dx$$

   $$-\frac{1}{y} = \cos(x) + C$$

   such that $C \in \mathbb{R}$
   Try the next two problems for practice

2. $xy' = (1 - 2x^2)\tan(y)$

3. $y' = 2xy$