\[ \frac{\text{number of solutions to a 1st order ode}}{y'^2 + y^2 = 0} \] has only 1 real solution, \( y = 0 \)

\[ y'^2 + (y^2 - 1)^2 = 0 \] has 2 real solutions, \( y = \pm 1 \).

**Role of constant in general solution**

If the ode is of the form
\[ y' = g(x) \] & \( g \) is continuous
then we know that
\[ y(x) = \int g(x) \, dx + C \]

But it is not the case that all solutions to 1st order odes differ by an **Constant**

additive

**But it is not the case that**

all solutions to 1st order odes
differ by an **Constant**. For instance,

\[ y' = y \]

has solutions of the form \( y(x) = Ke^x \).

In this case, the constant is **Multiplicative**.