## Examples

**Example 1.** Solve the initial value problem

$$\frac{dy}{dt} + t^k y = 0, \quad y(0) = 1, \quad y(1) = e^{-11}.$$

**Example 2.** Solve the initial value problem

$$\frac{dy}{dt} + y\sin t = 0, \quad y(\pi) = -7.$$

**Example 3.** Find a general solution to the differential equation

$$\frac{dy}{dt} + 13y = 0.$$

**Example 4.** Mumps is spreading on a college campus at a rate proportional to the infected population. On the day of the outbreak there are 5 people infected. A week later, there are 8 people infected. If there is no intervention, how many people will have been infected 30 days from the outbreak?

**Example 5.** You decide to hang-dry your clothes to save money. They dry out at a rate proportional to the moisture content. If after 1 hour they have lost 15% of their moisture, how long will it take for your clothes to lose 90% of their moisture?