Section 2.2  Separable Equations (contd)

Example 1. Consider the initial value problem

\[ y' = ty(4 - y)/3, \quad y(0) = y_0 > 0. \]

(a). Determine how the behavior of the solution as \( t \) increases depends on the initial value \( y_0 \).

(b). Suppose that \( y_0 = 0.5 \). Find the time \( T \) at which the solution first reaches the value 3.98.
Homogeneous Equation

Consider the differential equation $\frac{dy}{dx} = f(x, y)$. If the right hand side

then the equation is said to be ____________. Such equation can be transformed into ______________ by a change of variable.

Example 2. Solve the differential equation

$$\frac{dy}{dx} = \frac{y - 4x}{x - y}.$$