

Section 1: Introduction to differential equations

Exercise level 1

- Formulate a first order differential equation between the variables x and t (time) from the following information:
 - The rate of change of x is inversely proportional to the cube of the time t .
 - The rate of decrease of x is directly proportional to the square root of x .
- Find the general solution for each of the following differential equations.
 - $\frac{dy}{dx} = 3x^2 + 2$
 - $2\frac{dy}{dx} - x = 10$
 - $x^2 \frac{dy}{dx} = 3 + x$
- By separating the variables, find the general solution of each of the following differential equations, giving y in terms of x .
 - $\frac{dy}{dx} = y^2$
 - $\frac{dy}{dx} = 2xy^2$
 - $\frac{dy}{dx} = 2xy$