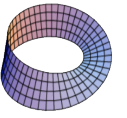
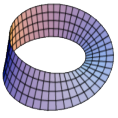


Ordinary Differential Equations – Second Order

1. Solve the differential equation $\frac{d^2y}{dx^2} - 9.8 = 0$ given that $y = 0$ and $\frac{dy}{dx} = 10$ when $x = 0$.
2. Solve the differential equation $\frac{d^2y}{dx^2} - x = 0$ given that $y = 1$ and $\frac{dy}{dx} = 1$ when $x = 0$.
3. Solve the differential equation $\frac{d^2y}{dx^2} + \frac{dy}{dx} = 0$ given that $y = 1$ and $\frac{dy}{dx} = 1$ when $x = 0$.
4. Solve the differential equation $\frac{d^2y}{dx^2} = \left(\frac{dy}{dx}\right)^2$ given that $\frac{dy}{dx} = -1$ when $x = 0$. And $y = 0$ when $x = 1$.
5. Solve the differential equation $x \frac{d^2y}{dx^2} = \frac{dy}{dx}$.
6. Solve the differential equation $\frac{d^2y}{dx^2} = 2y \frac{dy}{dx}$. Where $\frac{dy}{dx} = 4$ when $x = 0$ and $y = 0$ when $x = 0$.



Source(s):

- <http://www.MathsGrinds.ie/>
- <http://www.examinations.ie/>

Further Information:

- Questions marked with an asterisk * are past Leaving Cert Exam questions.

Answers:

1. $y = 10x + 4.9x^2$

2. $y = \frac{1}{6}x^3 + x + 1$

3. $y = -e^{-x} + 2$

4. $y = \ln\left(\frac{1}{x}\right)$

5. $y = C_1x^2 + C_2$

6. $y = 2 \tan(2x)$