

(1) Say whether the following equations are linear or not and the order of them.

(a)

$$t^3 \frac{d^2 y}{dt^2} + y \frac{dy}{dt} + e^t = 0$$

(b)

$$e^t \frac{d^5 y}{dt^5} + \cos(t) \frac{d^2 y}{dt^2} + \sin(t)y = 0$$

(c)

$$\cos(e^t) \frac{d^3 y}{dt^3} + t \frac{dy}{dx} + \sin(t)e^t y = \cos(t) + e^t$$

(2) Solve the following differential equation.

$$\frac{dy}{dt} + \sin(t)y = \sin(t)$$