



# Differential Equations

## Quiz #1

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**Name:**

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**Question 1.** For each of the following equations, say whether it is linear or non-linear, and give its order.

1.  $\theta''(t) + (\theta'(t))^2 = 0;$

2.  $\log(t) \cdot f(t) + e^t f'(t) = \cos(t);$

3.  $f^{(2)}(t) + f^3(t) + t^2 = f'(t).$

**Question 2.** Consider the following system :

$$\begin{cases} x'(t) &= a(t)x(t) + b(t)y(t) + \lambda(t) \\ y'(t) &= c(t)x(t) + d(t)y(t) + \mu(t) \end{cases}$$

Write it as a single *vector* differential equation.