

Answer on Question #69661 – Math – Differential Equations

QUESTION

The degree of differential equation

$$\left(\frac{d^3y}{dx^3}\right)^2 + 2\frac{d^2y}{dx^2} - \frac{dy}{dx} + x^2\left(\frac{dy}{dx}\right)^3 = 0$$

SOLUTION

By the definition,

the **degree of a differential equation** is the power of its highest derivative, after the equation has been made rational and integral in all of its derivatives.

(https://en.wikipedia.org/wiki/Degree_of_a_differential_equation)

We can see the equation

$$\left(\underbrace{\frac{d^3y}{dx^3}}_{\text{highest derivative}}\right)^{\boxed{2}} + 2\frac{d^2y}{dx^2} - \frac{dy}{dx} + x^2\left(\frac{dy}{dx}\right)^3 = 0$$

is a polynomial equation in $y'''(x)$, $y''(x)$ and $y'(x)$. The degree of this differential equation can be defined.

According to the above definition, the degree of the equation is 2.

ANSWER

The degree of the differential equation

$$\left(\frac{d^3y}{dx^3}\right)^2 + 2\frac{d^2y}{dx^2} - \frac{dy}{dx} + x^2\left(\frac{dy}{dx}\right)^3 = 0$$

is 2.

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