Differential Eq. :- An equation of the form f (x, y, y', y', -, y)=0 which contains an independent variable 'x', a dependent variable 'y' and derivatives of dependent variable ob any order is called Differential egn

A differential equis an equation which involves differential coefficients or differentiale.

In other words. An equation involving derivative ob dependent variable with respect to variable is called a differentsal eqn.

$$\frac{dy}{dx} - 2x - 2 = 0$$

(in)
$$y'' - 3(y')^3 + 7y - \cos x = 0$$

Order of Differential Eqn: The order of a differential eqn is the order of the highest Order derivative occurring in the egh. e.g.: - The order of (i), (ii), (iii), (iv), (v) respectively Differential equ is the degree of the highest order differential coefficient after making the differential equ free from radicale and fractions in its derivatives and putting it in the form ob the polynomial equation in its derivatives eg:- The degree of (i), (ii), (iii), (iv), (v) respectively

L'inear and non-linear Differential egn: - A differential

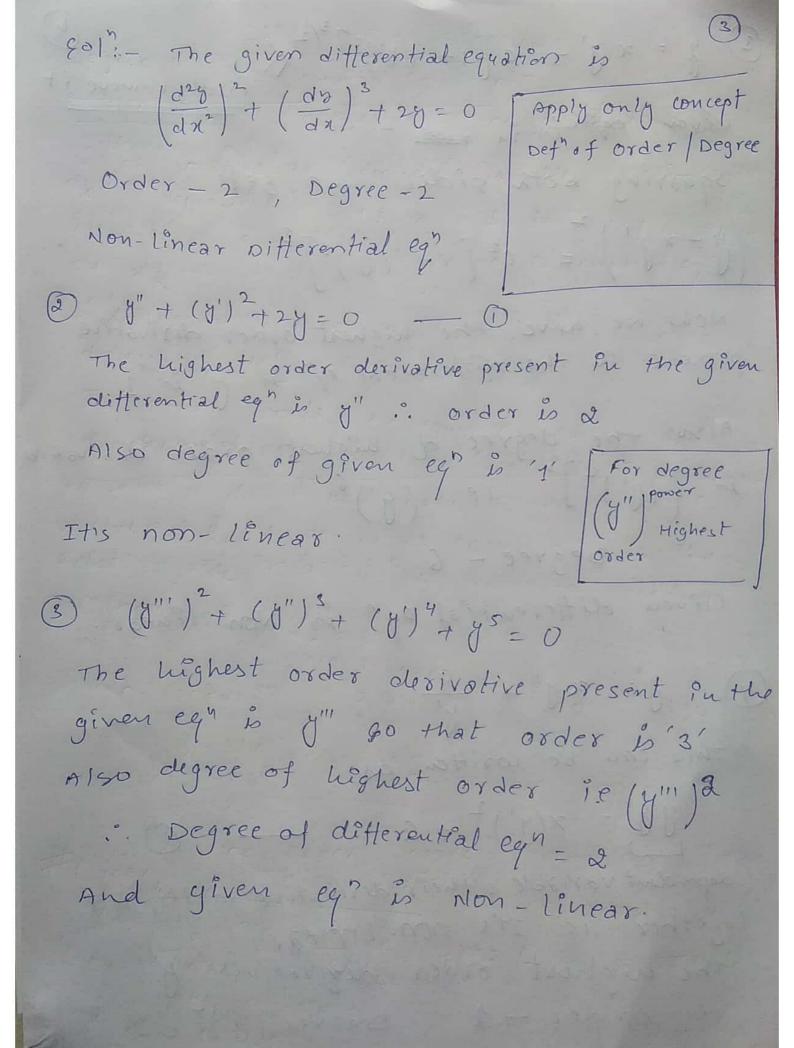
equation is said to be linear if the dependent variable and its derivatives occur only in the first degree and are not multiplied together otherwise, it is called a Non-Linear Differential.

100. (i), (iii) are linear while others are

fome exercise on above topic

write the order, Degree, Innear, non-linear of differential eqn.

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



(3) y = xy' + a[1+(y')2]3/2 Frystly remove it Squaring both sides, we get $(y - xy')^2 = a^2 [1 + (y')^2]^3$ Now, we have the highest order derivative present for the differential eq " is y' is 1 Also the degree of highest order derivative is [(y')²] ie (y')⁶ .. Degree - 6 Given differential egn & Non-linear. $(9) \quad y = xy' + \frac{a}{y'}$ This can be written as $yy' = x(y')^2 + a$ dependent variable & their derivative multiplied together it It's non-linear. The highest order degivatives t'. :. order -1 , Degree (y') = 2

(5) [1+ (dy)2]3/2 = Remove it firstly Squaring both gides we gel [1+ (ds)2]3 = 2 = 4 => [1+ (dr)2]3 = 4. ... Order is (y')= 1 Degree is [(4')2]3= (4')6= 6 Given egg is Non-linear. 6 y" + y2 + e8 = 0 The highest order derivative is y"

is order is '3'

Degree is not defined as [eff]

Alon-Linear.

Terms $(7) \frac{d^2y}{dx^2} + 3(\frac{dx}{dx})^2 = x^2 \log(\frac{d^2y}{dx^2})$ order is dy ile 2'

Degree Non-defined As log (y")

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