

NCERT Solutions for Class-XII Maths

Chapter-9.1

NCERT Math Class 12

1. Determine order and degree(if defined) of differential equation $\frac{d^4y}{dx^4} + \sin(y''') = 0$

1. (i) The required area is represented by the shaded area ADCBA as

$$\frac{d^4y}{dx^4} + \sin(y''') = 0$$

$$\Rightarrow y'''' + \sin(y''') = 0$$

The highest order derivative present in the differential equation is y'''' . Therefore, its order is four.

The given differential equation is not a polynomial equation in its derivatives. Hence, its degree is not defined.

2. Determine order and degree(if defined) of differential equation $y' + 5y = 0$

2. It is given that equation is $y' + 5y = 0$

We can see that the highest order derivative present in the differential is y' .

Thus, its order is one. It is polynomial equation in y' . The highest power raised to y' is

1.

Therefore, its degree is one.

3. Determine order and degree(if defined) of differential equation $\left(\frac{ds}{dt}\right)^4 + 3s\frac{d^2s}{dt^2} = 0$

$$\left(\frac{ds}{dt}\right)^4 + 3s\frac{d^2s}{dt^2} = 0$$

The highest order derivative present in the given differential equation is $\frac{d^2s}{dt^2}$. Therefore, its order is two.

It is a polynomial equation in $\frac{d^2s}{dt^2}$ and $\frac{ds}{dt}$. The power raised to $\frac{d^2s}{dt^2}$ is 1.

Hence, its degree is one.

4. Determine order and degree(if defined) of differential equation $\left(\frac{d^2y}{dx^2}\right)^2 + \cos\left(\frac{dy}{dx}\right) = 0$

4. It is given that equation is $\left(\frac{d^2y}{dx^2}\right)^2 + \cos\left(\frac{dy}{dx}\right) = 0$

We can see that the highest order derivative present in the given differential equation is $\frac{d^2y}{dx^2}$.

Thus, its order is two. The given differential equation is not a polynomial equation in its derivative.

Therefore, its degree is not defined.

5. Determine order and degree(if defined) of differential equation $\frac{d^2y}{dx^2} = \cos 3x + \sin 3x$

5. $\frac{d^2y}{dx^2} = \cos 3x + \sin 3x$

$\Rightarrow \frac{d^2y}{dx^2} - \cos 3x - \sin 3x = 0$

The highest order derivative present in the differential equation is $\frac{d^2y}{dx^2}$. Therefore, its order is two.

It is a polynomial equation in $\frac{d^2y}{dx^2}$ and the power raised to $\frac{d^2y}{dx^2}$ is 1.

Hence, its degree is one.

6. Determine order and degree(if defined) of differential equation

$(y''')^2 + (y'')^3 + (y')^4 + y^5 = 0$

6. It is given that equation is $(y''')^2 + (y'')^3 + (y')^4 + y^5 = 0$

We can see that the highest order derivative present in the differential is y''' .

Thus, its order is three. It is polynomial equation in y''' , y'' and y'

So, the highest power raised to y''' is 2.

Therefore, its degree is two.

7. Determine order and degree(if defined) of differential equation $y'''' + 2y'' + y' = 0$.

7. $y'''' + 2y'' + y' = 0$

The highest order derivative present in the differential equation is y'''' . Therefore, its order is three.

It is a polynomial equation in y'''' , y'' and y' . The highest power raised to y'''' is 1.

Hence, its degree is 1.

8. Determine order and degree(if defined) of differential equation $y' + y = e^x$

8. It is given that equation is $y' + y = e^x$

$\Rightarrow y' + y - e^x = 0$

12. The correct option is (A).

Explanation:

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

We can see that the highest order derivative present in the given differential equation is $\frac{d^2y}{dx^2}$.

Thus, its order is two.



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