



# MATHS

## BOOKS - JMD MATHS (PUNJABI ENGLISH)

### DIFFERENTIAL EQUATION

#### Exercise

1. Select the correct answer : Degree of differential equation

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

A. 1

B. 0

C. 2

D. 3

**Answer: A**



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2. Select the correct answer : Order of differential equation

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

A. 1

B. 0

C. 2

D. 3

**Answer: C**



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3. Select the correct answer: Degree of differential equation

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

A. 1

B. 2

C. 0

D. 3

**Answer: B**



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4. Select the correct answer: Degree of

$$\left[ 1 + \left( \frac{dy}{dx} \right)^2 \right]^{\frac{3}{2}} = 5 \left( d^3 \frac{y}{dx^3} \right)$$

A. 1

B. 0

C. 2

D. 3

**Answer: C**



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5. Select the correct answer: Degree of

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

A. 1

B. 1

C. 2

D. not defined

**Answer: D**



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6. Select the correct answer: Order of

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

A. 0

B. 1

C. 2

D. not defined

**Answer: C**



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7. The general solution of differential equation

:  $ydx - xdy = 0$  is :

A.  $xy=c$

B.  $x = cy^2$

C.  $y = cx^2$

D.  $x=cy$

**Answer: D**



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8. Select the correct answer: Degree of differential equation of  $\log\left(\frac{dy}{dx}\right)^2 = 3x + 4y$  is

A. 0

B. 1

C. 2

D. not defined

**Answer: D**



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9. The number of arbitrary constants in the particular solution of a differential equation of third order is :

A. 0

B. 1

C. 2

D. 3

**Answer: A**



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**10.** Select the correct answer: The number of arbitrary constant in the general solution of a differential equation of third order is

A. 0

B. 1

C. 2

D. 3

**Answer: D**



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11. Fill in the blank: Order of

$$5\left(d^2 \frac{y}{dx^2}\right) + 3\left(\frac{dy}{dx}\right)^2 - 2x = 0 \text{ is .....}$$



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12. Fill in the blank: Degree of

$$\left(\frac{dy}{dx}\right)^4 + 3y\left(d^2 \frac{y}{dx^2}\right) = 0 \text{ is .....}$$



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**13.** Fill in the blank: Integrating factor of

$$\frac{dy}{dx} - \left(\frac{y}{x}\right) = x^2 \text{ is .....}$$



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**14.** Fill in the blank: Integrating factor of

$$x \frac{dy}{dx} + 2y = 3x \text{ is}$$



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15. The integrating factor of  $\frac{dy}{dx} - \left(\frac{y}{x}\right) = 2x$  is  $\frac{1}{x}$



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16. Order of  $\left(\frac{dy}{dx}\right)^2 + \frac{1}{\frac{dy}{dx}} = 2$  is 1.



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17. Degree of differential equation

$y^n + \tan y' = y$  is 1



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18. Solve the following differential equation:

$$(x^2 - 1) \frac{dy}{dx} + 2xy = \frac{2}{x^2 - 1}$$



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19. Find the particular solution of the differential equation

$$\frac{dy}{dx} + y \cot x = 4x \cos ecx, (x \neq 0), \text{ given that}$$

$$y = 0 \text{ when } x = \frac{\pi}{2}.$$



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20. Solve the following differential equation:

$$(x^2 - 1) \frac{dy}{dx} + 2xy = \frac{2}{x^2 - 1}$$



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21. Find the particular solution of the differential equation

$$\frac{dy}{dx} + y \cot x = 4x \cos ecx, (x \neq 0), \text{ given that}$$

$$y = 0 \text{ when } x = \frac{\pi}{2}.$$





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22. Find the particular solution, satisfying the given condition, for the following differential

equation  $:\frac{dy}{dx} = \frac{y}{x} + \sec\left(\frac{y}{x}\right) = 0, y = 0$

when  $x = 1$



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23. Solve the following differential equation :

$$\cos x \frac{dy}{dx} + y = \sin x$$



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**24.** Solve the following differential equation :

$$x \frac{dy}{dx} + y = x \log x, x \neq 0.$$



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**25.** For the differential equation

$$xy \frac{dy}{dx} = (x + 2)(y + 2), \text{ find the solution}$$

curve passing through the point  $(1, -1)$ .



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26. Solve the following differential equation :

$$(1 + x^2) \frac{dy}{dx} + y = \tan^{-1} x$$



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27. Solve the differential equation

$$\left[ \frac{e^{-2\sqrt{x}}}{\sqrt{x}} - \frac{y}{\sqrt{x}} \right] \frac{dy}{dx} = 1 (x \neq 0)$$



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28. Show that the differential equation :

$$2ye^{\frac{x}{y}} dx + \left( y - 2xe^{\frac{x}{y}} \right) dy = 0 \quad \text{is}$$

homogeneous and find its particular solution

given that  $x = 0$  when  $y = 1$



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29. Solve the differential equation

$$x(x^2 - 1) dy dx = 1, y = 0 \text{ when } x = 2$$



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**30.** Find the particular solution of the differential equation

$$(x + 1) \frac{dy}{dx} = 2e - y - 1 \text{ given that } y = 0$$

when  $x = 0$



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**31.** Show that the differential equation

$$x \frac{dy}{dx} \sin\left(\frac{y}{x}\right) + x - y \sin\left(\frac{y}{x}\right) = 0 \quad \text{is}$$

homogeneous. Find the particular solution of

this differential equation, given that  $x = 1$

when  $y = \pi/2$



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