



MATHS

BOOKS - ACCURATE PUBLICATION

DIFFERENTAL QUATIONS





2. Solve the following differential equations:

$$\frac{dy}{dx} + \frac{1+y^2}{y} = 0$$

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3. Solve the following differential equations:

$$rac{dy}{dx}-rac{1+y^2}{y}=0$$



4. Find a one parameter family of slolutions of each of the followign differential equations indicating carefully the interval in which the solutions are valid:

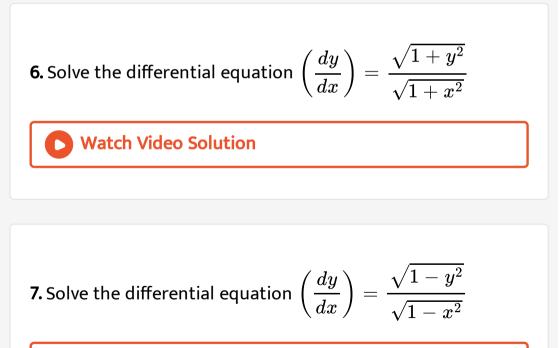
$$y^{\,\prime}\,=\,ig(1+x^2ig)ig(1+y^2ig)$$

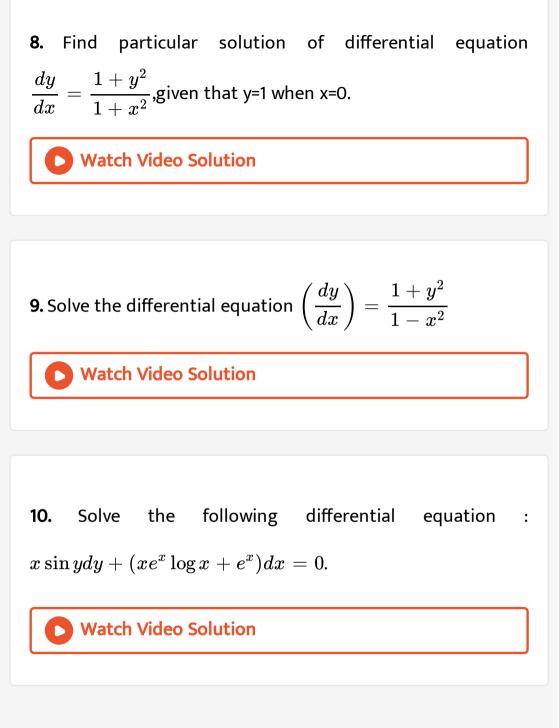


5. For the differential equation, find the general solution:

$$ig(e^x+e^{-x}ig)dy-ig(e^x-e^{-x}ig)dx=0$$

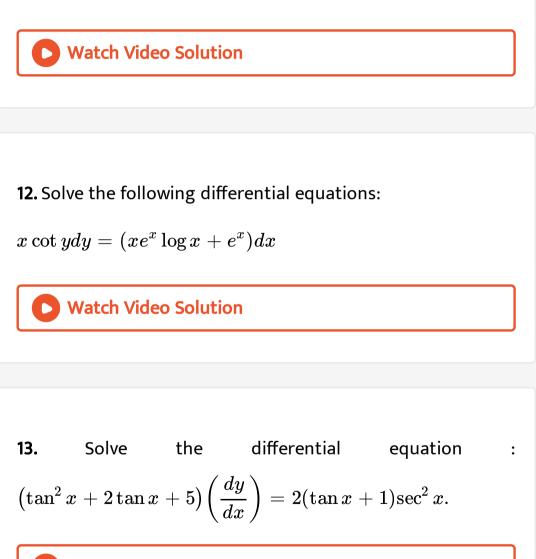
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11. Solve the following differential equations:

 $x an y dy = (x e^x \log x + e^x) dx$



14. Solve the differential equation :

$$(\sin^2 x + 2\sin x + 3)\left(\frac{dy}{dx}\right) = 2(\sin x + 1)\cos x.$$

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15. Solve the differential equation :
 $(\cos^2 x + 2\cos x + 3)\left(\frac{dy}{dx}\right) = -2(\cos x + 1)\sin x.$

16. Solve the differential equation :
$$y\sqrt{1-x^2}dy - \sqrt{1+y^2}dx$$
=0
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17. Solve the Differential Equation :
$$y\sqrt{4-x^2}dy-\sqrt{2+y^2}dx=0$$

18. Solve the following differential equations:

$$x^2(y+1)dx + y^2(x-1)dy = 0$$

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19. Solve the following differential equations:

$$x^2(y+1)dx - y^2(x-1)dy = 0$$

20. Solve the following differential equations

$$rac{dy}{dx} = 1 + x + y + xy$$

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21. Solve :

22. Solve :

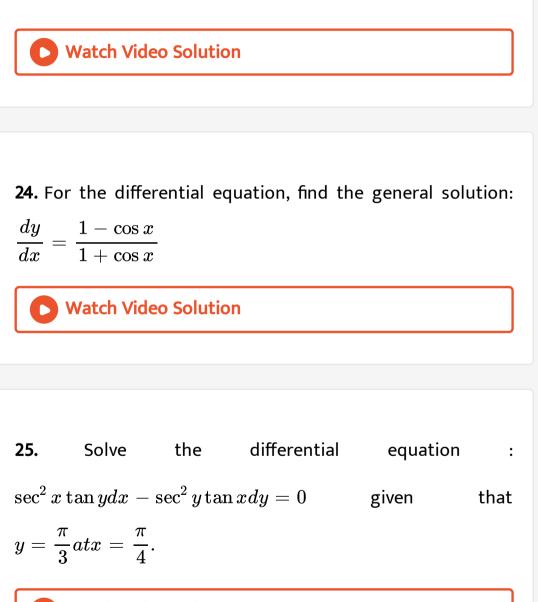
$$rac{dy}{dx}=e^{x\,-\,y}+x^2e^{\,-\,y}$$
 given that $x=1,y=1$

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$$rac{dy}{dx}=e^{x-y}+x^3e^{-y}$$
 given that $x=1,y=1$

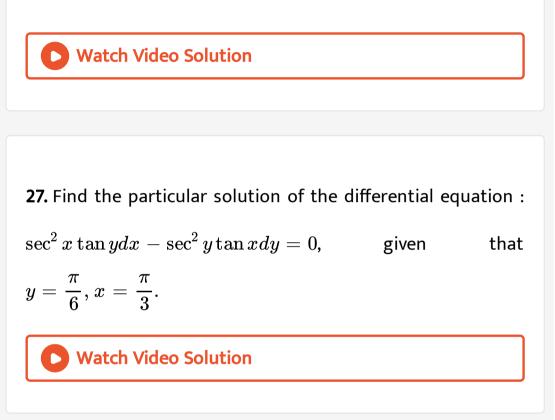
23. Find the particular solution of : $rac{dy}{dx}=e^{x-y}+xe^{-y}$,

given that x=1, y=1.





 $\sec^2 x \tan y dx + \sec^2 y \tan x dy = 0.$



28. Find the particular solution of the differential equation :

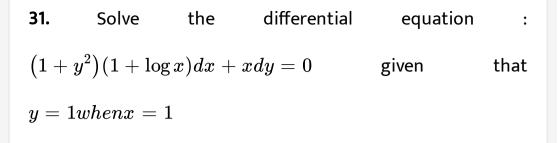
 $\sec^2 x \tan y dx - \sec^2 y \tan x dy = 0,$ given that $y = rac{\pi}{3}, x = rac{\pi}{6}.$

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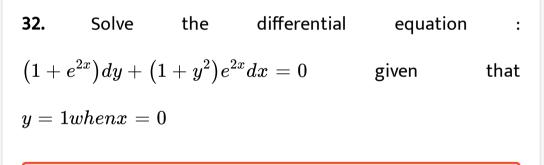
29. Find the particular solution of the differential equation : $\sec^2 x \tan y dx - \sec^2 y \tan x dy = 0$, given that $y = \frac{\pi}{4}, x = \frac{\pi}{4}$.

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30. Find the particular solution of the differential equation : $\sec^2 x \tan y dx - \sec^2 y \tan x dy = 0$, given that $y = \frac{\pi}{4}, x = \frac{\pi}{4}$.







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33. Find the general solution of the Differential Equation : $\frac{dy}{dx} = \cos^3 x \sin^4 x + x \sqrt{2x+1}$

34. Solve the following differential equations

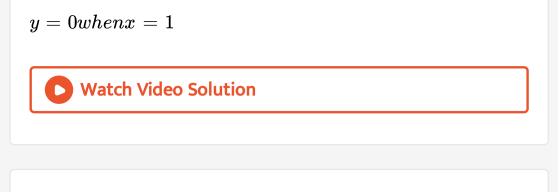
 $rac{dy}{dx} - x^2 \sin^2 x = rac{1}{x \log x}$

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35. Find the particular solution of the differential equation $(1+e^{2x})dy + (1+y^2)(e^x)dx = 0$ given that y = 1 when x = 0



36. Solve the differential equation :
$$xig(1+y^2ig)dx-yig(1+x^2ig)dy=0$$
 given that



37. Find the particular solution of the differential equation

 $x^2 dy - y dx = x dy$ given that x = 2, y = 1

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38. Find the particular solution of the differential equation :

 $x^2 dy - y dx = 2x dy$ given that x = 3, y = 1



39. Find particular solution satisfying the given condition $\frac{dy}{dx} = y \tan x, y = 1$ when x = 0.

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40. Find the particular solution of differential equation : $\cos\left(\frac{dy}{dx}\right) = \frac{1}{3}, y(0) = 2.$

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41. Find the particular solution of differential equation :

$$\cosigg(rac{dy}{dx}igg)=rac{1}{5}, y(0)=2.$$

42. Find the particular solution of differential equation : $\cos\left(\frac{dy}{dx}\right) = \frac{1}{7}, y(0) = 2.$

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43. Solve the different equation
$$\frac{dy}{dx} - \sin(x+y)$$
 or $\sin^{-1}\left(\frac{dy}{dx}\right) = x + y$
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44. Solve the differential equation
$$\sin^{-1}\left(\frac{dy}{dx}\right) = x - y$$
.

45. Solve
$$rac{dy}{dx} = \cos(x+y)$$
 or $\cos^{-1}igg(rac{dy}{dx}igg) = x+y$



46. Find the particular solution of $\frac{dy}{dx} = \cos(x+y+1)$,

given that x = 0, y = -1.

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47. Find the particular solution of : $\frac{dy}{dx} = \cos(x+y-1)$,

given that x = 0, y = 1

48. Find the particular solution of : $rac{dy}{dx}=\cos(x+y+2)$,

given that
$$x=0, y=-2$$

Vatch Video Solution 49. Solve the differential equation :

$$x \sec^2(\frac{y}{x})dy = \{y \sec^2(\frac{y}{x}) + x\}dx.$$
Vatch Video Solution 50. Solve the differential equation :

 $x \cos ec^2(\frac{y}{x})dy = \{y \cos ec^2(\frac{y}{x}) + x\}dx.$

51. Solve the differential equation
$$x \sec\left(\frac{y}{x}\right) \tan\left(\frac{y}{x}\right) dy = \Big\{y \sec\left(\frac{y}{x}\right) \tan\left(\frac{y}{x}\right) + x\Big\} dx.$$

52. Solve :
$$ig(3xy+y^2ig)dx+ig(x^2+xyig)dy=0.$$

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53. Find the general solution of the following

$$ig(x^2+xyig)dy+ig(3xy+y^2ig)dx=0$$

54. Find the general solution of the Differential Equation : $2xydx + ig(x^2+2y^2ig)dy = 0$

55. Show that the given differential equation is homogeneous and solve it: $(x^2 + xy)dy = (x^2 + y^2)dx$

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56. Solve the differential equation :
$$(x-y)dy - (x+y)dx = 0.$$

57. Solve:
$$y + x \frac{dy}{dx} = x - y \frac{dy}{dx}$$

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58. Solve the differential equation $(x^2 + y^2) dx = 2xy dy$
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59. Solve: $(x^2 - y^2) dx - xy dy = 0$
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60. Solve the differential equation
 $2xy dy - (x^2 + 3y^2) dx = 0$

61. Solve:
$$(2x-y)dy = (x-2y)dx$$



62. Solve the following differential equation:

$$ig(3xy+y^2ig)dx-3x^2dy=0$$

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63. Solve the following differential equation:

$$ig(5xy+y^2ig)dx-5x^2dy=0$$

64. Find the particular solution of differential equation : $x^2 dy - \left(x^2 + xy + y^2
ight) dx = 0, \, y(1) = 1.$

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65. Find the particular solution of differential equation : $x^2 dy - (3x^2 + xy + y^2) dx = 0, y(1) = 1.$

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66. Find the particular solution of differential equation : $x^2 dy - \left(x^2 + xy + 3y^2
ight) dx = 0, \, y(1) = 1.$

67. Solve the following differential equations

$$ig(y^2-2xyig)dx=ig(x^2-2xyig)dy$$

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68. Solve the differential equation:

$$xrac{dy}{dx}-y+x anrac{y}{x}=0$$

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69. Find the particular solution of the differential equation $\frac{dy}{dx} - \frac{y}{x} + \sec\left(\frac{y}{x}\right) = 0, (x \neq 0)$, given that y = 0, x = 1.



70. Find the particular solution satisfying the given condition:

$$rac{dy}{dx} - rac{y}{x} + \cos ec \Big(rac{y}{x}\Big) = 0, y = 0$$
 when $x = 1$

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71. Find the particular solution of differential equations :

$$\Big[x\sin^2\Bigl(rac{y}{x}\Bigr)-y\Big]dx+xdy=0, y(1)=rac{\pi}{4}.$$

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72. Solve the following differential equation

$$ig(x^2-y^2ig) dx+2xydy=0$$
 given that y=1 when x=1

73. Solve the differential equation : $x \frac{dy}{dx} - y = 2x^3$.



74. Solve the differential equation given that y = 1 where

x=2

$$xrac{dy}{dx}+y=x^3$$



75. Solve the differential equation:

$$xrac{dy}{dx}=y-x$$

76. Solve the differential equation : $x \frac{dy}{dx} + 2y = x^2$.

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77. Solve:

$$rac{dy}{dx} + 3y = 2x$$

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78. Solve:

$$rac{dy}{dx}+rac{y}{x}=x^2$$

$$rac{dy}{dx}+2y=3$$

$$xrac{dy}{dx}+y=x\log x$$



81. Solve:

$$xrac{dy}{dx}+2y=x^2\log x$$



82. Solve:

$$x\log xrac{dy}{dx}y=rac{2}{x}\log x$$

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83. Solve :
$$x\log x \frac{dy}{dx} + y = \frac{2}{x}\log x$$
.

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84. Solve:

$$xrac{dy}{dx}+2y=rac{\log x}{x^2}$$

85. Solve the differential equation :
$$x \frac{dy}{dx} + 3y = rac{\log x}{x^3}$$

$$xrac{dy}{dx}+4y=rac{\log x}{x^4}$$



87. Solve the differential equation :

$$\frac{dy}{dx} - \frac{1}{x+1}y = \left(\frac{x}{x+1}\right)e^x$$
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88. Solve the differential equation :
$$rac{dy}{dx} - rac{1}{x+2}y = \left(rac{x+1}{x+2}
ight)e^x$$



89. Solve
$$rac{dy}{dx}+2y=\sin x$$

90. Solve :
$$rac{dy}{dx} + 3y = \cos x$$

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91. Solve :
$$rac{dy}{dx}+2y=\sin 2x$$

92. Solve the following differential equation :
$$(1+x^2)rac{dy}{dx}+y= an^{-1}x$$

93. Find the particular solution of the following differential

equation given that at x=2,y=1

$$xrac{dy}{dx}+2y=x^2,\,(x
eq 0)$$

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94. Find the particular solution of the differential equation

$$\cos x \left(rac{dy}{dx}
ight) + y \sin x = 4x \cos^2 x, \left(x
eq rac{\pi}{2}
ight)$$
 given that $y=3, x=0$



95. Find the particular solution of the differential equation

$$\left(rac{dy}{dx}
ight)+y an x=\sin 2x$$
 given that $y=1,x=\pi.$

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96. For the differential equation, find a particular solution

satisfying the given condition: $rac{dy}{dx} - 3y \cot x = \sin 2x, y = 2$ when $x = rac{\pi}{2}$



97. Find the particular solution of the differential equation $\frac{dy}{dx} + y \cot x = 4x \cos ecx$, (x # 0), given that y = 0 when



98. Find the particular solution of the differential equation :

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99. Find the particular solution of differential equation :

$$an x rac{dy}{dx} + y = 2x an x + x^2, x
eq 0$$
, given that y=0 when $x = rac{\pi}{2}.$

100. Find the integrating factor for the differential equation :

$$an x rac{dy}{dx} + y = 2x + x^2.$$

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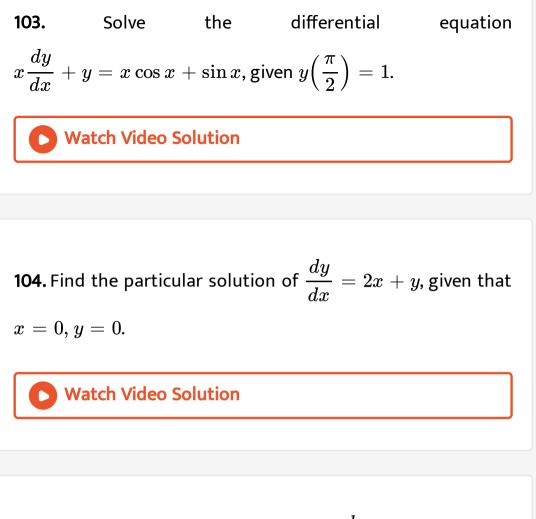
101. Find the integrating factor for the differential equation :

$$\cot x rac{dy}{dx} + y = 2x + x^2.$$

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102. Find the integrating factor for the differential equation :

$$\cos x rac{dy}{dx} + y = 2x + x^2.$$



105. Find the particular solution of : $rac{dy}{dx}=3x+y$, given

that x = 0, y = 0.

106. Find the particular solution of : $rac{dy}{dx}=4x+y$, given

that x = 0, y = 0.



Type I Multiple Choice Questions

1. The order of the differential equation:

$$2x^2rac{d^2y}{dx^2}-3rac{dy}{dx}+y=0$$
 is:

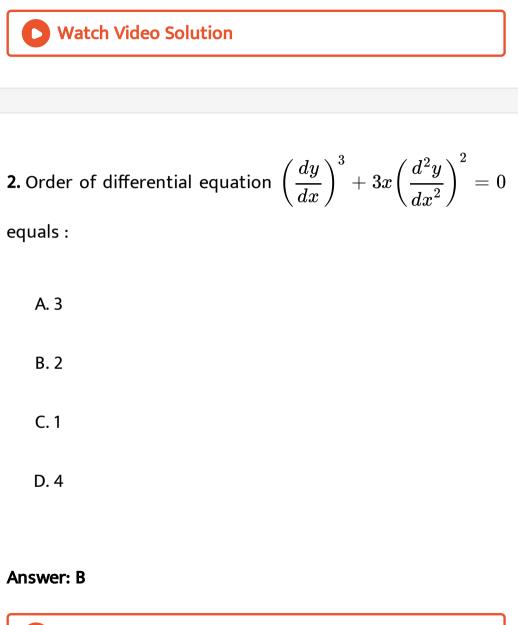
A. 2

B. 1

C. 0

D. 4

Answer: A



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3. Order of differential equation
$$\left[1 + \left(\frac{dy}{dx}\right)^2\right]^3 = \left(\frac{d^2y}{dx^2}\right)^2 \text{ equals :}$$
A.1
B.3
C.2
D.4

Answer: C



4. Order of differential equation $x \left(\frac{dy}{dx} \right)^2 + \left(\frac{d^2y}{dx^2} \right)^3 = 0$

equals :

A. 2

B. 3

C. 4

D. 1

Answer: A

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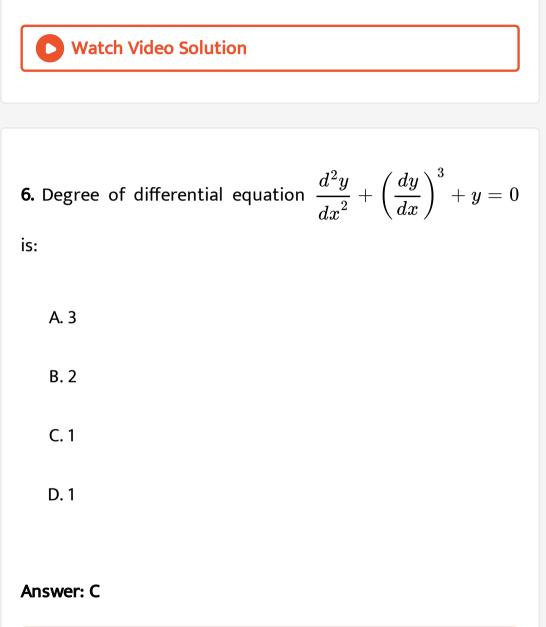
5. Order of differential equation
$$rac{d^2y}{dx^2} + \left(rac{dy}{dx}
ight)^3 + y = 0$$
 is

A. 3

B. 2

C. 0

D. 1





7. Order of differential equation

$$\left(\frac{d^2y}{dx^2}\right) - \left(\frac{dy}{dx}\right)^3 + 3y = 0$$
 is:
A. 3
B. 2
C. 0
D. 1

Answer: B

:

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8. Degree of the equation
$$: y rac{d^2 y}{dx^2} + \left(rac{dy}{dx}
ight)^3 = x \left(rac{d^3 y}{dx^3}
ight)^2$$
 is

A. 3

B. 1

C. 2

D. None of these

Answer: C

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9. Degree of the equation :
$$5x \left(rac{dy}{dx}
ight)^2 - rac{d^2y}{dx^2} - 6y = \log x$$

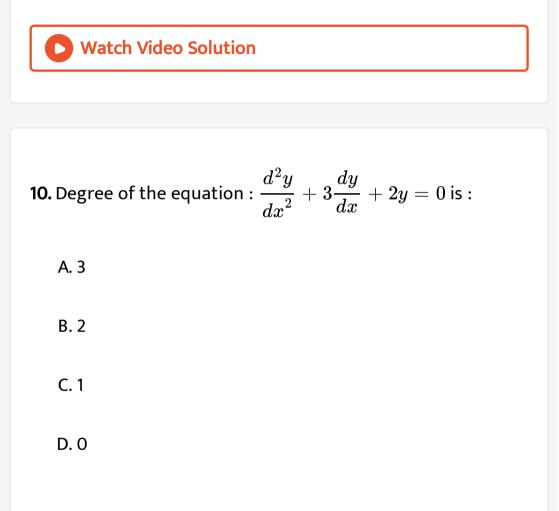
is :

A. 3

B. 2

C. 1

Answer: C



Answer: C



11. The degree of differential equation
$$\left(\frac{d^2y}{dx^2}\right)^3 + \sin\left(\frac{dy}{dx}\right) = 0$$
 is equal to

- B. 2
- C. 3
- D. None of these

Answer: D

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12. The degree of the differential equation

$$\left(rac{d^2y}{dx^2}
ight)^3+\left(rac{dy}{dx}
ight)^2+\sin\!\left(rac{dy}{dx}
ight)+1=0$$
 is:

A. 3

B. 2

C. 1

D. Not defined

Answer: D

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13. The degree of the differential equation $((d^2y)/(dx^2))^3 +$

 $\cos(dy/dx) = 0$ is equal to :

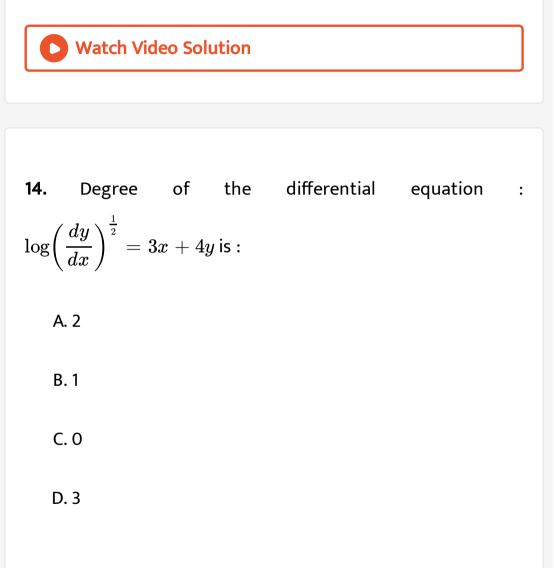
A. 1

B. 2

C. 3

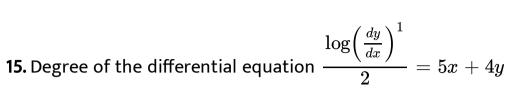
D. None of these

Answer: D









is :

A. 2

B. 1

C. 0

D. 3



16.	Degree	of	the	differential	equation	:
$\log \! \left(rac{dy}{dx} ight)^{rac{1}{2}} = 4x + 3y$ is :						
	A. 2					
	B. 1					
	C. 0					
	D. 3					

Answer: B

:



17. Degree of differential equation
$$x^2 \left(rac{dy}{dx}
ight)^3 - y rac{d^2 y}{dx^2} = 0$$
 is

A. 1

B. 2

C. 3

D. 4

Answer: A

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

A. 3

B. 2

C. 1

Answer: D



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

A. 2

- B. 1
- C. 3

D. 0

Answer: D



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

A. 4

B. 2

C. 1

D. 0

Answer: D



21. The general solution of differential equation : ydy + xdx = 0 is :

A.
$$x^2+y^2=c$$

B. $y^2=x^2+c$
C. $y^2=cx^2$
D. $x^2+y^2=c$

Answer: A



22. The general solution of differential equation :
$$rac{dy}{dx}=e^{x+y}$$

is equal to :

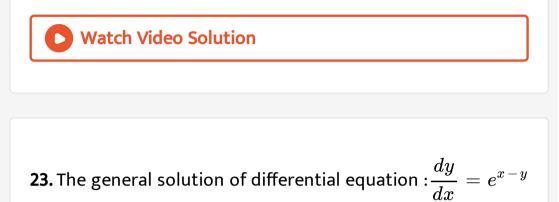
A.
$$e^x - e^y = c$$

$$\mathsf{B.}\,e^y-e^x=c$$

 $\mathsf{C}.\,e^x+e^{\,-\,y}=c$

D.
$$e^{-x} + e^{-y} = c$$

Answer: C



is equal to :

A.
$$e^x + e^{-y} = c$$

B. $e^y - e^x = c$

$$\mathsf{C}.\,e^x+e^y=c$$

D. $e^{-x} + e^{-y} = c$



24. The general solution of differential equation : $\frac{dy}{dx} = e^{y-x}$

is equal to :

- A. $e^x + e^{-y} = c$
- $\mathsf{B.}\,e^y-e^x=c$
- $\mathsf{C}.\, e^x + e^y = c$

D.
$$e^{-x} + e^{-y} = c$$



25. The Integrating Factor of the differentiate equation $\frac{dy}{dx} - 2y = 3x$ is :

A. e^{2x}

B. e^{-2x}

 $\mathsf{C}. e^x$

D. 2x

Answer: B

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26. The integrating factor of the differential equation

$$xrac{dy}{dx}-y=2x^2$$
 is:

A. e^{-x}

B. e^{-y}

 $\mathsf{C}.\,\frac{1}{x}$

 $\mathsf{D.}\,x$

Answer: C



27. Solve the differential equation :
$$x igg(rac{dy}{dx} igg) + y = x \log x$$

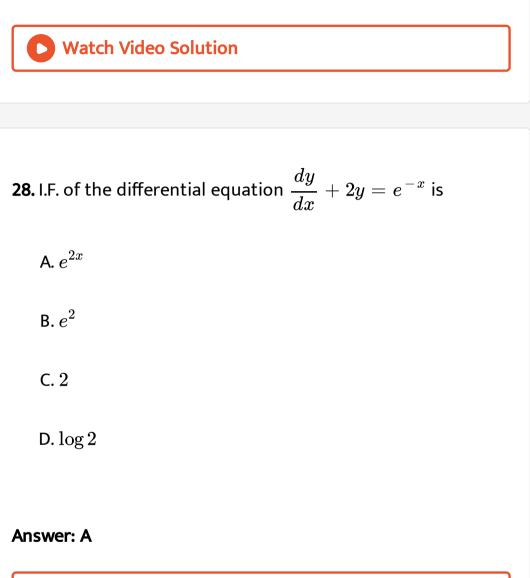
A. |x|

 $\mathsf{B.}\,x^2$

 $C.\sin x$

D. $\cos x$

Answer: A



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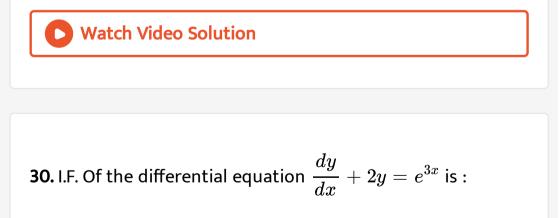
29. I.F. Of the differential equation $rac{dy}{dx}+2y=e^{4x}$ is :

A. e^{2x} B. e^{2}

 $\mathsf{C.}\ 2$

 $\mathsf{D}.\log 2$

Answer: A



A. e^{2x}

 $\mathsf{B.}\,e^2$

 $\mathsf{C.}\,2$

 $\mathsf{D}.\log 2$

Answer: A

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31. I.F. (Integrating Factor) of the differential equation $\frac{dy}{dx} - y = xe^x$ is :

A. e^x

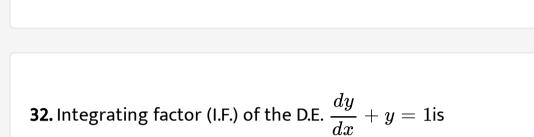
B. e^{-x}

C. *x*

 $D.\log x$

Answer: B

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B. e^x

A. e^{-x}

 $\mathsf{C}.\,x$

 $\mathsf{D.}\,x^2$



33. Integrating factor of differential equation : $rac{dy}{dx} + y = 3$

is :

A. x

B.e

 $\mathsf{C}. e^x$

 $D.\log x$

Answer: C

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34. The Integrating. factor of the differential equation $x\left(\frac{dy}{dx}\right) - 3y = e^{-2x}$ is :

A.
$$\frac{1}{x}$$

B. $\frac{1}{x^2}$
C. $\frac{1}{x^3}$
D. x^3

Answer: C



35. The integrating factor of the differential equation

$$xrac{dy}{dx}-y=e^{-3x}$$
 is A. $rac{1}{x}$ B. $rac{1}{x^2}$ C. x^2

Answer: B

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36. The general solution of the differential equation $\frac{ydx - xdy}{y} = 0$ is:

A. xy = C

 $\mathsf{B.}\, x = Cy^2$

 $\mathsf{C}.\, y = C x$

 $\mathsf{D}.\, y = C x^2$

Answer: C



37. A homogeneous differential equation of the form $\frac{dx}{dy} = h\left(\frac{x}{y}\right)$ can be solved by making the substitution.

A. y = vx

B. v = yx

 $\mathsf{C}.\,x=vy$

 $\mathsf{D}.\, x = v$

Answer: C



38. Which of the following is a homogeneous differential equation?

A.
$$(4x+5y+5)dy-(3y+2x+4)dx=0$$

B. $(xy)dx-(x^2+y^3)dy=0$
C. $(x^3+2y^2)dx+2xydy=0$
D. $y^2dx+(x^2-xy-y^2)dy=0$

Answer: D

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39. The degree of the differential equation $\frac{d^2y}{dx^2} + \left[1 + \left(\frac{dy}{dx}\right)^2\right]^{\frac{3}{2}} = 0$ is

A. 1

B. 2

C. 3

D. 4

Answer: B

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40. The degree of the differential equation

$$rac{d^2y}{dx^2} + 3igg(rac{dy}{dx}igg)^3 = x^2\logigg(rac{d^2y}{dx^2}igg), ext{ is }$$

A. 1

B. 2

C. 3

D. Not defined

Answer: D



41. The order and degree of the differential equation

$$\left[1+\left(rac{dy}{dx}
ight)^2
ight]^2=rac{d^2y}{dx^2}$$
 respectively are

B. 2,2

C. 2,1

D. 4,2

Answer: C



42. The order of the differential equation of all circles of given radius a is:

A. 1 B. 2 C. 3

D. 4



43. The solution of the differential equation 2x. $\frac{dy}{dx} - y = 3$

represents a family are

A. straight lines

B. circles

C. parabolas

D. ellipses

Answer: C

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44. The integrating factor of the differential equation $\frac{dy}{dx}(x\log x) + y = 2\log x$ is

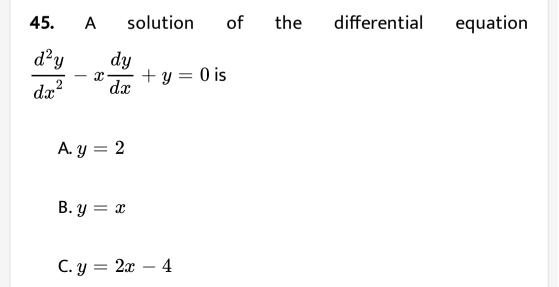
A. e^x

 $\mathsf{B}.\log x$

 $\mathsf{C}.\log(\log x)$

D. x





D.
$$y = 2x^2 - 4$$

Answer: C



46. Which of the following is not a homogenous function of x

and y

A.
$$x^2+2xy$$

B. $2x-y$
C. $\cos^2\Bigl(rac{y}{x}\Bigr)+$

 $\frac{y}{x}$

 $D.\sin x - \cos y$

Answer: D



47. Solution of the differential equation $rac{dy}{x} + yrac{dy}{y} = 0$ is

A.
$$rac{1}{x}+rac{1}{y}=c$$

 $\mathsf{B}.\log x.\log y = c$

$$\mathsf{C}. xy = c$$

D. x + y = c

Answer: C

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48. Solve the differential equation : $x \frac{dy}{dx} + 2y = x^2$.

A.
$$y=rac{x^2+c}{4x^2}$$

B.
$$y=rac{x^2}{4}+c$$

C. $y=rac{x^4+c}{x^2}$
D. $y=rac{x^4+c}{4x^2}$

Answer: D

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49. The degree of the differential equation $\left(\frac{d^2y}{dx^2}\right)^2 + \left(\frac{dy}{dx}\right)^2 = x\sin\left(\frac{dy}{dx}\right)$ is

A. 1

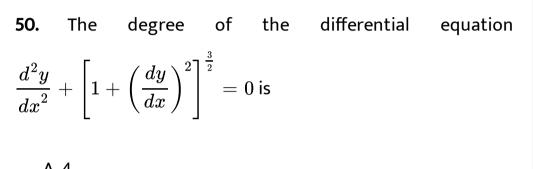
B. 2

C. 3

D. Not defined

Answer: D





B.
$$\frac{3}{2}$$

C. not defined

D. 2

Answer: C



51. The order and degree of the differential equation $\frac{d^2y}{dx^2} + \left(\frac{dy}{dx}\right)^{\frac{1}{4}} + x^{\frac{1}{5}} = 0$ respectively, are

A. 2 and not defined

B. 2 and 2

C. 2 and 3

D. 3 and 3

Answer: A

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52. Solution of differential equation xdy - ydx = 0 represents

A. a rectangular hyperbola

B. parabola whose vertex is at origin

C. straight line passing through origin

D. a circle whose centre is at origin

Answer: C

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53. Integrating factor of the differential equation $\cos x \frac{dy}{dx} + y \sin x = 1$ is A. cos x

B. tanx

C. secx

D. sinx

Answer: C

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54. Solution of the differential equation $\tan y \sec^2 x \, dx + \tan x \sec^2 y \, dy = 0$ is

A.
$$an x + an y = k$$
d

B.
$$an x - an y = k$$

C.
$$rac{ an x}{ an y} = k$$

D. $\tan x$. $\tan y = k$

Answer: D



55. Family $Y = Ax + A^3$ of curves is represented by the

differential equation of degree

A. 1

B. 2

C. 3

D. 4

Answer: A

56. Integrating factor of
$$x \frac{dy}{dx} - y = x^4 - 3$$
 is

A. x

B. logx

 $\mathsf{C}.\,\frac{1}{x}$

 $\mathsf{D}.-x$

Answer: C

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57. Solve the following differential equations

 $rac{dy}{dx}-y=\cos x$, given that x=0,y=1

A.
$$xy = -e^x$$

B. $xy - e^{-x} \mathsf{d}$

 $\mathsf{C.}\, xy=\,-1$

D.
$$y = e^x - 1$$

Answer: D

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58. The number of solutions of
$$rac{dy}{dx}=rac{y+1}{x-1}$$
 when $y(1)=2$

is r.

A. none

B. one

C. two

D. infinite

Answer: B

59. Which of the following is a second order differential equation:

A.
$$(y')^2 + x = y^2$$

B. $y'y'' = y + \sin x$
C. $y''' + (y'') + y = 0$
D. $y' = y^2$

Answer: B



60. Integrating factor of the differential equation

$$(1-x^2)\frac{dy}{dx} - xy = 1d$$
 is
A. $-x$
B. $\frac{x}{1+x^2}$
C. $\sqrt{1-x^2}$
D. $\frac{1}{2}\log(1-x^2)$

Answer: C

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61. $\tan^{-1} x + \tan^{-1} y = c$ is the general solution of the

differential equation:

A.
$$\frac{dy}{dx} = \frac{1+y^2}{1+x^2}$$

B. $\frac{dy}{dx} = \frac{1+x^2}{1+y^2}$
C. $(1+x^2)dy + (1+y^2)dx = 0$
D. $(1+x^2)dx + (1+y^2)dy = 0$

Answer: C

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62. The differential equation $y \frac{dy}{dx} + x = c$ represents

A. Family of hyperbolas

B. Family of parabolas

C. Family of ellipses

D. Family of circles

Answer: D



63. The general solution of $e^x \cos y dx - e^x \sin y dy = 0$ is

A.
$$e^x \cos y = k$$

- B. $e^x \sin y = k$
- $\mathsf{C}.\, e^x = k\cos y$
- D. $e^x = k \sin y$

Answer: A

64. The degree of the differential equation
$$\frac{d^2y}{dx^2} + \left(\frac{dy}{dx^3}\right) + 6y^5 = 0$$
 is

A. 1

B. 2

C. 3

D. 5

Answer: A

65. The solution of
$$\displaystyle rac{dy}{dx} + y = e^{-x}, y(0) = 0$$
 is

A.
$$y=e^x(x-1)$$

B.
$$y = xe^{-x}$$

C.
$$y = xe^{-x} + 1$$

D.
$$y = (x+1)e^{-x}$$

Answer: B



66. Integrating factor of the differential equation $\frac{dy}{dx} + y \tan x - \sec x = 0$ is

A. $\cos x$

B. $\sec x$

C. $e^{\cos x}$

D. $e^{\sec x}$

Answer: B

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67. Find the general solution of the differential equation

 $\left(rac{dy}{dx}
ight) = rac{1+y^2}{1+x^2}$

A.
$$y = an^{-1} x$$

B.
$$y-x=k(1+xy)$$

$$\mathsf{C.}\,x=\tan^{-1}y$$

$$\mathsf{D}. an(xy)=k$$

Answer: B



68. The integrating factor of the differential equation

$$rac{dy}{dx}+y=rac{1+y}{x}$$
 is
A. $rac{x}{e^x}$
B. $rac{e^x}{x}$
C. xe^xd
D. e^x

Answer: B

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69. The solution of the differential equation $\cos x \sin y dx + \sin x \cos y dy = 0$ is

A.
$$rac{\sin x}{\sin y} = c$$

 $\mathsf{B.}\sin x \sin y = c$

 $\mathsf{C}.\, six + \sin y = c$

 $\mathsf{D}.\cos x\cos y=c$

Answer: B



70. The solution of
$$x rac{dy}{dx} + y = e^x$$
 is

A.
$$y=rac{e^x}{x}+rac{k}{x}$$

B. $y=xe^x+cx$
C. $y=xe^x+k$
D. $x=rac{e^y}{y}=rac{k}{y}$

Answer: A



71. Family $y = Ax + A^3$ of curves will correspond to a differential equation of order

A. 3

 $\mathsf{B.}\,2$

 $\mathsf{C}.\,1$

D. Not defined

Answer: C

72. The general solution of $\displaystyle rac{dy}{dx} = 2x e^{x^2-y}$ is

A. $e^{x^2y}-c$ B. $e^{-y}+e^{x^2}=c$ C. $e^y=e^{x^2}+c$

D.
$$e^{x^2+y}=c$$

Answer: C



73. The curve for which the slope of the tangent at any point is equal to the ratio of the abscissa to the ordinate of the point is

A. an ellipse

B. parabola whose vertex is at origin

C. circle

D. rectangular hyperbola

Answer: D

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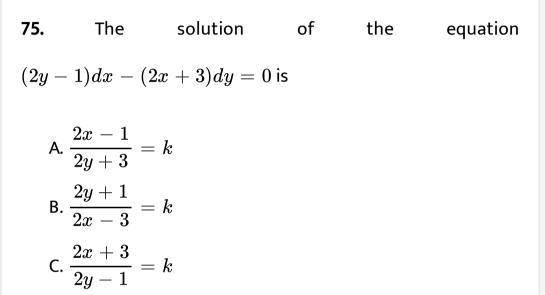
74. The general solution of the differential equation $rac{dy}{dx} = e^{rac{x^2}{2}} + xy$ is

A.
$$y = ce^{-rac{x^2}{2}}$$

B. $y = ce^{rac{x^2}{2}}$
C. $y = (x+c)e^{rac{x^2}{2}}$
D. $y = (c-x)e^{rac{x^2}{2}}$

Answer: C





D.
$$rac{2x-1}{2y-1}=k$$

Answer: C



76. The solution of $\displaystyle rac{dy}{dx} + y = e^{-x}, y(0) = 0$ is

A.
$$y=e^{-x}(x-1)$$

 $\mathsf{B.}\, y = x e^x$

$$\mathsf{C}.\, y = x e^{-x} + 1$$

D.
$$y = x e^{-x}$$

Answer: D

77. The order and degree of the differential equation
$$\left(\frac{d^3y}{dx^3}\right)^2 - 3\frac{d^2y}{dx^2} + 2\left(\frac{dy}{dx}\right)^4 = y^4$$
 are

B. 3,4

C. 2,4

D. 3,2

Answer: D

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78. The order and degree of the differential equation

$$\left[1+\left(rac{dy}{dx}
ight)^2
ight]^2=rac{d^2y}{dx^2}$$
 respectively are

A. 2,
$$\frac{3}{2}$$

B. 2, 3

C. 2, 1

D.3, 4

Answer: C



79. Which of the following is the general solution of

$$\frac{d^2y}{dx^2} - 2\frac{dy}{dx} + y = 0?$$
A. $y = (Ax + B)e^x$
B. $y = (Ax + B)e^{-x}$
C. $Y = Ae^x + Be^{-x}$
D. $Y = a\cos x + B\sin x$

Answer: A



80. General solution of $rac{dy}{dx} + y \tan x = \sec x$ is

A. $y \sec x = \tan x + c$

 $\mathsf{B.} y \tan x = \sec x + c$

 $C. \tan x = y \tan x + c$

D. $x \sec x = \tan y + c$

Answer: A



81. Solution of the differential equation $\frac{dy}{dx} + \frac{y}{x} = \sin x$ is

A.
$$x(y+\cos x)=\sin x+c$$

 $\mathsf{B.}\,x(y-\cos x)=\sin x+c$

 $\mathsf{C}.\, xy \cos x = \sin x + c$

 $\mathsf{D}.\, x(y+\cos x)=\cos x+c$

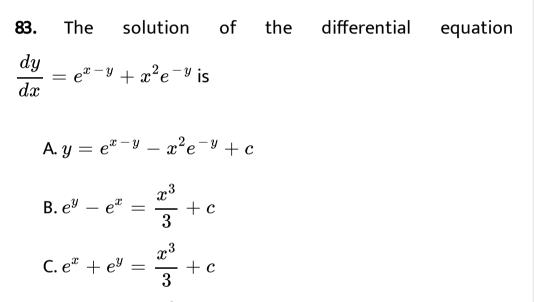
Answer: A

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82. The general solution of the differential equation $(e^{x} + 1)ydy = (y + 1)e^{x}dx$ is A. $(y + 1) = k(e^{x} + 1)$ B. $y + 1 = e^{x} + 1 + k$ C. $y = \log\{k(y + 1)(e^{x} + 1)\}$ D. $y = \log\left\{\frac{e^{x} + 1}{y + 1}\right\} + k$

Answer: C





D.
$$e^x-e^y=rac{x^3}{3}+c$$

Answer: B



84. The solution of the differential equation

$$\frac{dy}{dx} + \frac{2xy}{1+x^2} = \frac{1}{(1+x^2)^2}$$
 is
A. $y(1+x^2) = c + \tan^{-1} x$
B. $\frac{y}{1+x^2} = c + \tan^{-1} x$
C. $y \log(1+x^2) = c + \tan^{-1} x$
D. $y(1+x^2) = c + \sin^{-1} x$

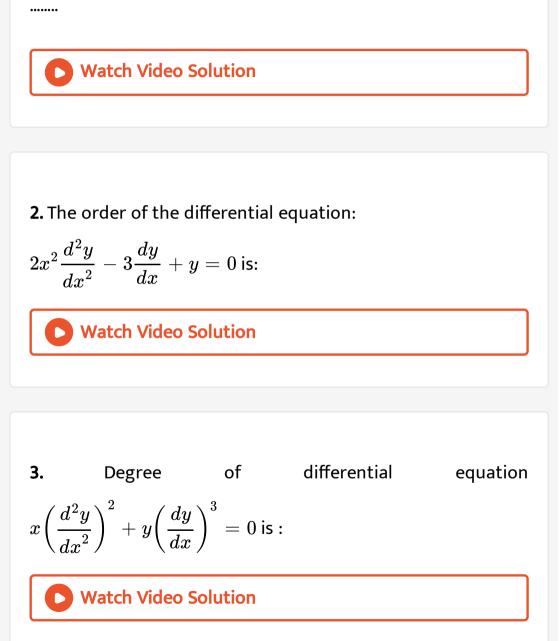
Answer: A

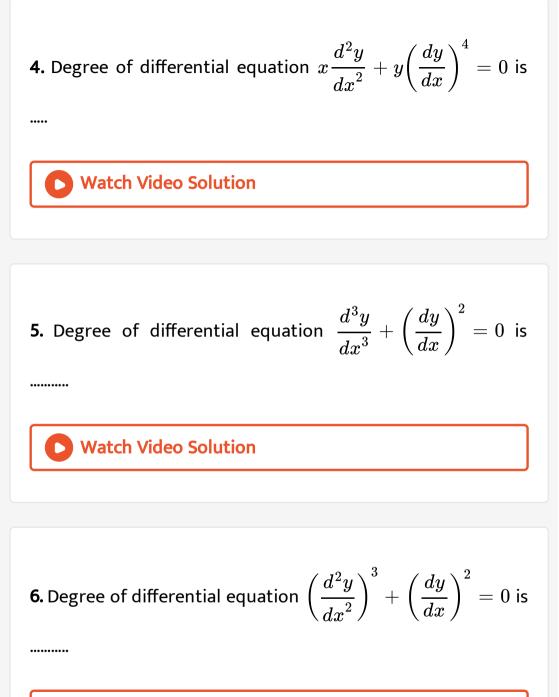
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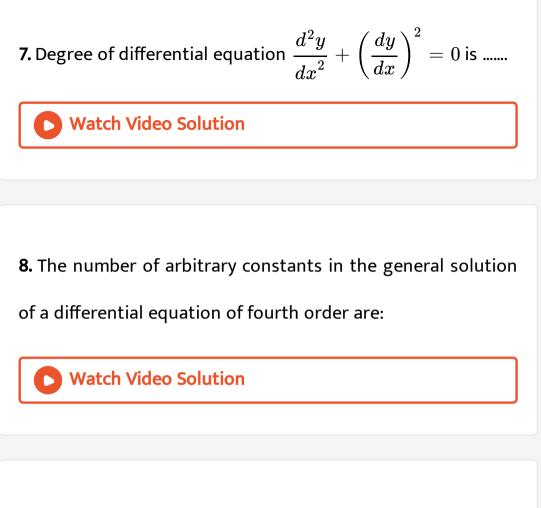
Type Ii Fill In The Blanks Questions

1. Order differential equation

$$rac{d^2y}{dx^2} - \left(rac{dy}{dx}
ight)^3 + 5y = 0$$
 is





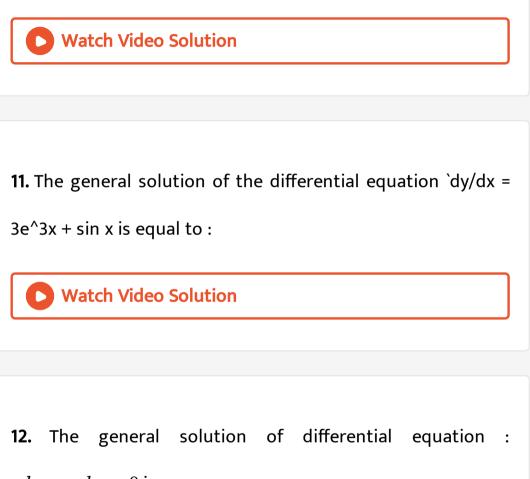


9. The number of arbitrary constants in the particular solution of a differential equation of 'third order are-:



10. The general solution of the differential equation dy/dx =

 $2e^{2x} + \sin x$ is equal to :



ydx - xdy = 0 is :

13. The general solution of differential equation : ydx + xdy = 0 is :

14. The Integrating Factor of the differential equation $xrac{dy}{dx}-y=2x^2$ is:

15. The integrating factor of differential equation $\frac{dy}{dx} + \frac{y}{x} = 2x$ is:



16. The integrating factor of the differential equation

$$xrac{dy}{dx}-y=2x^2$$
 is:

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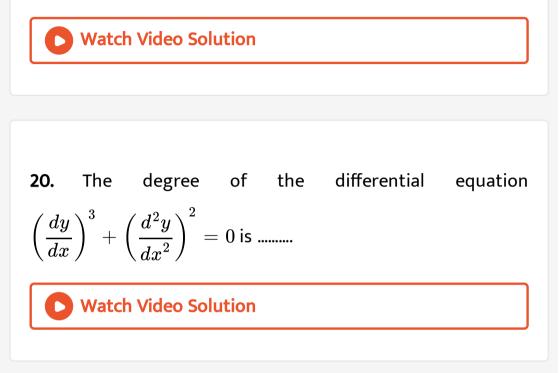
17. The integrating factor of differential equation
$$\frac{dy}{dx} + \frac{y}{x} = 2x$$
 is:

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18. The integrating factor of differential equation $\frac{dy}{dx} + \frac{2y}{x} = 3x$ is

19. Order of the differential equation representing the family

of parabolas $y^2 = 4ax$ is



21. The number of arbitrary constants in a particular solution

of the differential equation an x dx + an y dy = 0 is

22.
$$F(x,y)=rac{\sqrt{x^2+y^2}+y}{x}$$
 is a homogeneous function of

degree.....

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23. Integrating factor of the differential equation $x \frac{dy}{dx} - y = \sin x$ is

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24. The general solution of the differential equation $\frac{dy}{dx} = e^{x-y}$ is .

25. The general solution of the differential equation $\frac{dy}{dx} + \frac{y}{x} = 1$ is.....

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26. Solve the differential equation:

$$\left[rac{e^{-2\sqrt{x}}}{\sqrt{x}}-rac{y}{\sqrt{x}}
ight]rac{dx}{dy}=1, (x
eq 0)$$

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27. The degree of the differential equation
$$rac{d^2y}{dx^2} + e^{rac{dy}{dx}} = 0$$
 is

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....

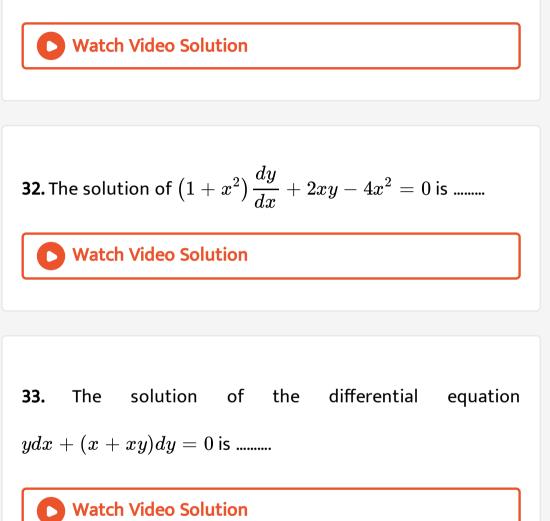
28. The degree of the differential equation
$$\sqrt{1 + \left(\frac{dy}{dx}\right)^2} = x$$
 is

29. The number of arbitrary constant in the general solution

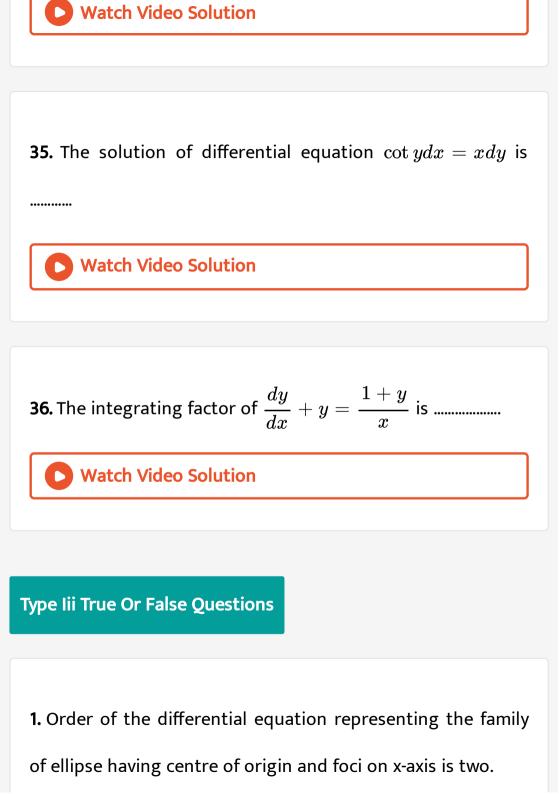
of a differential equation of order three is

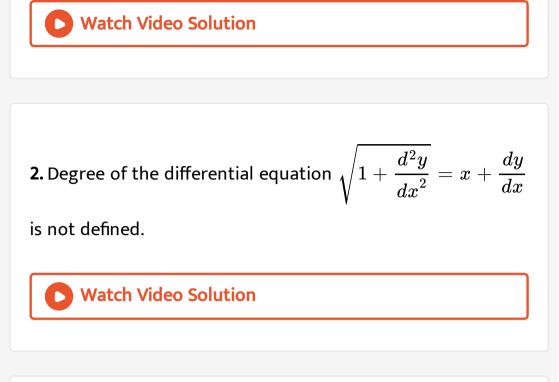
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30.
$$\frac{dy}{dx} + \frac{y}{x \log x} = \frac{1}{x}$$
 is an equation of the type.....

31. Solve the differential equation : $x \frac{dy}{dx} + 2y = x^2$.



34. General solution of
$$rac{dy}{dx} + y = \sin x$$
 is





3. $\frac{dy}{dx} + y = 5$ is a differential equation of the type $\frac{dy}{dx} + Py = Q$ but it can be solved using variable separble

method also.



4.
$$F(x,y) = rac{y\cos\left(rac{y}{x}
ight) + x}{x\cos\left(rac{y}{x}
ight)}$$
 is not a homiogeneous

function.

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5.
$$F(x,y) = rac{x^2+y^2}{x-y}$$
 is a homogeneous function of degree 1.

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6. Integrating factor of the differential equation $\frac{dy}{dx} - y = \cos x$ is

7. The general solution of the differential equation $xig(1+y^2ig)dx+yig(1+x^2ig)dy=0$ is $ig(1+x^2ig)ig(1+y^2ig)=k.$

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8. The general solution of the differential equation $\frac{dy}{dx} + y \sec x = \tan x$ is $y(\sec x - \tan x) = \sec x - \tan x + x + k.$

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9. Verify that the function $x+y= an^{-1}y$ satisfies the differential equation $y^2y'+y^2+1=0$

10. Integrating factor of the differential of the form $rac{dx}{dy} + p_1 x = Q_1$ is given by $e^{\int p_1 dy}$.



11. Correct substitution for the solution of the differential equation of the type $\frac{dy}{dx} = f(x, y)$, where f(x,y) is homogeneous function of zero dgree is y = vx.

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12. Number of arbitrary constants in the particular solution

of a differential equation of order two is :



13. The differential equation representing the family of circles

 $x^2 + (y-a)^2 = a^2$ will be of order two.

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14. show: The solution of
$$rac{dy}{dx}=\left(rac{y}{x}
ight)^{rac{1}{3}}$$
 is $y^{rac{2}{3}}-x^{rac{2}{3}}=c$

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15. show: The solution of the differential equation $\frac{dy}{dx} = \frac{x+2y}{x}$ is $x+y=kx^2$.

16. prove that : Solution of
$$x \frac{dy}{dx} = y + x an \frac{y}{x}$$
 is $\sin \left(\frac{y}{x} \right) = cx.$

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17. The differential equation of the all non horizontal lines in

a plane is
$$\displaystyle rac{d^2 x}{dy^2} = 0$$

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18. The degree of the differential equation

$$\left(rac{d^2y}{dx^2}
ight)^3+\left(rac{dy}{dx}
ight)^2+\sin\!\left(rac{dy}{dx}
ight)+1=0$$
 is:

19. The order of the differential equation

$$2x^2 \frac{d^2y}{dx^2} - 3\frac{dy}{dx} + y = 0$$
 is 2.
Vatch Video Solution

20. The number of arbitraruy constants in the particular solution of as differential equation of third order is 0.

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21. The general solution of differential equation

$$ydx - xdy = 0$$
 is y=cx.

22. Correct substitution for the solution of the differential equation of the type $\frac{dy}{dx} = f(x, y)$, where f(x,y) is homogeneous function of zero dgree is y = vx.



23. The integrating factor of the differential equation $\frac{dy}{dx}(x\log x) + y = 2\log x$ is

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24. The integrating factor of the differential equation $\left(1+y^2
ight)+\left(2xy-\cot y
ight)rac{dy}{dx}=0$ is....

25. The integrating factor of the differential equation

$$ig(1-y^2ig)rac{dx}{dy} + yx = ay, (\,-1 < y < 1)$$
 is:

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26. The integrating factor of the differential equation $x \frac{dy}{dx} - y = e^{-3x}$

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Questions Carrying 4 Marks

1. Write the sum of the order and the degree of the following

differential equation

$$\frac{d}{dx} \left\{ \left(\frac{dy}{dx} \right)^3 \right\} = 0$$
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2. Find the sum of the degree and the order for the following

differential equation:

$$rac{d}{dx} iggl[iggl(rac{d^2 y}{dx^2} iggr)^4 iggr] = 0$$

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3. Find the differential equations representing the family of curves $v = \frac{A}{r} + B$ where Aand B are arbitrary constants.

4. Solve :
$$x\sqrt{\left(1+y^2
ight)}dx+y\sqrt{\left(1+x^2
ight)}dy=0$$

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5. Solve
$$\sqrt{1+x^2+y^2+x^2y^2}+xyrac{dy}{dx}=0$$

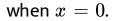
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6. Solve the following differential equation

$$e^x an y dx + (1-e^x) \mathrm{sec}^2 y dy = 0$$

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7. Find the particular solution of the following differential equation : $rac{dy}{dx} = 1 + x^2 + y^2 + x^2 y^2$, given that y = 1





8. Find the particular solution of the following differential

equation:

$$(x+1)rac{dy}{dx}=2e^{-y}-1,y=0$$
 when x=0

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9. Find the particular solution of the following differential

equation:

$$xyrac{dy}{dx}=(x+2)(y+2),y=\ -1$$
 when x=1

10. If y(x) is a solution of the differential equation $\left(\frac{2+\sin x}{1+y}\right)\frac{dy}{dx} = -\cos x$ and y(0)=1 then find the value of $y\left(\frac{\pi}{2}\right)$

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11. Find the particular solution of the differential equation

$$\log\!\left(rac{dy}{dx}
ight)=3x+4y$$
 given that $y=0$ when $x=0$

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12. Find the particular solution of the differential equation

$$e^x\sqrt{1-y^2}dx+rac{y}{x}dy=0$$
 given that y=1 when x=0

13. Solve the differential equation
$$(x^2-yx^2)dx+(y^2+x^2y^2)dy=0$$
 given that y=1, when x=1.

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14. Find the particular solution of the following differential

equation:

$$xrac{dy}{dx}-y+x\sin\Bigl(rac{y}{x}\Bigr)=0$$
 given that when $x=2,y=\pi$

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15. Show that each of the following differential equations is homogeneous and find the primitive of each of them. Derive

the solution whenever possible.

$$(x-y)y' = x+2y$$

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16. Show that each of the following differential equations is homogeneous and find the primitive of each of them. Derive the solution whenever possible.

$$2ye^{rac{x}{y}}dx+\Big(y-2xe^{rac{x}{y}}\Big)dy=0$$

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17. Show that each of the following differential equations is homogeneous and find the primitive of each of them. Derive

the solution whenever possible.

$$ydx+x\Bigl({
m log}{y\over x}\Bigr)dy-2xdy=0$$

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$$x^2rac{dy}{dx}=x^2-2y^2+xy$$

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19. Show that the given differential equation is homogeneous

and solve it: $\Big\{x\cos\Big(rac{y}{x}\Big)+y\sin\Big(rac{y}{x}\Big)\Big\}ydx=\Big\{y\sin\Big(rac{y}{x}\Big)-x\cos\Big(rac{y}{x}\Big)\Big\}xdy$

20. Solve the differential equation xdy - ydx = $\sqrt{x^2 + y^2}dx$



21. Solve the following differential equations

$$\Big(x\sinrac{y}{x}\Big)dy=\Big(y\sinrac{y}{x}-x\Big)dx$$

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22. Show that the differential equation
$$x - \cos\left(\frac{y}{x}\right)\left(\frac{dy}{dx}\right) = y\cos\left(\frac{y}{x}\right) + x$$
 is homogeneous and

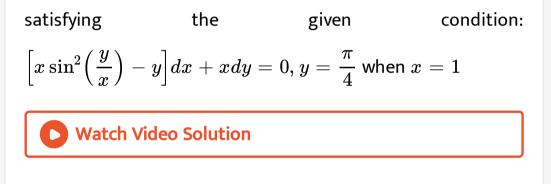
solve it.

23. Solve the following differential equation:

$$\Big[y-x\cos\Big(rac{y}{x}\Big)\Big]dy+\Big[y\cos\Big(rac{y}{x}\Big)-2x\sin\Big(rac{y}{x}\Big)\Big]dx=0$$

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24. For the differential equation, find the particular solution



25. For each of the differential equations, find the particular solution satisfying the given condition:

$$x^2 dy = ig(2xy+y^2ig) dx$$
, given that $y=1$ when x=1

26. For each of the differential equations, find the particular solution satisfying the given condition:

$$rac{dy}{dx} = rac{xy}{x^2+y^2}$$
 given that $y=1$ when x=0

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27. Solve :
$$x\log x rac{dy}{dx} + y = rac{2}{x}\log x.$$

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28. Find one parameter families of solution curves of the following differential equation:

$$ig(1+x^2ig) dy+2xydx=\cot xdx(x
eq 0)$$

29. Solve the differential equation:

$$\left[rac{e^{-2\sqrt{x}}}{\sqrt{x}}-rac{y}{\sqrt{x}}
ight]rac{dx}{dy}=1,\,(x
eq 0)$$



30. Solve the following differential equations

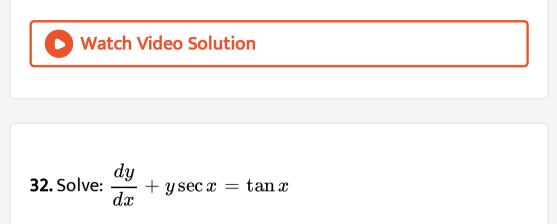
$$xdy - ig(y+2x^2ig)dx = 0$$



31. Find a one parameter family of solutions of each of the

following differential equations

$$y'\cos^2 x = \tan x - y$$



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33. Solve the following differential equations

$$ig(x^2-1ig)rac{dy}{dx}+2xy=rac{2}{x^2-1}$$

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34. The solution of
$$ig(1+x^2ig)rac{dy}{dx}+y=e^{ an-1x}$$
, is given by

35. Solve the following differential equation

$$ig(1+y^2ig)dx=ig(an^{-1}y-xig)dy$$

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36. Find the particular solution of the differential equation

 $(y-\sin x)dx+(\tan x)dy)=0$ satisfying the condition that y=0 when x=0

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37. Find the particular solution of the differential equation $\frac{dx}{dy} + y \cot x = 2x + x^2 \cot x (x
eq 0)$ given that y = 0 when $x = \frac{\pi}{2}$



38. Solve:
$$\frac{dy}{dx} + 2y \tan x = \sin x, y = 0$$
 when $x = \frac{\pi}{3}$

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39. Find the particular solution of the differential equation

$$(x+1)rac{dy}{dx}=2e-y-1$$
given that $y=0$ when $x=0$

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40. Solve the differential equation:

$$rac{dy}{dx} + y \cot x = 2 \cos x$$
 given that y=0 when $x = rac{\pi}{2}$

41. Solve the differential equation:

$$xrac{dy}{dx}+y=x\cos x+\sin x,$$
 given $y\Big(rac{\pi}{2}\Big)=2$