MATHS

31. The solution of the differential equation $xdy=\left(x^5+x^3y^2+y\right)dx$ is

1) $\tan^{-1}\left(\frac{y}{x}\right)=\frac{x^4}{4}+c$
2) $\tan^{-1}\left(\frac{y}{x}\right)=x^2+c$
3) $\cot^{-1}\left(\frac{y}{x}\right)=\frac{y^4}{4}+c$
4) $\cot^{-1}\left(\frac{y}{x}\right)=\frac{x^4}{4}+x^2+c$

32. $y\left(x^2y+e^x\right)dx-e^xdy=0$ then solution of above differential equation is

1) $x^3y+xy^3=e^x+c$
2) $x^3y+3e^x=3cy$
3) $x^3y-3e^x=c$
4) $xy^3+xy^3=3cy$

33. The solution of $(1+xy)xdy+(1-xy)ydx=0$

1) $-\frac{1}{xy}+\log x=c$
2) $\frac{-1}{xy}+\log y=c$
3) $\frac{-1}{xy}-xy=\log cx$
4) $\frac{-1}{xy}+\log_e\left(y/x\right)=c$

34. $\dfrac{xdx+ydy}{xdy-ydx}=\sqrt{\dfrac{a^2-x^2-y^2}{x^2+y^2}}$ then its solution is

1) $\sin^{-1}\left(\dfrac{\sqrt{x^2+y^2}}{a}\right)=\tan^{-1}\left(\dfrac{y}{x}\right)+c$ 2) $\tan^{-1}\left(\dfrac{\sqrt{x^2+y^2}}{a}\right)=\sin^{-1}(y/x)+c$

3) $\sin^{-1}\left(\dfrac{\sqrt{x^2+y^2}}{a}\right)=\sin^{-1}(y/x)+c$ 4) $\tan^{-1}\left(\dfrac{\sqrt{x^2+y^2}}{a}\right)=\tan^{-1}(y/x)+c$

35. $\left(\dfrac{1}{x}-\dfrac{y^2}{(x-y)^2}\right)dx+\left(\dfrac{x^2}{(x-y)^2}-\dfrac{1}{y}\right)dy=0$ then solution of above differential equation is

1) $\log\left(\dfrac{x}{y}\right)+\dfrac{xy}{x-y}=cx+cy$ 2) $\log\left(\dfrac{x}{y}\right)-\dfrac{xy}{x-y}=cx-cy$

3) $\log(x/y)+\dfrac{xy}{x-y}=c$ 4) $\log(x-y)+\log(x/y)=c$

36. Solution of the differential equation $\dfrac{dy}{dx}=\dfrac{3x^2y^4+2xy}{x^2-2x^3y^3}$

1) $x^3y^2+\dfrac{x^2}{y}=c$ 2) $x^3y^2+x^2=y^2+c$

3) $x^3y^2+\dfrac{y^2}{x}=c$ 4) $x^2y^3+\dfrac{x^2}{y}=x^2y^2$

37. $\frac{dy}{dx} - y\frac{\phi^1(x)}{\phi(x)} = \frac{-y^2}{\phi(x)}$ then $\phi(x) =$ _____

1) $xy + cy$ 2) $xy - cy^2$ 3) $x^2y^2 + cy$ 4) $xy^3 + x^3y = cy$

38. Solution of the differential equation $\frac{dy}{dx} = \frac{1}{x+y+1}$

1) $x = c.e^y + xy - 2$ 2) $x^2 = c.e^y - y + 2$

3) $x = c.e^y - y - 2$ 4) $xy = ce^y - x + 2$

39. Area of the smaller region bounded by $x^2 + y^2 = 1$ and $|y| = x + 1$

1) $\frac{\pi}{2}$ 2) $\frac{\pi}{2} - 1$ 3) $\frac{\pi}{2} + 1$ 4) 1

40. The area of the region bounded by $y = |x-1|$ and $y = 3 - |x|$

1) 1 sq. units 2) 2 sq. units 3) 3 sq. units 4) 4 sq. units

41. If a circle intersect with a concentric square at 8 – distinct points so that area of square out side the circle is equal to the area of the circle out side the square then ratio of radius of the circle to the side of the square

1) $\frac{1}{\pi}$ 2) $\frac{1}{\sqrt{\pi}}$ 3) $\frac{1}{\sqrt[3]{\pi}}$ 4) $\frac{1}{2\pi}$

42. Area of the region bounded by $x=y^2$ and $x=3-2y^2$

1) 1 2) 2 3) 3 4) 4

43. $\left(y-\sin^{-1}x\right)^2=x-x^2$ then area enclosed by this curve

1) π 2) $\frac{\pi}{3}$ 3) $\frac{\pi}{4}$ 4) $\frac{\pi}{6}$

44. Area bounded by $\left[|x|\right]+\left[|y|\right]=2$ (Where [.] denotes G.I.F and |.| is modules function)

1) 1 2) 12 3) 4 4) 9

45. Let $f(x)=\sin x+x$ and $g(x)$ be the inverse of $f(x)$. Find the area bounded by $g(x)$ with y-axis from $y=0$ to $y=2\pi$.

1) π^2 2) $2\pi^2$ 3) $3\pi^2$ 4) $4\pi^2$

46. If $\frac{dy}{dx}=y+\int_0^1 ydx$ and $y=1$, If $x=0$. then

1) $y=\frac{2e^x}{3-e}$ 2) $y=\frac{2\,e^x-e+1}{3-e}$ 3) $y=\frac{2\,e^x+1}{3-e}$ 4) $y=\frac{e^x}{3-e}+1$

47. If $x\int_0^x y(t)dt=(x+1)\int_0^x t\,y(t)dt$ $x>0$ then

1) $y=\frac{ce^{-1/x}}{x^3}$ 2) $y=\frac{c.e^{1/x}}{x^3}$ 3) $y=\frac{c}{x^3}$ 4) $y=c.e^{-1/x}$

48. Solution of $\frac{dy}{dx}+2.\frac{y}{x}=x$

1) $y=\frac{x^2}{4}+c$ 2) $y=\frac{x^2}{4}+\frac{c}{x^2}$ 3) $y=\frac{x^2}{4}+\frac{1}{x}$ 4) None

49. Area of the region bounded between $|x|+|y|=1$ and $x^2+y^2=1$

1) π sq. unit 2) 2 sq. units 3) $\pi+2$ sq. units 4) $(\pi-2)$ sq. units

50. Area bounded between two curves $y=x^2$ and $y=\sqrt{x}$

1) $\frac{1}{2}$ sq. units 2) $\frac{1}{3}$ sq. units 3) $\frac{1}{4}$ sq. units 4) 1 sq .unit

51. Area of the region bounded by $y^2=x^2\left(a^2-x^2\right)$

1) $\frac{a^3}{2}$ 2) $\frac{a^3}{3}$ 3) $\frac{2a^3}{3}$ 4) $\frac{4a^3}{3}$

52. The area of the figure bounded by $y=x^2-2x+3$ and the line tangent to it at $M(2,3)$ and y – axis

1) $\frac{2}{3}$ 2) $\frac{4}{3}$ 3) 2 4) $\frac{8}{3}$

53. The value of the parameter a such that area bounded by $y = x^2 - 3$ and the line $y = ax + 2$ attains its minimum value is

1) $a = 1$ 2) $a = -1$ 3) $a = 0$ 4) None

54. If area bounded by $y = e^{x^2}, x-$axis and the lines $x = 1, x = 2$ is equal to a sq. units then area bounded by $y = \sqrt{\log_e x}, y-$axis and the line $y = e$ and $y = e^4$ is

1) $e^4 - e - a$ 2) $2e^4 - e - 2a$ 3) $2e^4 - 2e - a$ 4) $2e^4 - e - a$

55. A point P – moves in xy – plane in such $[x + y + 1] = [x]$ where $[.]$ represents G.I.F and $0 < x < 2$ then Area of the region representing all possible positions of P is

1) 2 sq. units 2) 8 sq. units 3) $\sqrt{2}$ sq. units 4) 4 sq. units

56. The solution of the differential equation $x\frac{dy}{dx} = y - 3\left(\sqrt{y^2 - x^2}\right)$ is

1) $y^2\left(x + \sqrt{y^2 - x^2}\right) = c$ 2) $y^2\left(x - \sqrt{y^2 - x^2}\right) = c$

3) $x^2\left(y + \sqrt{y^2 - x^2}\right) = c$ 4) None

57. The differential equation whose general solution is $y = c_1 \sin x + c_2 \cos x$ where c_1, c_2 are arbitrary constants.

1) $\frac{d^2y}{dx^2} - y = 0$ 2) $\frac{dy}{dx} = y^2$ 3) $\frac{d^2y}{dx^2} + y = 0$ 4) $\frac{dy}{dx} + y^2 = 0$

58. The solution of $x\frac{dy}{dx} + y = xy^3$

1) $\frac{1}{x} - \frac{1}{2x^2y^2} = c$ 2) $\frac{1}{2x} - \frac{1}{x^2y^2} = c$ 3) $\frac{1}{x} + \frac{1}{2x^2y^2} = c$ 4) $\frac{1}{2x} + \frac{1}{x^2y^2} = c$

59. General solution of $\frac{dy}{dx} = \frac{x^2 + y^2 + 1}{2xy}$ is

1) $y^2 + 1 = x^2 + cy$ 2) $y^2 + 1 = x^2 + cx$

3) $x^2 + 1 = y^2 + cy$ 4) $x^2 + 1 = y^2 + cx$

60. Let $f : R \to R, g : R \to R$ be twice differentiable functions satisfying $f''(x) = g''(x)$, $2f'(1) = g'(1) = 4$ and $3f(2) = g(2) = 9$ then $f(4) - g(4) =$ _____

1) -6 2) -16 3) -10 4) -8