

Integration-Assignment

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1. Find the sum of the order and the degree of the differential equation :
$$\left(x + \frac{dx}{dy}\right)^2 = \left(\frac{dy}{dx}\right)^2 + 1$$
2. If $\frac{d}{dx}(x) = \frac{\sec^4 x}{\csc^4 x}$ and $F\left(\frac{\pi}{4}\right) = \frac{\pi}{4}$, then find $F(x)$
3. Find : $\int \frac{\log x - 3}{(\log x)^4} dx$.
4. Find : $\int \frac{dx}{\sqrt{x} + \sqrt[3]{x}}$.
5. Evaluate : $\int_0^{\pi/2} \frac{\cos x}{(1 + \sin x)(4 + \sin x)} dx$
6. Evaluate : $\int_0^{\pi} \frac{x}{1 + \sin x} dx$.
7. Using integration, find the area of the region enclosed by the curve $y = x^2$, the x-axis and the ordinates $x = -2$ and $x = 1$.
8. Using integration, find the area of the region enclosed by line $y = \sqrt{3}x$, semi-circle $y = \sqrt{4 - x^2}$ and x-axis in first quadrant.
9. Find the product of the order and the degree of the differential equation
$$\frac{d}{dx}(xy^2) \cdot \frac{dy}{dx} + y = 0$$
.
10. Find : $\int \frac{\sqrt{\cot x}}{\sin x \cos x} dx$
11. Find : $\int \frac{1}{x(x^2 + 4)} dx$

12. Evaluate : $\int_0^1 \tan^{-1} x dx$
13. Find : $\int \frac{2x}{x^2+3x+2} dx$
14. Solve the following differential equation : $(1 + e^{y/x}) dy + e^{y/x}(1 - \frac{y}{x}) dx = 0$
15. Evaluate : $\int_0^1 x(1-x)^n dx$
16. Using integration, find the area of the smaller region enclosed the curve $4x^2 + 4y^2 = 9$ and the line $2x + 2y = 3$
17. If the area of the region bounded by the curve $y^2 = 4ax$ and the line $x = 4a$ is $\frac{256}{3}$ sq.units, then using integration, find the value of a, where $a > 0$.
18. Find the general solution of the differential equation : $\frac{dy}{dx} = \frac{3e^{2x} + 3e^{4x}}{e^x + e^{-x}}$
19. Find : $\int \frac{dx}{x^2-6x+13}$
20. Find the particular solution of the differential equation $x \frac{dy}{dx} - y = x^2 \cdot e^x$, given $y(1) = 0$.
21. Find the general solution of the differential equation $x \frac{dy}{dx} = y(\log y - \log x + 1)$
22. Evaluate : $\int_{-\pi/2}^{\pi/2} (\sin|x| + \cos|x|) dx$
23. Find : $\int \frac{x^2}{(x^2+1)(3x^2+4)} dx$
24. Evaluate : $\int_{-2}^1 \sqrt{5-4x-x^2} dx$
25. Find the area of the region enclosed by the curves $y^2 = x$, $x = \frac{1}{4}$, $y = 0$ and $x = 1$, using integration.
26. $\int \frac{\cos 8x+1}{\tan 2x-\cot 2x} dx = \lambda \cos 8x + c$, then the value of λ is
 - (a) $\frac{1}{16}$
 - (b) $\frac{1}{8}$
 - (c) $-\frac{1}{16}$
 - (d) $-\frac{1}{8}$

27. $\int_0^1 \tan(\sin^{-1} x) dx$ equals
- 2
 - 0
 - 1
 - 1
28. The integrating factor of the differential equation $x\left(\frac{dy}{dx}\right) - y = \log x$ is _____.
29. Find the solution of the differential equation $\log\left(\frac{dy}{dx}\right) = ax + by$
30. Solve the following homogeneous differential equation : $x\left(\frac{dy}{dx}\right) = x + y$
31. Evaluate $\int_1^3 (x^2 + 1 + e^x) dx$ as the limit of sums.
32. If the area between the curves $x = y^2$ and $x = 4$ is divided into two equal parts by the line $x = a$, then find the value of a using integration.
33. Find : $\int \frac{x}{(x+1)^2(x+2)} dx$
34. Evaluate : $\int_0^1 \frac{xe^x}{(x+1)^2} dx$
35. Solve the following differential equation : $\left(\frac{dy}{dx}\right) = e^{x+y} + x^2 e^y$
36. The supply function of a commodity is $100p = (x + 20)^2$. Find producer's surplus (PS), when the market price is ₹25.
37. Find : $\int \frac{2x^2+1}{x^2-3x+2} dx$
38. In a certain culture of bacteria, the rate of increase of bacteria is proportional to the number present. It is found that there are 10,000 bacteria at the end of 3 hours and 40,000 bacteria at the end of 5 hours . determine the number of bacteria present int the beginning