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Time : 02:30:00 Hrs

- $\int \frac{1}{x^3} dx$ is
(a) $\frac{-3}{x^2} + c$ (b) $\frac{-1}{2x^2} + c$ (c) $\frac{-1}{3x^2} + c$ (d) $\frac{-2}{x^2} + c$
- $\int 2^x dx$ is
(a) $2^x \log 2 + c$ (b) $2^x + c$ (c) $\frac{2^x}{\log 2} + c$ (d) $\frac{\log 2}{2^x} + c$
- $\int \frac{\log x}{x} dx, x > 0$ is
(a) $\frac{1}{2} (\log x)^2 + c$ (b) $-\frac{1}{2} (\log x)^2 + c$ (c) $\frac{2}{x^2} + c$ (d) $\frac{2}{x^2} + c$
- $\int \sqrt{e^x} dx$ is
(a) $\sqrt{e^x} + c$ (b) $2\sqrt{e^x} + c$ (c) $\frac{1}{2}\sqrt{e^x} + c$ (d) $\frac{1}{2\sqrt{e^x}} + c$
- $\int \frac{dx}{\sqrt{x^2-36}}$ is
(a) $\sqrt{x^2-36} + c$ (b) $\log \left| x + \sqrt{x^2-36} \right| + c$ (c) $\log \left| x - \sqrt{x^2-36} \right| + c$ (d) $\log \left| x^2 + \sqrt{x^2-36} \right| + c$
- $\int_0^\infty e^{-2x} dx$ is
(a) 0 (b) 1 (c) 2 (d) $\frac{1}{2}$
- The value of $\int_{\frac{\pi}{2}}^{\frac{\pi}{4}} \cos x dx$ is
(a) 0 (b) 2 (c) 1 (d) 4
- The value of $\int_2^3 f(5-x) dx - \int_2^3 f(x) dx$ is
(a) 1 (b) 0 (c) -1 (d) 5
- Using the factorial representation of the gamma function, which of the following is the solution for the gamma function $\Gamma(n)$ when $n = 8$
(a) 5040 (b) 5400 (c) 4500 (d) 5540
- $\Gamma\left(\frac{3}{2}\right)$
(a) $\sqrt{\pi}$ (b) $\frac{\sqrt{\pi}}{2}$ (c) $2\sqrt{\pi}$ (d) $\frac{3}{2}$

10 x 2 = 20

11) Integrate the following with respect to x. $\sqrt{x}(x^3 - 2x + 3)$

12) Integrate the following with respect x.

$$\frac{x^3 + 3x^2 - 7x + 11}{x+5}$$

13)

Integrate the following with respect to x.

$$\frac{e^{3x} + e^{5x}}{e^x + e^{-x}}$$

14) Integrate the following with respect to x.

$$\sin^3 x$$

15) Integrate the following with respect to x.

$$\log x$$

16) Integrate the following with respect to x

$$\frac{1}{\sqrt{9x^2 - 7}}$$

17) Integrate the following with respect to x

$$\frac{1}{\sqrt{x^2 - 3x + 2}}$$

18) Integrate the following with respect to x

$$\sqrt{4x^2 - 5}$$

19) Using second fundamental theorem, evaluate the following:

$$\int_1^2 \frac{xdx}{x^2 + 1}$$

20) Evaluate the following using properties of definite integrals:

$$\int_{-1}^1 \log\left(\frac{2-x}{2+x}\right) dx$$

$$10 \times 3 = 30$$

21) Evaluate $\int \frac{2x^2 - 14x + 24}{x - 3} dx$

22) Evaluate $\int \frac{x+2}{\sqrt{2x+3}} dx$

23) Evaluate $\int \frac{1}{\sqrt{x+2} - \sqrt{x-2}} dx$

24) Evaluate $\int (\log x)^2 dx$

25) Evaluate $\int \frac{dx}{x^2 - 3x + 2}$

26) Evaluate $\int \frac{dx}{\sqrt{x^2 + 4x + 8}}$

27) Evaluate $\int \sqrt{x^2 - 4x + 3} dx$

28) Evaluate $\int_0^{\frac{\pi}{2}} \frac{\sin x}{\sin x + \cos x} dx$

29) Evaluate $\int_2^5 \frac{\sqrt{x}}{\sqrt{x} + \sqrt{7-x}} dx$

30) Evaluate the integral as the limit of a sum: $\int_1^2 x^2 dx$

$$7 \times 5 = 35$$

31) Evaluate $\int \frac{3x+2}{(x-2)^2(x-3)} dx$

32) Evaluate $\int \frac{3x^2 + 6x + 1}{(x+3)(x^2+1)} dx$

33) Evaluate $\int \left[\frac{1}{\log x} - \frac{1}{(\log x)^2} \right] dx$

34) Evaluate $\int_0^1 (e^x - 4a^x + 2 + \sqrt[3]{x}) dx$

35) Evaluate $\int_{\frac{\pi}{6}}^{\frac{\pi}{3}} \sin x \, dx$

36) Evaluate $\int_{-1}^1 (x^3 + 3x^2)^3 (x^2 + 2x) dx$

37) If $\int_a^b dx = 1$ and $\int_a^b x dx = 1$, then find a and b

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