All Branches Hinglish

Subject: Engineering Mathematics

DPP-09

Chapter: Integral Calculus

Topic : Integration & Definite Integration and its application

1. If $F(a)=\frac{1}{\log a}, a>1$ and $F(x)=\int a^x dx+K$ is equal to

(a) $\frac{1}{\log a}\left(a^x-a^a+1\right)$

(b) $\frac{1}{\log a}\left(a^x-a^a\right)$

(c) $\frac{1}{\log a}\left(a^x+a^a+1\right)$

(d) $\frac{1}{\log a}\left(a^x+a^a-1\right)$

2. $\int\frac{dx}{1+\sin x}$ is equal to

(a) $-\cot x+\operatorname{cosec} x+c$

(b) $\cot x+\operatorname{cosec} x+c$

(c) $\tan x-\sec x+c$

(d) $\tan x+\sec x+c$

3. $\int\frac{(3x+1)}{2x^2-2x+3}dx$ equal to

(a) $\frac{3}{4}\log\left(2x^2-2x+3\right)+\frac{\sqrt{5}}{2}\tan^{-1}\left(\frac{2x-1}{\sqrt{5}}\right)$

(b) $\frac{4}{3}\log\left(2x^2-2x+3\right)+\sqrt{5}\tan^{-1}\left(\frac{2x-1}{\sqrt{5}}\right)$

(c) $\frac{4}{3}\log\left(2x^2-2x+3\right)+\frac{2}{\sqrt{5}}\tan^{-1}\left(\frac{2x-1}{\sqrt{5}}\right)$

(d) $\frac{3}{4}\log\left(2x^2-2x+3\right)+\frac{2}{\sqrt{5}}\tan^{-1}\left(\frac{2x-1}{\sqrt{5}}\right)$

4. $\int\frac{2x+3}{\sqrt{x^2+x+1}}dx$ is equal to

(a) $2\sqrt{x^2+x+1}+2\sinh^{-1}\frac{2x+1}{\sqrt{3}}$

(b) $\sqrt{x^2+x+1}+2\sinh^{-1}\frac{2x+1}{\sqrt{3}}$

(c) $2\sqrt{x^2+x+1}+\sinh^{-1}\frac{2x+1}{\sqrt{3}}$

(d) $2\sqrt{x^2+x+1}-\sinh^{-1}\frac{2x+1}{\sqrt{3}}$

5. The value of $\int e^x\left(\frac{1+\sin x}{1+\cos x}\right)dx$ is

(a) $e^x\tan\frac{x}{2}+c$ (b) $e^x\cot\frac{x}{2}+c$

(c) $e^x\tan x+c$ (d) $e^x\cot x+c$

6. $\int_0^{\pi/2}\frac{e^x}{2}\left(\sec^2\frac{x}{2}+2\tan\frac{x}{2}\right)dx$ is equal to

(a) e^{π} (b) $e^{\pi/2}$

(c) e (d) $e^{\pi/4}$

7. $\int_0^1\int_x^{\sqrt{x}}\left(x^2+y^2\right)dydx$ is equal to

(a) 7/60 (b) 3/35

(c) 4/49 (d) None of these

8. $\int_{-1}^{1}\frac{|x|}{x}dx$ is equal to

(a) 2 (b) 0

(c) 1 (d) 1/2

9. $\int_{-1}^{1}\int_0^z\int_{x-z}^{x+z}(x+y+z)\,dy\,dx\,dz$ is equal to

(a) 4 (b) –4

(c) 0 (d) None of these

10. $\int_0^{\pi}\cos^m x\sin^n x dx$ is equal to zero, if

(a) m is even (b) n is even

(c) m is odd (d) n is odd

11. The area bounded by the curve $r = \theta \cos\theta$ and the lines $\theta = 0$ and $\theta = \frac{\pi}{2}$ is given by

(a) $\frac{\pi}{4}\left(\frac{\pi^2}{16}-1\right)$ (b) $\frac{\pi}{16}\left(\frac{\pi^2}{6}-1\right)$

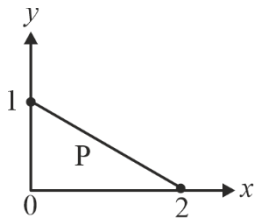
(c) $\frac{\pi}{16}\left(\frac{\pi^2}{16}-1\right)$ (d) None of these

12. The volume of the cylinder $x^2 + y^2 = a^2$ bounded below by $z = 0$ and bounded above by $z = h$ is given by

(a) rah (b) $\pi a^2 h$

(c) $\frac{1}{3}\pi a^3 h$ (d) None of these

13. Consider the triangular region P shown in the figure. What is $\iint_P xydxdy$?



(a) 1/6 (b) 2/9

(c) 7/16 (d) 1

14. The area enclosed between the curves $y^2 = 4x$ and $x^2 = 4y$ is

(a) 16/3 (b) 8

(c) 32/3 (d) 16

Answer Key

1. (a)
2. (c)
3. (a)
4. (a)
5. (a)
6. (b)
7. (b)
8. (b)
9. (c)
10. (c)
11. (c)
12. (b)
13. (a)
14. (a)