

Grade: XII MATHEMATICS-WORKSHEET(INTEGRATION)

I. Integrate the following with respect to 'x':

1. (i) $(3x+4)^6$ (ii) $(4-3x)^7$ (iii) $(lx+m)^6$
2. (i) $\frac{1}{(2x+3)^5}$ (ii) $\frac{1}{(bx-a)^8}$ (iii) $\frac{1}{(x+3)^2}$
3. (i) $\frac{1}{(2x+3)}$ (ii) $\frac{1}{(4-5x)}$ (iii) $\frac{1}{(s-tx)}$
4. (i) $\sin(2x+4)$ (ii) $\cos(5-2x)$
5. (i) $\sec^2(3-4x)$ (ii) $\operatorname{cosec}^2\left(\frac{2}{3}x-4\right)$
6. (i) $\sec(7x-8)$ (ii) $\tan(7x-8)$ (iii) $\operatorname{cosec}(2-x)$ (iv) $\cot(2-x)$
7. (i) e^{5-4x} (ii) e^{ax+b}
8. (i) $\frac{1}{\cos^2(px+q)}$ (ii) $\frac{1}{\sin^2(l-mx)}$
9. (i) $(3-2x)^{-1}$ (ii) e^{-x} (iii) $\sqrt{4-5x}$
10. (i) $\frac{\tan(3-4x)}{\cos(3-4x)}$ (ii) $\frac{1}{e^{p+qx}}$ (iii) $\frac{1}{\tan(2x+3)\sin(2x+3)}$

II. Integrate :

11. (i) $a^x + x^a + 10 - \operatorname{cosec} 2x \cot 2x$ (ii) $k \sec^2(ax+a) - \sqrt[3]{(4x+5)^2}$
12. (i) $\frac{1}{5} \cos\left(\frac{x}{5} + 7\right) + \frac{3}{(lx+m)} + e^{\frac{x}{2}+3}$ (ii) $p \operatorname{cosec}^2(px-q) - 6(1-x)^4 + 4e^{3-4x}$
13. (i) $\frac{1}{\left(3+\frac{2}{3}x\right)} - \frac{2}{3} \cos\left(x-\frac{2}{3}\right) + 3\left(\frac{x}{3}+4\right)^6$ (ii) $\frac{3}{x} + \frac{m}{4x+1} - 2(5-2x)^5$
14. $(ae)^x - a^{-x} + b^x$
15. $2x^e + 3e^x + e^e$
16. $a \sec^2(bx+c) + \frac{q}{e^{l-mx}}$

III. Integrate :

17. (i) $(1+x^2)^3$ (ii) $\sin 5x \cos 2x$ (iii) $\frac{x^2 - 5x + 1}{x}$
18. (i) $\cos^3 x$ (ii) $(\tan x + \cot x)^2$ (iii) $\frac{1}{1 + \cos x}$
19. (i) $\frac{1 - \cos x}{1 + \cos x}$ (ii) $\sqrt{1 + \sin 2x}$ (iii) $\frac{x^3 + 2}{x - 1}$
20. (i) $\frac{\cos 2x}{\sin^2 x \cos^2 x}$ (ii) $\frac{3^x - 2^{x+1}}{6^x}$
21. (i) $e^{x \log 2} e^x$ (ii) $\frac{1}{\sqrt{x+3} - \sqrt{x-4}}$
22. (i) $(3x+4)\sqrt{3x+7}$ (ii) $(2x+1)\sqrt{2x+1}$
23. (i) $\cos^2 5x \sin 10x$ (ii) $\sin mx \cos nx (m > n)$
24. (i) $\frac{x+1}{(x+2)(x+3)}$ (ii) $\frac{x^2+1}{(x-2)(x+2)(x^2+9)}$
25. (i) $\frac{1}{\sin^2 x \cos^2 x}$ (ii) $\cos^3 2x - \sin 6x$

IV. Integrate the following with respect to x:

26. (i) $x^{16}(1+x^{17})^4$ (ii) $\frac{x^{24}}{(1+x^{25})^{10}}$ (iii) $\frac{x^{15}}{1+x^{32}}$
27. (i) $x(a-x)^{17}$ (ii) $\frac{e^{\sqrt{x}}}{\sqrt{x}}$
28. (i) $\frac{\log(\tan x)}{\sin 2x}$ (ii) $\sin^{15} x \cos x$
29. (i) $e^{\tan x} / \cos^2 x$ (ii) $\tan x \sqrt{\sec x}$
30. (i) $\frac{e^{x/2} - e^{-x/2}}{e^x - e^{-x}}$ (ii) $\frac{1}{x + \sqrt{x}}$
31. (i) $\alpha \beta x^{\alpha-1} e^{-\beta x^\alpha}$ (ii) $x^2(2-x)^{15}$
32. (i) $(2x-3)\sqrt{4x+1}$ (ii) $\frac{x \sin^{-1}(x^2)}{\sqrt{1-x^4}}$
33. (i) $\frac{\cos x}{\cos(x-a)}$ (ii) $\frac{\sin 2x}{a \cos^2 x + b \sin^2 x}$

$$34. \quad (i) \frac{1 + \tan x}{x + \log \sec x} \quad (ii) \frac{5(x+1)(x + \log x)^4}{x}$$

V. Integrate the following with respect to x:

$$35. \quad (i) x \sec^2 x \quad (ii) \log x \quad (iii) \sin^{-1} x \quad (iv) \tan^{-1} x$$

$$36. \quad (i) x \sin^2 x \quad (ii) x \sin 3x \cos 2x \quad (iii) x^2 \cos 2x$$

$$37. \quad (i) \frac{x \sin^{-1} x}{\sqrt{1-x^2}} \quad (ii) e^{\sqrt{x}}$$

$$38. \quad (i) x^3 e^{x^2} \quad (ii) x 5^x$$

$$39. \quad (i) x \tan^2 x \quad (ii) x^2 \cos 3x$$

$$40. \quad (i) x \sin^{-1}(x^2) \quad (ii) \cos ec^3 x$$

$$41. \quad (i) \sec^3 2x \quad (ii) \sec^3 x$$

$$42. \quad (i) e^{ax} \cos bx \quad (ii) e^{3x} \sin 2x$$

$$43. \quad (i) e^{4x} \cos 5x \sin 2x \quad (ii) e^{-3x} \cos^3 x$$

VI. Integrate the following:

$$44. \quad (i) \frac{1}{(3x+5)^2 + 4} \quad (ii) \frac{1}{2x^2 + 7x + 13} \quad (iii) \frac{1}{9x^2 + 6x + 10}$$

$$45. \quad (i) \frac{1}{1+x-x^2} \quad (ii) \frac{1}{5-6x-9x^2}$$

$$46. \quad (i) \frac{1}{(2x-1)^2 - 26} \quad (ii) \frac{1}{x^2 + 3x - 3}$$

$$47. \quad (i) \frac{1}{\sqrt{(3x-5)^2 + 6}} \quad (ii) \frac{1}{\sqrt{x^2 + 5x + 26}}$$

$$48. \quad (i) \frac{1}{\sqrt{x^2 + 4x - 12}} \quad (ii) \frac{1}{\sqrt{8-x-x^2}}$$

$$49. \quad (i) \frac{1}{\sqrt{1+x-x^2}} \quad (ii) \sqrt{x^2 - 3x + 10}$$

$$50. \quad (i) \frac{2x-1}{2x^2+x+3} \quad (ii) \sqrt{\frac{1+x}{1-x}} \quad (iii) \frac{6x+7}{\sqrt{(x-4)(x-5)}} \quad (iv) \frac{4x+1}{x^2+3x+1}$$