

KEY CONCEPTS

1. If $n \neq -1$ then $\int x^n dx = \frac{x^{n+1}}{n+1} + c.$

2. $\int dx = x + c$

3. $\int \frac{1}{\sqrt{x}} dx = 2\sqrt{x} + c$

4. $\int \frac{1}{x} dx = \log |x| + c.$

5. $\int e^x dx = e^x + c$

6. $a > 0, a \neq 1$ then $\int a^x dx = \frac{a^x}{\log a} + c.$

7. $\int \cos x dx = \sin x + c$

8. $\int \sin x dx = -\cos x + c$

9. $\int \sec^2 x dx = \tan x + c$

10. $\int \csc^2 x dx = -\cot x + c$

11. $\int \sec x \tan x dx = \sec x + c$

12. $\int \csc x \cot x dx = -\csc x + c$

13. $\int \frac{1}{\sqrt{1-x^2}} dx = \sin^{-1} x + c = -\cos^{-1} x + c$

Indefinite Integration

247

14. $\int \frac{1}{1+x^2} dx = \tan^{-1} x + c = -\cot^{-1} x + c$

15. If $x > 1$, then $\int \frac{1}{x\sqrt{x^2-1}} dx = \sec^{-1} x + c = -\cosec^{-1} x + c$

and if $x < -1$ then $\int \frac{1}{x\sqrt{x^2-1}} dx = -\sec^{-1} x + c = \cosec^{-1} x + c$

16. $\int \sinh x dx = \cosh x + c$

17. $\int \cosh x dx = \sinh x + c$

18. $\int \operatorname{sech}^2 x dx = \tanh x + c$

19. $\int \operatorname{cosech}^2 x dx = -\coth x + c$

20. $\int \operatorname{sech} x \tanh x dx = -\operatorname{sech} x + c$

21. $\int \operatorname{cosech} x \coth x dx = -\operatorname{cosech} x + c$

22. $\int \frac{1}{\sqrt{1+x^2}} dx = \operatorname{sinh}^{-1} x + c$

23. $\int \frac{1}{\sqrt{x^2-1}} dx = \operatorname{cosh}^{-1} x + c$

24. If $f(x)$ is an integrable function and k is a real number then $\int (kf)(x) dx = k \int f(x) dx$.

25. $f(x), g(x)$ are two integrable functions then $\int (f+g)(x) dx = \int f(x) dx + \int g(x) dx$.

26. If $f(x), g(x)$ are two integrable functions then $\int (f-g)(x) dx = \int f(x) dx - \int g(x) dx$.

27. If $f_1(x), f_2(x), \dots, f_n(x)$ are integrable functions then $\int (f_1+f_2+\dots+f_n)(x) dx$

$$= \int f_1(x) dx + \int f_2(x) dx + \dots + \int f_n(x) dx.$$

28. If $f(x), g(x)$ are two integrable functions and k, l are two real numbers then
 $\int (kf+lg)(x) dx = k \int f(x) dx + l \int g(x) dx$.

29. If $\int f(x) dx = g(x)$ then $\int f(ax+b) dx = \frac{1}{a} g(ax+b) + c$.

30. If $f(x)$ is a differentiable function then $\int \frac{f'(x)}{f(x)} dx = \log |f(x)| + c$.

31. $\int \tan x \, dx = \log |\sec x| + c.$

32. $\int \cot x \, dx = \log |\sin x| + c.$

33. $\int \sec x \, dx = \log |\sec x + \tan x| + c = \log |\tan(\pi/4 + x/2)| + c$

34. $\int \csc x \, dx = \log |\csc x - \cot x| + c = \log |\tan x/2| + c.$

35. If $f(x)$ is differentiable function and $n \neq -1$ then $\int [f(x)]^n f'(x) \, dx = \frac{[f(x)]^{n+1}}{n+1} + c.$

36. If $n = -1$ then $\int [f(x)]^n f'(x) \, dx = \int \frac{f'(x)}{f(x)} \, dx = \log |f(x)| + c.$

37. $\int \frac{f'(x)}{\sqrt{f(x)}} \, dx = 2\sqrt{f(x)} + c$

38. If $\int f(x) \, dx = F(x)$ and $g(x)$ is a differentiable function then $\int (f \circ g)(x) g'(x) \, dx = F[g(x)] + c.$

39. $\int \frac{1}{\sqrt{a^2 - x^2}} \, dx = \sin^{-1}\left(\frac{x}{a}\right) + c$

40. $\int \frac{1}{\sqrt{a^2 + x^2}} \, dx = \sinh^{-1}\left(\frac{x}{a}\right) + c.$

41. $\int \frac{1}{\sqrt{x^2 - a^2}} \, dx = \cosh^{-1}\left(\frac{x}{a}\right) + c.$

42. $\int \frac{1}{a^2 + x^2} \, dx = \frac{1}{a} \tan^{-1}\left(\frac{x}{a}\right) + c.$

43. $\int \frac{1}{a^2 - x^2} \, dx = \frac{1}{2a} \log \left| \frac{a+x}{a-x} \right| + c.$

44. $\int \frac{1}{x^2 - a^2} \, dx = \frac{1}{2a} \log \left| \frac{x-a}{x+a} \right| + c.$

45. $\int \sqrt{a^2 - x^2} \, dx = \frac{x}{2} \sqrt{a^2 - x^2} + \frac{a^2}{2} \sin^{-1}\left(\frac{x}{a}\right) + c.$

46. $\int \sqrt{a^2 + x^2} \, dx = \frac{x}{2} \sqrt{a^2 + x^2} + \frac{a^2}{2} \sinh^{-1}\left(\frac{x}{a}\right) + c.$

47. $\int \sqrt{x^2 - a^2} \, dx = \frac{x}{2} \sqrt{x^2 - a^2} - \frac{a^2}{2} \cosh^{-1}\left(\frac{x}{a}\right) + c.$

48. Integration By Parts : If $f(x)$ and $g(x)$ are two integrable functions then

$$\int f(x) \cdot g(x) \, dx = f(x) \int g(x) \, dx - \int f'(x) \cdot [\int g(x) \, dx] \, dx.$$

49. If u and v are two functions of x then $\int u dv = uv - \int v du$.

50. $\int e^{ax} \cos bx dx = \frac{e^{ax}}{a^2 + b^2} (a \cos bx + b \sin bx) + c$

51. $\int e^{ax} \sin bx dx = \frac{e^{ax}}{a^2 + b^2} (a \sin bx - b \cos bx)$.

52. $\int e^x [f(x) + f'(x)] dx = e^x f(x) + c$.

53. $\int e^{-x} [f(x) - f'(x)] dx = -e^{-x} f(x) + c$

54. If $I_n = \int x^n e^{ax} dx$, then $I_n = \frac{e^{ax}}{a} x^n - \frac{n}{a} I_{n-1}$ where n is a positive integer.

55. If $I_n = \int \sin^n x dx$ then $I_n = \frac{-\sin^{n-1} x \cos x}{n} + \frac{n-1}{n} I_{n-2}$, where n is a positive integer.

56. If $I_n = \int \cos^n x dx$ then $I_n = \frac{\cos^{n-1} x \sin x}{n} + \frac{n-1}{n} I_{n-2}$.

57. If $I_n = \int \tan^n x dx$ then $I_n = \frac{\tan^{n-1} x}{n-1} - I_{n-2}$.

58. If $I_n = \int \cot^n x dx$ then $I_n = \frac{-\cot^{n-1} x}{n-1} - I_{n-2}$.

59. If $I_n = \int \sec^n x dx$ then $I_n = \frac{\sec^{n-2} x \tan x}{n-1} + \frac{n-2}{n-1} I_{n-2}$.

60. If $I_n = \int \operatorname{cosec}^n x dx$ then $I_n = \frac{-\operatorname{cosec}^{n-2} x \cot x}{n-1} + \frac{n-2}{n-1} I_{n-2}$.

61. If $I_n = \int (\log x)^n dx$ then $I_n = x (\log x)^n - n I_{n-1}$.

62. If $I_{m,n} = \int \sin^m x \cos^n x dx$ then

$$I_{m,n} = \frac{\sin^{m+1} x \cos^{n-1} x}{m+n} + \frac{n-1}{m+n} I_{m,n-2} = -\frac{\sin^{m-1} x \cos^{n+1} x}{m+n} + \frac{m-1}{m+n} I_{m-2,n}$$

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OBJECTIVE QUESTIONS FOR EAMCET & JEE

1. $\int \frac{1}{x} dx =$

[CEE 79]

- 1) $\log x$ 2) $\log x + c$ 3) $\log |x|$ 4) $\log |x| + c$

2. $\int |x| dx =$

[EAMCET 96]

- 1) $\frac{x^2}{2} + c$ 2) $\frac{x|x|}{2} + c$

3) $x^2 + c$

4) $\frac{|x|^2}{2} + c$

3. $\int e^{\log(1 + \cot^2 x)} dx =$

- 1) $-\cot x + c$ 2) $\cot x + c$ 3) $\cosec x + c$ 4) $-\cosec x + c$

4. $\int \tan^2 x dx =$

- 1) $\tan x + x + c$ 2) $\tan x - x + c$ 3) $\sec x - x + c$ 4) $\sec x + x + c$

5. $\int \frac{1 - \cos 2x}{1 + \cos 2x} dx =$

- 1) $\tan x + x + c$ 2) $\tan x - x + c$ 3) $\sec x - x + c$ 4) $\sec x + x + c$

6. $\int (\tan x + \cot x)^2 dx$

- 1) $\tan x - \cot x + c$ 2) $\tan x + \cot x + c$ 3) $\sec x - \tan x + c$ 4) $\sec x + \cosec x + c$

7. $\int \frac{\sec x}{\sec x + \tan x} dx =$

- 1) $\sec x - \tan x + c$ 2) $\tan x + \sec x + c$ 3) $\tan x - \sec x + c$ 4) none

8. $\int \frac{\cos^2 x}{1 + \sin x} dx =$

- 1) $x - \sin x + c$ 2) $x + \cos x + c$ 3) $x - \cos x + c$ 4) none

9. $\int \frac{1}{1 + \sin x} dx =$

- 1) $\tan x + \sec x + c$ 2) $\tan x - \sec x$ 3) $\tan x - \sec x + c$ 4) $\tan x + \sec x$

10. $\int \frac{1}{\sin^2 x \cos^2 x} dx =$

- 1) $\tan x + \cot x + c$ 2) $\tan x - \cot x + c$ 3) $\cot x - \tan x + c$ 4) none

11. $\int \frac{1}{1 - \cos 2x} dx =$

- 1) $\frac{1}{2} \cot x + c$ 2) $-\frac{1}{2} \cot x + c$ 3) $-2 \cot x + c$ 4) $2 \cot x + c$

12. $\int \frac{1 + \sin^2 x}{1 - \cos 2x} dx =$

- 1) $\frac{1}{2} (-\cot x + x) + c$ 2) $\frac{1}{2} (\cot x + x) + c$ 3) $\frac{1}{2} (\tan x + x) + c$ 4) none

13. $\int \frac{2(1 + \cos^2 x)}{1 - \cos 2x} dx =$

- 1) $2 \cot x + x + c$ 2) $-2 \cot x - x + c$ 3) $-2 \cot x + x + c$ 4) $2 \cot x - x + c$

14. $\int \frac{1 + \cos 4x}{\cot x - \tan x} dx =$

1) $-\frac{1}{4} \cos 4x + c$

2) $\frac{1}{8} \cos 4x + c$

3) $\frac{1}{4} \sin 4x + c$

4) $-\frac{1}{8} \cos 4x + c$

[EAMCET 2011]

15. $\int \frac{\sin x + \cos x}{\sqrt{1 + \sin 2x}} dx =$

1) $-x + c$

2) $x + c$

3) $\cos x + \sin x + c$

4) $\sin x - \cos x + c$

[EMCET 85]

16. $\int \frac{\sin^3 x + \cos^3 x}{\sin^2 x \cos^2 x} dx =$

1) $\sin x + \cos x + c$ 2) $\tan x + \cot x + c$ 3) $\sec x - \operatorname{cosec} x + c$ 4) $\sin x - \cos x + c$

17. $\int \frac{2 \cos^2 x - 3 \sin^2 x}{\cos^2 x \sin^2 x} dx =$

1) $-2 \cot x - 3 \tan x + c$ 2) $2 \cot x - 3 \tan x + c$ 3) $2 \cot x + 3 \tan x + c$ 4) none

18. If $\int \frac{\sin^8 x - \cos^8 x}{1 - 2 \sin^2 x \cos^2 x} dx = A \sin 2x + B$, then $A =$

[EAMCET 2011]

1) $-\frac{1}{2}$

2) -1

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

4) 1

19. $\int (1 - \cos x) \operatorname{cosec}^2 x dx = f(x) + c \Rightarrow f(x) =$

[EAMCET 2010]

1) $\tan \frac{x}{2}$

2) $\cot \frac{x}{2}$

3) $2 \tan \frac{x}{2}$

4) $\frac{1}{2} \tan \frac{x}{2}$

20. $\int \sec^2 x \operatorname{cosec}^4 x dx = -\frac{1}{3} \cot^3 x + k \tan x - 2 \cot x + c \Rightarrow k =$

[EAMCET 2012]

1) 4

2) 3

3) 2

4) 1

21. $\int \frac{x^5}{x^2 + 1} dx =$

[EAMCET 98]

1) $\frac{x^4}{4} + \frac{x^2}{2} + \operatorname{Tan}^{-1} x + c$

3) $\frac{x^4}{4} + \frac{x^3}{3} + \operatorname{Tan}^{-1} x + c$

2) $\frac{x^4}{4} - \frac{x^2}{2} + \frac{1}{2} \log(x^2 + 1) + c$

4) $\frac{x^4}{4} - \frac{x^3}{3} - \operatorname{Tan}^{-1} x + c$

22. $\int \frac{1+x+\sqrt{x+x^2}}{\sqrt{x}+\sqrt{1+x}} dx =$

[EAMCET 2003]

1) $\frac{1}{2} \sqrt{1+x} + c$

2) $\frac{2}{3} (1+x)^{3/2} + c$

3) $\sqrt{1+x} + c$

4) $2(1+x)^{3/2} + c$

23. $\int \frac{1}{x} \sqrt{\frac{x-1}{x+1}} dx =$

[EAMCET 99]

1) $\operatorname{Cosh}^{-1} x - \operatorname{Sec}^{-1} x + c$

3) $\operatorname{Sinh}^{-1} x - \operatorname{Sec}^{-1} x + c$

2) $\operatorname{Cosh}^{-1} x + \operatorname{Sec}^{-1} x + c$

4) $\operatorname{Sinh}^{-1} x - \operatorname{Cosec}^{-1} x + c$

24. $\int \sqrt{\left[\frac{x}{a^3 - x^3} \right]} dx = g(x) + c \Rightarrow g(x) =$

- 1) $\frac{2}{3} \cos^{-1} x$ 2) $\frac{2}{3} \sin^{-1} \left(\frac{x^3}{a^3} \right)$

- 3) $\frac{2}{3} \sin^{-1} \left(\sqrt{\frac{x^3}{a^3}} \right)$ 4) $\frac{2}{3} \cos^{-1} \left(\frac{x}{a} \right)$

25. $\int \cos^3 x dx =$

- 1) $\frac{3}{4} \sin x + \frac{1}{12} \sin 3x + c$
 3) $-\frac{3}{4} \sin x + \frac{1}{12} \sin 3x + c$

- 2) $\frac{3}{4} \sin x - \frac{1}{12} \sin 3x + c$
 4) $-\frac{3}{4} \sin x - \frac{1}{12} \sin 3x + c$

[CEE 79]

26. $\int \cos 3x \cos 2x dx =$

- 1) $\frac{1}{2} [\sin 5x + \sin x] + c$
 3) $\frac{1}{2} [5 \sin 5x + \sin x] + c$

- 2) $\frac{1}{2} \left[\frac{1}{5} \sin 5x + \sin x \right] + c$
 4) none

27. $\int \sin x \sin 2x \sin 3x dx =$

- 1) $\frac{1}{24} \cos 6x - \frac{1}{16} \cos 4x - \frac{1}{8} \cos 2x + c$
 3) $\frac{1}{24} \sin 6x - \frac{1}{16} \sin 4x - \frac{1}{8} \sin 2x + c$

- 2) $\frac{1}{16} \cos 4x + \frac{1}{8} \cos 2x - \frac{1}{24} \cos 6x + c$
 4) none

28. $\int \sqrt{1 - \cos x} dx =$

- 1) $2\sqrt{2} \cos x + c$

- 2) $-2\sqrt{2} \cos(x/2) + c$ 3) $\sqrt{2} \sin x + c$ 4) none

29. $\int \frac{1 - \cos x}{1 + \cos x} dx =$

- 1) $\frac{1}{2} \tan \frac{x}{2} - x + c$

- 2) $\tan \frac{x}{2} - x + c$

- 3) $2 \tan \frac{x}{2} - x + c$ 4) none

30. $\int \frac{1 - \tan^2 x}{1 + \tan^2 x} dx =$

- 1) $\frac{1}{2} \sin 2x + c$

- 2) $2 \sin 2x + c$

- 3) $-\frac{1}{2} \cos 2x + c$ 4) $\frac{1}{2} \sin 2x + c$

31. $\int \frac{e^{\sin^{-1} x}}{\sqrt{1 - x^2}} dx =$

- 1) $\frac{1}{2} e^{\sin^{-1} x} + c$

- 2) $2 e^{\sin^{-1} x} + c$

- 3) $e^{\sin^{-1} x} + c$

- 4) none

32. $\int \frac{\tan^{-1} x}{1 + x^2} dx =$

- 1) $\frac{1}{2} (\tan^{-1} x)^2 + c$

- 2) $(\tan^{-1} x)^2 + c$

- 3) $2 (\tan^{-1} x)^2 + c$

- 4) none

Indefinite Integration

33. $\int \sec 2x \tan 2x \, dx =$

- 1) $\sec 2x + c$ 2) $2 \sec 2x + c$ 3) $\frac{1}{2} \sec 2x + c$ 4) none

34. $\int \frac{e^x}{e^{2x} + 1} \, dx =$

- 1) $\tan^{-1}(e^x) + c$ 2) $\log |e^x| + c$ 3) $2 \tan^{-1}(e^x) + c$ 4) none

35. $\int \frac{1}{e^x + e^{-x}} \, dx =$

- 1) $\tan^{-1}(e^x) + c$ 2) $\log |e^x| + c$ 3) $2 \tan^{-1}(e^x) + c$ 4) none

36. $\int \frac{\sin^6 x}{\cos^8 x} \, dx =$

[EAMCET 2000]

- 1) $\tan 7x + c$ 2) $\frac{\tan^7 x}{7} + c$ 3) $\frac{\tan 7x}{7} + c$ 4) $\sec^7 x + c$

37. $\int \frac{x^2 \tan^{-1}(x^3)}{1+x^6} \, dx =$

- 1) $\tan^{-1}(x^3) + c$ 2) $\frac{1}{2} (\tan^{-1} x^3)^2 + c$ 3) $\frac{1}{6} (\tan^{-1} x^3)^2 + c$ 4) none

38. $\int \frac{x^{49} \tan^{-1}(x^{50})}{(1+x^{100})} \, dx = k (\tan^{-1} x^{50})^2 + c \Rightarrow k =$

[EAMCET 2005]

- 1) $1/50$ 2) $-1/50$ 3) $1/100$ 4) $-1/100$

39. $\int \frac{dx}{x^2 (x^4 + 1)^{3/4}} =$

[JEE MAIN 2015]

- 1) $\left(\frac{x^4 + 1}{x^4} \right)^{1/4} + c$ 2) $(x^4 + 1)^{1/4} + c$ 3) $-(x^4 + 1)^{1/4} + c$ 4) $-\left(\frac{x^4 + 1}{x^4} \right)^{1/4} + c$

40. $\int \frac{1}{\sqrt{x}} \sin \sqrt{x} \, dx =$

- 1) $2 \cos \sqrt{x} + c$ 2) $-2 \cos \sqrt{x} + c$ 3) $\sin \sqrt{x} + c$ 4) none

41. $\int \frac{\sqrt{\cot x}}{\sin x \cos x} \, dx = -f(x) + c \Rightarrow f(x) =$

[EAMCET 2004]

- 1) $2 \sqrt{\tan x}$ 2) $-2 \sqrt{\tan x}$ 3) $-2 \sqrt{\cot x}$ 4) $2 \sqrt{\cot x}$

42. $\int \frac{dx}{\sqrt{\sin^3 x \cos x}} = g(x) + c \Rightarrow g(x) =$

[EAMCET 2014]

- 1) $\frac{-2}{\sqrt{\tan x}}$ 2) $\frac{2}{\sqrt{\cot x}}$ 3) $\frac{2}{\sqrt{\tan x}}$ 4) $\frac{-2}{\sqrt{\cot x}}$

254

43. $\int \frac{\sin x \cos x}{1 + \sin^4 x} dx =$

- 1) $\tan^{-1}(\sin^2 x) + c$
- 2) $2 \tan^{-1}(\sin^2 x) + c$
- 3) $\frac{1}{2} \tan^{-1}(\sin^2 x) + c$**
- 4) none

44. $\int \frac{1}{x(\log x + 1)} dx =$

- 1) $\log(1+x) + c$
- 2) $\log|1+\log x| + c$**
- 3) $\log(\log x) + c$
- 4) none

45. $\int \frac{dx}{x(1 + \log x)^3} =$ [EAMCET 99]

- 1) $\frac{-1}{2(1 + \log x)^2} + c$**
- 2) $\frac{1}{2(1 + \log x)^2} + c$
- 3) $\frac{1}{1 + \log x} + c$
- 4) $\frac{-1}{3(1 + \log x)^3} + c$

46. $\int \frac{1 + \cos x}{x + \sin x} dx =$

- 1) $\log|x + \sin x| + c$**
- 2) $\log|1 + \cos x| + c$
- 3) $x + \sin x + c$
- 4) none

47. $\int \frac{1}{\sqrt{x} + x} dx =$

- 1) $\log(x + \sqrt{x}) + c$
- 2) $\log(1 + \sqrt{x}) + c$
- 3) $2 \log(x + \sqrt{x}) + c$
- 4) $2 \log(1 + \sqrt{x}) + c$

48. $\int \sqrt{\frac{1 - \cos x}{1 + \cos x}} dx =$

- 1) $2 \log|\sec x/2| + c$**
- 2) $\log|\sec x/2| + c$
- 3) $\frac{1}{2} \log|\sec x/2| + c$
- 4) none

49. If $\int \frac{e^x - 1}{e^x + 1} dx = f(x) + c$, then $f(x) =$ [EAMCET 2007]

- 1) $2 \log(e^x + 1)$
- 2) $\log(e^{2x} - 1)$
- 3) $2 \log(e^x + 1) - x$**
- 4) $\log(e^{2x} + 1)$

50. $\int \frac{3^x}{\sqrt{9^x - 1}} dx =$ [EAMCET 2002]

- 1) $\frac{1}{\log 3} \log|3^x + \sqrt{9^x - 1}| + c$
- 3) $\frac{1}{\log 9} \log|3^x + \sqrt{9^x - 1}| + c$
- 2) $\frac{1}{\log 3} \log|3^x - \sqrt{9^x - 1}| + c$
- 4) $\frac{1}{\log 3} \log|9^x + \sqrt{9^x - 1}| + c$

51. $\int \sqrt{e^x - 4} dx =$ [EAMCET 2015TS]

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

52. If $\int \frac{\sin x}{\sin(x - \alpha)} dx = Ax + B \log \sin(x - \alpha) + C$, then value of (A, B) is [AIEEE 2004]
- 1) $(\sin \alpha, \cos \alpha)$
 - 2) $(-\cos \alpha, \sin \alpha)$
 - 3) $(-\sin \alpha, \cos \alpha)$
 - 4) $(\cos \alpha, \sin \alpha)$

53. The value of $\sqrt{2} \int \frac{\sin x dx}{\sin(x - \pi/4)}$ is

- 1) $x - \log \left| \sin \left(x - \frac{\pi}{4} \right) \right| + c$
- 3) $x - \log \left| \cos \left(x - \frac{\pi}{4} \right) \right| + c$
- 2) $x + \log \left| \sin \left(x - \frac{\pi}{4} \right) \right| + c$
- 4) $x + \log \left| \cos \left(x - \frac{\pi}{4} \right) \right| + c$

54. $\int \frac{dx}{x^2 \sqrt{4+x^2}} =$

[EAMCET 2012]

- 1) $\frac{1}{4} \sqrt{4+x^2} + c$
- 2) $-\frac{1}{4} \sqrt{4+x^2} + c$
- 3) $\frac{-1}{4x} \sqrt{4+x^2} + c$
- 4) $\frac{9}{4x} \sqrt{4+x^2} + c$

55. $\int \frac{3dx}{2x^2 - x - 1} =$

[EAMCET 99]

- 1) $\log \left| \frac{x-1}{x+1} \right| + c$
- 2) $\log \left| \frac{x+1}{2x+1} \right| + c$
- 3) $\log \left| \frac{x-1}{2x-1} \right| + c$
- 4) $\log \left| \frac{x-1}{2x+1} \right| + c$

56. $\int \frac{1}{(x+1)(x+2)(x+3)} dx =$

- 1) $\frac{1}{2} \log \left| \frac{(x+1)(x+2)}{(x+3)^2} \right| + c$
- 2) $\frac{1}{2} \log \left| \frac{(x+1)(x+3)}{(x+2)^2} \right| + c$
- 3) $\frac{1}{2} \log \left| \frac{(x+2)(x+3)}{(x+1)^2} \right| + c$
- 4) none

57. $\int \frac{1}{x(1+x^n)} dx =$

- 1) $\frac{1}{n} \log |1+x^n| + c$
- 2) $\frac{1}{n} \log \left| \frac{x^n}{1+x^n} \right| + c$
- 3) $\frac{1}{n} \log \left| \frac{1+x^n}{x^n} \right| + c$
- 4) none

58. $\int \frac{1}{(x^2+1)(x^2+2)} dx =$

- 1) $\tan^{-1} x - \frac{1}{\sqrt{2}} \tan^{-1} \left(\frac{x}{\sqrt{2}} \right) + c$
- 2) $\tan^{-1} x + \tan^{-1} \left(\frac{x}{\sqrt{2}} \right) + c$
- 3) $\tan^{-1} x + \frac{1}{\sqrt{2}} \tan^{-1} \left(\frac{x}{\sqrt{2}} \right) + c$
- 4) none

59. $\int \frac{7x^8 + 8x^7}{(1+x+x^8)^2} dx = f(x) + c \Rightarrow f(x) =$

[EAMCET 2010]

- 1) $\frac{x^8}{1+x+x^8}$
- 2) $28 \log (1+x+x^8)$
- 3) $\frac{1}{1+x+x^8}$
- 4) $\frac{-1}{1+x+x^8}$

60. $\int \frac{\sin x}{\cos x (1 + \cos x)} dx = f(x) + c \Rightarrow f(x) =$

[EAMCET 2005]

- 1) $\log \left| \frac{1 + \cos x}{\cos x} \right|$ 2) $\log \left| \frac{\cos x}{1 + \cos x} \right|$ 3) $\log \left| \frac{\sin x}{1 + \sin x} \right|$ 4) $\log \left| \frac{1 + \sin x}{\sin x} \right|$

61. $\int \frac{\cos x + x \sin x}{x(x + \cos x)} dx =$

- 1) $\log |x| + \log |x + \cos x| + c$
 2) $\log |x| - \log |x + \cos x| + c$
 3) $\log |x + \cos x| - \log |x| + c$
 4) none

62. $\int \frac{x+1}{x(1+x e^x)} dx =$

[EAMCET 2015AP]

- 1) $\log \left| \frac{1+x e^x}{x e^x} \right| + C$
 2) $\log \left| \frac{x e^x}{1+x e^x} \right| + C$
 3) $\log |x e^x (1+x e^x)| + C$
 4) $\log (1+x e^x) + C$

63. $\int \frac{dx}{x(\log x - 2)(\log x - 3)} = I + c \Rightarrow I =$

[EAMCET 2013]

- 1) $\frac{1}{x} \log \left| \frac{\log x - 3}{\log x - 2} \right|$
 2) $\log \left| \frac{\log x - 3}{\log x - 2} \right|$
 3) $\log \left| \frac{\log x - 2}{\log x - 3} \right|$
 4) $\log |(\log x - 3)(\log x - 2)|$

64. $\int \frac{1}{\sqrt{4-x^2}} dx =$

- 1) $\text{Sin}^{-1}(x/2) + c$ 2) $\text{Sinh}^{-1}(x/2) + c$ 3) $\text{Cosh}^{-1}(x/2) + c$ 4) none

65. $\int \frac{1}{\sqrt{9+x^2}} dx =$

- 1) $\text{Sin}^{-1}(x/3) + c$ 2) $\text{Sinh}^{-1}(x/3) + c$ 3) $\text{Cosh}^{-1}(x/3) + c$ 4) none

66. $\int \frac{1}{\sqrt{x^2 - 16}} dx =$

- 1) $\text{Sin}^{-1}(x/4) + c$ 2) $\text{Sinh}^{-1}(x/4) + c$ 3) $\text{Cosh}^{-1}(x/4) + c$ 4) none

67. $\int \frac{1}{\sqrt{x^2 + 2x + 5}} dx =$

- 1) $\text{Sin}^{-1}\left(\frac{x+1}{2}\right) + c$ 2) $\text{Sinh}^{-1}\left(\frac{x+1}{2}\right) + c$ 3) $\text{Cosh}^{-1}\left(\frac{x+1}{2}\right) + c$ 4) none

68. $\int \frac{1}{\sqrt{2x^2 - 3x - 2}} dx =$

- 1) $\frac{1}{\sqrt{2}} \text{Sin}^{-1}\left(\frac{4x-3}{5}\right) + c$ 2) $\frac{1}{\sqrt{2}} \text{Sinh}^{-1}\left(\frac{4x-3}{5}\right) + c$ 3) $\frac{1}{\sqrt{2}} \text{Cosh}^{-1}\left(\frac{4x-3}{5}\right) + c$ 4) none

69. $\int \left(\sqrt{\frac{a+x}{a-x}} + \sqrt{\frac{a-x}{a+x}} \right) dx =$

[EAMCET 2011]

- 1) $2 \operatorname{Sin}^{-1} \left(\frac{x}{a} \right) + c$ 2) $2a \operatorname{Sin}^{-1} \left(\frac{x}{a} \right) + c$ 3) $2 \operatorname{Cos}^{-1} \left(\frac{x}{a} \right) + c$ 4) $2a \operatorname{Cos}^{-1} \left(\frac{x}{a} \right) + c$

70. $\int \frac{dx}{\sqrt{x-x^2}} =$

[EAMCET 2012]

- 1) $2 \operatorname{Sin}^{-1} \sqrt{x} + c$ 2) $2 \operatorname{Sin}^{-1} x + c$ 3) $2x \operatorname{Sin}^{-1} x + c$ 4) $\operatorname{Sin}^{-1} \sqrt{x} + c$

71. $\int \frac{3x-4}{\sqrt{x^2+4x+13}} dx =$

- 1) $\frac{3}{2} \sqrt{x^2+4x+13} - 10 \operatorname{Sinh}^{-1} \left(\frac{x+2}{3} \right) + c$ 2) $3 \sqrt{x^2+4x+13} - 10 \operatorname{Sinh}^{-1} \left(\frac{x+2}{3} \right) + c$
 3) $3 \sqrt{x^2+4x+3} + 10 \operatorname{Sinh}^{-1} \left(\frac{x+2}{3} \right) + c$ 4) none

72. $\int \sqrt{\frac{2+x}{2-x}} dx =$

[EAMCET 2015TS]

- 1) ~~$2 \operatorname{Sin}^{-1} \left(\frac{x}{2} \right) + \sqrt{4-x^2} + c$~~ 2) $\operatorname{Cos}^{-1} \left(\frac{x}{2} \right) - \sqrt{4-x^2} + c$
 3) $\operatorname{Sin}^{-1} \left(\frac{x}{2} \right) - \sqrt{4-x^2} + c$ 4) ~~$2 \operatorname{Sin}^{-1} \left(\frac{x}{2} \right) - \sqrt{4-x^2} + c$~~

73. $\int \sqrt{\frac{x-1}{2x-3}} dx =$

- 1) $\frac{1}{2} \sqrt{2x^2-5x+3} + \frac{4}{\sqrt{2}} \operatorname{Sin}^{-1} (4x-5) + c$ 2) $\frac{1}{2} \sqrt{2x^2-5x+3} + \frac{4}{\sqrt{2}} \operatorname{Sinh}^{-1} (4x-5) + c$
 3) $\frac{1}{2} \sqrt{2x^2-5x+3} + \frac{1}{4\sqrt{2}} \operatorname{Cosh}^{-1} (4x-5) + c$ 4) none

74. $\int \frac{dx}{x^2+2x+2} = f(x) + c \Rightarrow f(x) =$

[EAMCET 2006]

- 1) ~~$\operatorname{Tan}^{-1} (x+1)$~~ 2) $2 \operatorname{Tan}^{-1} (x+1)$ 3) $-\operatorname{Tan}^{-1} (x+1)$ 4) $3 \operatorname{Tan}^{-1} (x+1)$

75. $\int \frac{2x+3}{x^2+4x+5} dx =$

- 1) $\log |x^2+4x+5| + \operatorname{Tan}^{-1} (x+2) + c$ 2) $\log |x^2+4x+5| - \operatorname{Tan}^{-1} (x+2) + c$
 3) $\log |x^2+4x+5| + \frac{1}{2} \operatorname{Tan}^{-1} (x+2) + c$ 4) none

76. If $\int \frac{x+5}{x^2+4x+5} dx = a \log (x^2+4x+5) + b \operatorname{Tan}^{-1} (x+k) + \text{constant}$ then $(a, b, k) =$

[EAMCET 2015TS]

- 1) ~~$\left(\frac{1}{2}, 3, 2 \right)$~~ 2) $\left(\frac{1}{2}, 1, 2 \right)$ 3) $\left(\frac{1}{2}, 3, 1 \right)$ 4) $(1, 3, 2)$

77. If $\int \frac{dx}{\sqrt{x}(x+9)} = f(x) + \text{constant}$, then $f(x) =$

[EAMCET 2001, 97]

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

78. $\int \frac{dx}{(x+100)\sqrt{x+99}} = f(x) + c \Rightarrow f(x) =$

[EAMCET 2004]

- 1) $2(x+100)^{1/2}$ 2) $3(x+100)^{1/2}$ 3) $2 \tan^{-1} (\sqrt{x+99})$ 4) $2 \tan^{-1} (\sqrt{x+100})$

79. $\int \frac{dx}{(x+1)\sqrt{4x+3}} =$

[EAMCET 2009]

- 1) $\tan^{-1} \sqrt{4x+3} + c$
 2) $2 \tan^{-1} \sqrt{4x+3} + c$
 3) $3 \tan^{-1} \sqrt{4x+3} + c$
 4) $4 \tan^{-1} \sqrt{4x+3} + c$

80. $\int \frac{dx}{(x-1)\sqrt{x^2-1}} =$

[EAMCET 2015AP]

- 1) $-\sqrt{\frac{x-1}{x+1}} + C$ 2) $\sqrt{\frac{x-1}{x^2+1}} + C$ 3) $-\sqrt{\frac{x+1}{x-1}} + C$ 4) $\sqrt{\frac{x^2+1}{x-1}} + C$

81. $\int \sqrt{x^2+2x+5} dx =$

- 1) $\frac{(x+1)}{2} \sqrt{x^2+2x+5} + 2 \sin^{-1} \left(\frac{x+1}{2} \right) + c$
 2) $\frac{(x+1)}{2} \sqrt{x^2+2x+5} + 2 \sinh^{-1} \left(\frac{x+1}{2} \right) + c$
 3) $\frac{(x+1)}{2} \sqrt{x^2+2x+5} - 2 \cosh^{-1} \left(\frac{x+1}{2} \right) + c$
 4) none

82. $\int \sqrt{3-2x-x^2} dx =$

- 1) $\frac{(x+1)}{2} \sqrt{3-2x-x^2} + 2 \sin^{-1} \left(\frac{x+1}{2} \right) + c$
 2) $\frac{(x+1)}{2} \sqrt{3-2x-x^2} + 2 \sinh^{-1} \left(\frac{x+1}{2} \right) + c$
 3) $\frac{(x+1)}{2} \sqrt{3-2x-x^2} - 2 \cosh^{-1} \left(\frac{x+1}{2} \right) + c$
 4) none

83. $\int (2x+3) \sqrt{x^2+2x+2} dx =$

- 1) $\frac{2}{3} (x^2+2x+2)^{3/2} + c$
 2) $(x+1) \sqrt{x^2+2x+2} + c$
 3) $\frac{2}{3} (x^2+2x+2)^{3/2} + \frac{x+1}{2} \sqrt{x^2+2x+2} + \frac{1}{2} \sinh^{-1} (x+1) + c$
 4) none

84. $\int \frac{dx}{7+5 \cos x} =$

[EAMCET 2002]

- 1) $\frac{1}{\sqrt{3}} \tan^{-1} \left(\frac{1}{\sqrt{3}} \tan \frac{x}{2} \right) + c$
 2) $\frac{1}{\sqrt{6}} \tan^{-1} \left(\frac{1}{\sqrt{6}} \tan \frac{x}{2} \right) + c$
 3) $\frac{1}{\sqrt{7}} \tan^{-1} \left(\tan \frac{x}{2} \right) + c$
 4) $\frac{1}{\sqrt{4}} \tan^{-1} \left(\tan \frac{x}{2} \right) + c$

Indefinite Integration

259

85. $\int \frac{dx}{\cos x - \sin x} =$

- 1) $\frac{1}{\sqrt{2}} \log \left| \tan \left(\frac{x}{2} - \frac{\pi}{8} \right) \right| + c$
- 3) $\frac{1}{\sqrt{2}} \log \left| \tan \left(\frac{x}{2} - \frac{3\pi}{8} \right) \right| + c$

86. $\int \frac{dx}{\cos x + \sqrt{3} \sin x}$ equals

- 1) $\frac{1}{2} \log \tan \left(\frac{x}{2} + \frac{\pi}{12} \right) + c$
- 3) $\log \tan \left(\frac{x}{2} + \frac{\pi}{12} \right) + c$

87. $\int \frac{dx}{1 - \cos x - \sin x} =$

- 1) $\log \left| 1 + \cot \frac{x}{2} \right| + c$
- 3) $\log \left| 1 - \cot \frac{x}{2} \right| + c$

88. $\int \frac{1}{1 + \cos^2 x} dx =$

- ~~1)~~ $\frac{1}{\sqrt{2}} \tan^{-1} \left(\frac{1}{\sqrt{2}} \tan x \right) + c$ 2) $\frac{1}{\sqrt{3}} \tan^{-1} \left(\frac{1}{\sqrt{3}} \tan x \right) + c$ 3) $\frac{x}{2} + c$ 4) none

89. $\int \frac{1}{2 \sin^2 x + 3 \cos^2 x} dx =$

- 1) $\frac{1}{\sqrt{3}} \tan^{-1} (\sqrt{2} \tan x) + c$
- 3) $\frac{1}{\sqrt{6}} \tan^{-1} \left(\frac{\sqrt{2}}{\sqrt{3}} \tan x \right) + c$

90. $\int \frac{dx}{a^2 \sin^2 x + b^2 \cos^2 x} =$

- ~~1)~~ $\frac{1}{ab} \tan^{-1} \left(\frac{a \tan x}{b} \right) + c$
 3) $\frac{1}{ab} \tan^{-1} \left(\frac{b \tan x}{a} \right) + c$

91. $\int \frac{9 \cos x - \sin x}{4 \sin x + 5 \cos x} dx =$

- 1) $x - \log |4 \sin x + 5 \cos x| + c$
- 3) $\log |4 \sin x + 5 \cos x| + c$

92. $\int \frac{\sin x + 8 \cos x}{4 \sin x + 6 \cos x} dx =$

[AIEEE 2004]

- 2) $\frac{1}{\sqrt{2}} \log \left| \tan \left(\frac{x}{2} + \frac{3\pi}{8} \right) \right| + c$
- 4) $\frac{1}{\sqrt{2}} \log \left| \cot \left(\frac{x}{2} \right) \right| + c$

[AIEEE 2007]

- 2) $\frac{1}{2} \log \tan \left(\frac{x}{2} - \frac{\pi}{12} \right) + c$
- 4) $\log \tan \left(\frac{x}{2} - \frac{\pi}{12} \right) + c$

[EAMCET 2002]

- 2) $\log \left| 1 - \tan \frac{x}{2} \right| + c$
- 4) $\log \left| 1 + \tan \frac{x}{2} \right| + c$

[EAMCET 2001]

- 2) $\tan^{-1} \left(\frac{a \tan x}{b} \right) + c$
- 4) $\tan^{-1} \left(\frac{b \tan x}{a} \right) + c$

- 2) $x + \log |4 \sin x + 5 \cos x| + c$
- 4) none

[EAMCET 2007]

~~1) $x + \frac{1}{2} \log(4 \sin x + 6 \cos x) + c$~~

3) $x + 2 \log(2 \sin x + 3 \cos x) + c$

93. $\int \frac{\sin x}{\sin x - \cos x} dx =$

1) $\frac{1}{2} [x + \log |\sin x - \cos x|] + c$

3) $\log |\sin x - \cos x| - x + c$

94. $\int \frac{3 \cos x + 2 \sin x}{4 \sin x + 5 \cos x} dx =$

~~1) $\frac{23x}{41} - \frac{2}{41} \log |4 \sin x + 5 \cos x| + c$~~

3) $\frac{23x}{41} + \frac{2}{41} \log |4 \sin x + 5 \cos x| + c$

95. If the integral $\int \frac{5 \tan x}{\tan x - 2} dx = x + a \log |\sin x - 2 \cos x| + k$ then a is equal to

1) 1

2) 2

3) -1

4) -2

[AIEEE 2012]

96. $\int x^2 e^x dx =$

1) $e^x (x^2 - 1) + c$

2) $e^x (x^2 + 2x + 1) + c$

~~3) $e^x (x^2 - 2x + 2) + c$~~

4) none

[EAMCET 87]

97. $\int x \cos^2 x dx =$

~~1) $\frac{x^2}{4} + \frac{x}{4} \sin 2x + \frac{1}{8} \cos 2x + c$~~

2) $\frac{x^2}{4} - \frac{x}{4} \sin 2x + \frac{1}{8} \cos 2x + c$

3) $\frac{x^2}{4} + \frac{x}{4} \sin 2x - \frac{1}{8} \cos 2x + c$

4) none

98. $\int \log x dx =$

~~1) $x (\log x - 1) + c$~~

2) $x (\log x + 1) + c$

3) $x \log x - 1 + c$

4) $x \log x + 1 + c$

99. $\int x \log x dx =$

1) $\frac{x^2}{2} (\log x - 1) + c$

2) $x^2 \log x - x + c$

3) $\frac{x^2}{2} \log x + \frac{x^2}{4} + c$

~~4) $\frac{x^2}{2} \log x - \frac{x^2}{4} + c$~~

100. $\int x \sec^2 x dx =$

1) $x \tan x + 2 \log (\sec x) + c$

2) $x \tan x - 2 \log (\sec x) + c$

3) $x \tan x + \log (\sec x) + c$

~~4) $x \tan x - \log (\sec x) + c$~~

101. $\int x \tan^2 x dx =$

1) $x \tan x + 2 \log (\sec x) + c$

~~2) $x \tan x - \log (\sec x) - \frac{x^2}{2} + c$~~

3) $x \tan x + \log (\sec x) + \frac{x^2}{2} + c$

4) none

102. $\int \frac{x - \sin x}{1 + \cos x} dx = x \tan\left(\frac{x}{2}\right) + p \log \left| \sec\left(\frac{x}{2}\right) \right| + c \Rightarrow p =$

1) -4

2) 4

3) 2

4) -2

[EAMCET 2013]

103. $\int \frac{x^2 \ Tan^{-1} x}{1 + x^2} dx =$

1) $(x - 1) \ Tan^{-1} x - \frac{1}{2} \log(1 + x^2) + c$

2) $x \ Tan^{-1} x + \frac{1}{2} \log(1 + x^2) - \frac{1}{2} (\Tan^{-1} x)^2 + c$

3) $x \ Tan^{-1} x - \frac{1}{2} \log(1 + x^2) - \frac{1}{2} (\Tan^{-1} x)^2 + c$

4) none

104. $\int \frac{x \ Sin^{-1} x}{\sqrt{1 - x^2}} dx =$

1) $x - \sqrt{1 - x^2} \ Sin^{-1} x + c$

2) $x + \sqrt{1 - x^2} \ Sin^{-1} x + c$

3) $2x - \sqrt{1 - x^2} \ Sin^{-1} x + c$

4) none

105. $\int \Sin^{-1} x dx =$

1) $x \ Sin^{-1} x - \sqrt{1 - x^2} + c$

2) $x \ Sin^{-1} x + \sqrt{1 - x^2} + c$

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

4) $x \ Sin^{-1} x - \frac{1}{2} \sqrt{1 - x^2} + c$

106. $\int \Tan^{-1} x dx =$

1) $x \ Tan^{-1} x - \frac{1}{2} \log(1 + x^2) + c$

2) $x \ Tan^{-1} x + \frac{1}{2} \log(1 + x^2) + c$

3) $x \ Tan^{-1} x - \log(1 + x^2) + c$

4) $x \ Tan^{-1} x + \log(1 + x^2) + c$

107. $\int \Sin^{-1} \left(\frac{2x}{1 + x^2} \right) dx = f(x) - \log(1 + x^2) + c \Rightarrow f(x) =$

[EAMCET 2005]

1) $2x \ Tan^{-1} x$

2) $-2x \ Tan^{-1} x$

3) $x \ Tan^{-1} x$

4) $-x \ Tan^{-1} x$

108. $\int \Cos^{-1} \left(\frac{1 - x^2}{1 + x^2} \right) dx =$

1) $x \ Tan^{-1} x - \frac{1}{2} \log(1 + x^2) + c$

2) $2x \ Tan^{-1} x - \log(1 + x^2) + c$

3) $2x \ Tan^{-1} x + \log(1 + x^2) + c$

4) none

109. $\int x \ Tan^{-1} x dx =$

1) $\frac{x^2}{2} \ Tan^{-1} x - \frac{1}{2} x + \frac{1}{2} \ Tan^{-1} x + c$

2) $\frac{x^2}{2} \ Tan^{-1} x + \frac{1}{2} x - \frac{1}{2} \ Tan^{-1} x + c$

3) $\frac{x^2}{2} \ Tan^{-1} x + \frac{1}{2} x + \frac{1}{2} \ Tan^{-1} x + c$

4) none

110. $\int \Tan^{-1} \left(\sqrt{\frac{1 - x}{1 + x}} \right) dx =$

[EAMCET 2007]

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

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

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

4) $\frac{1}{2}(x \sin^{-1} x + \sqrt{1-x^2}) + c$

111. $\int e^{\sqrt{x}} dx =$

1) $2e^{\sqrt{x}} (\sqrt{x} + 1) + c$ 2) $2e^{\sqrt{x}} (\sqrt{x} - 1) + c$ 3) $e^{\sqrt{x}} (\sqrt{x} + 1) + c$ 4) $e^{\sqrt{x}} (\sqrt{x} - 1) + c$

112. $\int \cos \sqrt{x} dx =$

[CEE 84]

1) $2\sqrt{x} \sin \sqrt{x} + 2 \cos \sqrt{x} + c$

3) $2\sqrt{x} \sin \sqrt{x} - 2 \cos \sqrt{x} + c$

2) $2\sqrt{x} \sin \sqrt{x} + 2 \sin \sqrt{x} + c$

4) $\sqrt{x} \cos \sqrt{x} - 2 \sin \sqrt{x} + c$

113. $\int x^3 e^{x^2} dx =$

[CEE 80]

1) $\frac{1}{2}(x^2 e^{x^2} + e^{x^2}) + c$

2) $\frac{e^{x^2} (x^2 - 1)}{2} + c$

3) $\frac{e^{x^2} (x^2 + 1)}{3} + c$

4) none

114. $\int (x+1)^2 e^x dx =$

[EAMCET 2001]

1) $x e^x + c$

2) $x^2 e^x + c$

3) $(x+1)e^x + c$

4) $(x^2 + 1) e^x + c$

115. $\int e^x \operatorname{cosec} x (1 - \cot x) dx =$

[EMCET 85]

1) $-e^x \cot x + c$

2) $e^x \operatorname{cosec} x + c$

3) $-e^x \operatorname{cosec} x + c$

4) $e^x \cos x + c$

116. If $\int e^x (1+x) \cdot \sec^2(x e^x) dx = f(x) + \text{constant}$; then $f(x) =$

[EAMCET 2008]

1) $\cos(x e^x)$

2) $\sin(x e^x)$

3) $2 \tan^{-1}(x)$

4) $\tan(x e^x)$

117. $\int e^x (1 - \cot x + \cot^2 x) dx =$

[EAMCET 2000]

1) $e^x \cot x + c$

2) $-e^x \cot x + c$

3) $e^x \operatorname{cosec} x + c$

4) $-e^x \operatorname{cosec} x + c$

118. $\int e^x \left(\frac{1+x \log x}{x} \right) dx =$

[EAMCET 98]

1) $e^x \log x + c$

2) $-e^x \log x + c$

3) $e^x \frac{1}{x} + c$

4) none

119. $\int \frac{e^x}{x+2} [1 + (x+2) \log(x+2)] dx =$

[EAMCET 95]

1) $e^x \frac{1}{x+2} + c$

2) $-e^x \frac{1}{x+2} + c$

3) $e^x \log(x+2) + c$

4) none

120. $\int (1+x-x^{-1}) e^{x+x^{-1}} dx =$

[JEE MAIN 2014, EAMCET 2003]

1) $(x+1) e^{x+x^{-1}} + c$

2) $(x-1) e^{x+x^{-1}} + c$

3) $-x \cdot e^{x+x^{-1}} + c$

4) $x e^{x+x^{-1}} + c$

121. If $\int e^x \left(\frac{1-\sin x}{1-\cos x} \right) dx = f(x) + \text{constant}$, then $f(x) =$

[EAMCET 2008]

1) $e^x \cot\left(\frac{x}{2}\right)$

2) $e^x \cot\left(\frac{x}{2}\right)$

3) $-e^x \cot\left(\frac{x}{2}\right)$

4) $-e^x \cot\left(\frac{x}{2}\right)$

122. $\int \left(\frac{2 - \sin 2x}{1 - \cos 2x} \right) e^x dx =$

1) $-e^x \cot x + c$

2) $e^x \cot x + c$

3) $2e^x \cot x + c$

4) $-2e^x \cot x + c$

[EAMCET 2009]

123. $\int e^x \left(\frac{2 + \sin 2x}{1 + \cos 2x} \right) dx =$

1) $e^x \cot x + c$

2) $2e^x \sec^2 x + c$

3) $e^x \cos 2x + c$

4) $e^x \tan x + c$

[EAMCET 2013]

124. $\int \frac{x e^x}{(x+1)^2} dx =$

1) $\frac{e^x}{x+1} + c$

2) $-\frac{e^x}{x+1} + c$

3) $\frac{e^x}{(x+1)^2} + c$

4) $-\frac{e^x}{(x+1)^2} + c$

125. $\int e^x \frac{x^2 + 1}{(x+1)^2} dx =$

[EAMCET 2015AP]

1) $\frac{e^x}{x+1} + C$

2) $\frac{-e^x}{x-1} + C$

3) $e^x \left(\frac{x-1}{x+1} \right) + C$

4) $e^x \frac{(x+1)}{x-1} + C$

126. $\int \frac{3 - x^2}{1 - 2x + x^2} e^x dx = e^x f(x) + c \Rightarrow f(x) =$

[EAMCET 2004]

1) $\frac{1+x}{1-x}$

2) $\frac{1-x}{1+x}$

3) $\frac{1+x}{x-1}$

4) $\frac{x-1}{1+x}$

127. $\int \left\{ \frac{(\log x - 1)}{(1 + (\log x)^2)} \right\}^2 dx =$

[AIEEE 2005]

1) $\frac{\log x}{(\log x)^2 + 1} + c$

3) $\frac{x e^x}{1+x^2} + c$

4) $\frac{x}{(\log x)^2 + 1} + c$

128. $\int e^x \cos x dx =$

1) $\frac{1}{2} e^x (\cos x + \sin x) + c$

2) $\frac{1}{2} e^x (\cos x - \sin x) + c$

3) $\frac{1}{2} e^x (\sin x - \cos x) + c$

4) none

129. $\int e^{3x} \cos 4x dx =$

1) $e^{3x} (3 \cos 4x + 4 \sin 4x) + c$

2) $\frac{1}{25} e^{3x} (3 \cos 4x + 4 \sin 4x) + c$

3) $\frac{1}{25} e^{3x} (4 \cos 4x + 3 \sin 4x) + c$

4) none

130. $\int e^x \cos^2 x dx =$

1) $\frac{1}{10} e^x [5 + \cos 2x + 2 \sin 2x] + c$

2) $\frac{1}{2} e^x [5 + \cos 2x + 2 \sin 2x] + c$

3) $\frac{1}{10} e^x [5 - \cos 2x + 2 \sin 2x] + c$

4) none

131. If $\int f(x) dx = \Psi(x)$, then $\int x^5 f(x^3) dx$ is equal to

[JEE MAIN 2013]

1) $\frac{1}{3} x^3 \Psi(x^3) - \int x^2 \Psi(x^3) dx + C$

2) $\frac{1}{3} \left[x^3 \Psi(x^3) - \int x^3 \Psi(x^3) dx \right] + C$

3) $\frac{1}{3} \left[x^3 \Psi(x^3) - \int x^2 \Psi(x^3) dx \right] + C$

4) $\frac{1}{3} x^3 \Psi(x^3) - 3 \int x^3 \Psi(x^3) dx + C$

132. If $f_n(x) = \log \log \log \dots \log x$ (log is repeated n -times), then

$$\int [(x f_1(x) f_2(x) \dots f_n(x))]^{-1} dx =$$

[EAMCET 2010]

1) $f_{n+1}(x) + c$

2) $\frac{f_{n+1}(x)}{n+1} + c$

3) $n f_n(x) + c$

4) $\frac{f_n(x)}{n} + c$

133. $\int \frac{f(x) g'(x) - f'(x) g(x)}{f(x) g(x)} [\log(g(x)) - \log(f(x))] dx =$

[EAMCET 2015AP]

1) $\log\left(\frac{g(x)}{f(x)}\right) + C$

2) $\frac{1}{2} \left[\log\left(\frac{g(x)}{f(x)}\right) \right]^2 + C$

3) $\frac{g(x)}{f(x)} \log\left(\frac{g(x)}{f(x)}\right) + C$

4) $\log\left[\frac{g(x)}{f(x)}\right] - \frac{g(x)}{f(x)} + C$

134. If $I_n = \int x^n \cdot e^{cx} dx$ for $n \geq 1$, then $c \cdot I_n + n \cdot I_{n-1} =$

[EAMCET 2008]

1) $x^n e^{cx}$

2) x^n

3) e^{cx}

4) $x^n + e^{cx}$

135. If $I_n = \int \sin^n x dx$, then $n I_n - (n-1) I_{n-2} =$

[EAMCET 2009]

1) $\sin^{n-1} x \cos x$

2) $\cos^{n-1} x \sin x$

3) $-\sin^{n-1} x \cos x$

4) $-\cos^{n-1} x \sin x$

136. If $I_n = \int \frac{\sin nx}{\sin x} dx$ where $n > 1$, then $I_n - I_{n-2}$

[EAMCET 97]

1) $\frac{2}{n-1} \cos(n-1)x$ 2) $\frac{2}{n-1} \sin(n-1)x$ 3) $\frac{2}{n} \cos nx$ 4) $\frac{2}{n} \sin nx$

137. For any integer $n \geq 2$, let $I_n = \int \tan^n x dx$. If $I_n = \frac{1}{a} \tan^{n-1} x - b I_{n-2}$ for $n \geq 2$, then the ordered pair $(a, b) =$

[EAMCET 2014]

1) $\left(n-1, \frac{n-2}{n-1} \right)$

2) $(n, 1)$

3) $(n-1, 1)$

4) $\left(n-1, \frac{n-1}{n-2} \right)$

138. $\int \tan^5 \theta d\theta =$

[EAMCET 93]

1) $\frac{1}{4} \tan^4 \theta - \frac{1}{2} \tan^2 \theta + \log |\sec \theta| + c$

2) $\frac{1}{4} \tan^4 \theta + \frac{1}{2} \tan^2 \theta + \log |\sec \theta| + c$

3) $\frac{1}{4} \tan^4 \theta - \frac{1}{2} \tan^2 \theta - \log |\sec \theta| + c$ 4) none

139. $\int |x| dx =$

[EAMCET 96]

1) $\frac{x^2}{2} + c$

2) $\frac{|x|}{2} + c$

3) $x^2 + c$

4) $\frac{|x|^2}{2} + c$

140. $\int \sqrt{\left[\frac{1-\sqrt{x}}{1+\sqrt{x}} \right]} dx =$

[IIT 85]

1) $\sqrt{x} \sqrt{1-x} - 2\sqrt{1-x} - \sin^{-1} \sqrt{x} + c$

2) $\sqrt{x} \sqrt{1-x} + 2\sqrt{1-x} - \sin^{-1} \sqrt{x} + c$

3) $\sqrt{x} \sqrt{1-x} - 2\sqrt{1-x} + \sin^{-1} \sqrt{x} + c$

4) none

141. If $\int \frac{dx}{(1+\sqrt{x})\sqrt{x-x^2}} = \frac{A\sqrt{x}}{\sqrt{1-x}} + \frac{B}{\sqrt{1-x}} + C$, where C is a real constant then $A+B=$

1) 0

2) 1

3) 2

4) 3 [EAMCET 2014]

142. If $\int \frac{(x^2-1)}{(x+1)^2 \sqrt{x(x^2+x+1)}} dx = A \tan^{-1} \left(\sqrt{\frac{x^2+x+1}{x}} \right) + c$ in which c is a constant

then $A =$

[EAMCET 2014]

1) 3

2) 2

3) 1

4) 1/2

143. $\int \frac{4e^x + 6e^{-x}}{9e^x - 4e^{-x}} dx = Ax + B \log(9e^{2x} - 4) + c$ then $A =$ [IIT 90]

1) $-3/2$

2) $3/2$

3) $-2/3$

4) $2/3$

144. If $\int \frac{1}{\sqrt{x^2+2x+1}} dx = a \log|x+1| + c$ then $a =$

1) 0

2) 1

3) -1

4) 2

145. If $\int \frac{x^2-3}{x^3-2x^2-x+2} dx = a \log \left| \frac{(x-2)(x-1)^3}{x+1} \right| + c$ then $a =$

1) 1

2) -1

3) $1/3$

4) $-1/3$

146. $\int \frac{7x^8 + 8x^7}{(1+x+x^8)^2} dx = f(x) + c \Rightarrow f(x) =$ [EAMCET 2010]

1) $\frac{x^8}{1+x+x^8}$

2) $28 \log(1+x+x^8)$

3) $\frac{1}{1+x+x^8}$

4) $\frac{-1}{1+x+x^8}$

147. If $\int \frac{dx}{(x^2+1)^2} = a \tan^{-1} x + b \frac{x}{(x^2+1)} + c$ then

1) $a=b=1$

2) $a=b=1/2$

3) $a=b=-1/2$

4) $a=b=-1$

148. If $\int \frac{1}{e^{2x} + e^{-2x}} dx = a \tan^{-1}(e^{2x}) + c$ then $a =$

- 1) 1 2) -1 3) 2 4) 1/2

149. $\int e^{-x} \tan^{-1}(e^x) dx = f(x) - \frac{1}{2} \log(1 + e^{2x}) + c \Rightarrow f(x) =$ [EAMCET 2015TS]

- 1) $e^x - e^{-x} \tan^{-1}(e^x)$ 2) $x^2 + e^{-x} \tan^{-1}(e^x)$ 3) $-e^{-x} \tan^{-1}(e^x)$ 4) $x - e^{-x} \tan^{-1}(e^x)$

150. A function $f(x)$ satisfying $f''(x) = x^{-3/2}$, $f'(4) = 2$, $f(0) = 0$ is

- 1) $3x + 4\sqrt{x}$ 2) $3x - 4\sqrt{x}$ 3) $3x - 2\sqrt{x}$ 4) c

151. Let D be the domain of a twice differentiable function f . For all $x \in D$, $f''(x) + f(x) = 0$ and $f(x) = \int g(x) dx + \text{constant}$. If $h(x) = [f(x)]^2 + [g(x)]^2$ and $h(0) = 5$ then $h(2015) - h(2014) =$ [EAMCET 2015AP]

- 1) 5 2) 3 3) 0 4) 1

152. Observe the following statements :

$$A : \int \left(\frac{x^2 - 1}{x^2} \right) e^{\frac{x^2 + 1}{x}} dx = e^{\frac{x^2 + 1}{x}} + c \quad R : \int f'(x) e^{f(x)} dx = f(x) + c$$

Then which of the following is true ?

[EAMCET 2006]

- 1) Both A and R are true and R is not the correct reason for A
 2) Both A and R are true and R is the correct reason for A
 3) A is true, R is false 4) A is false, R is true

ANSWERS

1.4	2.2	3.1	4.2	5.2	6.1	7.3	8.2	9.3	10.2	11.2	12.1	13.2	14.4	15.2
16.3	17.1	18.1	19.1	20.4	21.2	22.2	23.1	24.3	25.1	26.2	27.1	28.2	29.3	30.1
31.3	32.1	33.3	34.1	35.1	36.2	37.3	38.3	39.4	40.2	41.4	42.1	43.3	44.2	45.1
46.1	47.4	48.1	49.3	50.1	51.2	52.4	53.2	54.3	55.4	56.2	57.2	58.1	59.1	60.1
61.2	62.2	63.2	64.1	65.2	66.3	67.2	68.3	69.2	70.1	71.2	72.4	73.3	74.1	75.2
76.1	77.2	78.3	79.3	80.3	81.2	82.1	83.3	84.2	85.2	86.1	87.3	88.1	89.3	90.1
91.2	92.1	93.1	94.3	95.2	96.3	97.1	98.1	99.4	100.4	101.2	102.1	103.3	104.1	105.2
106.1	107.1	108.2	109.1	110.1	111.2	112.1	113.2	114.4	115.2	116.4	117.2	118.1	119.3	120.4
121.3	122.1	123.4	124.1	125.3	126.1	127.4	128.1	129.2	130.1	131.1	132.1	133.2	134.1	135.3
136.2	137.3	138.1	139.2	140.1	141.1	142.2	143.1	144.2	145.3	146.1	147.2	148.4	149.4	150.2
151.3	152.3													

