MATHS

BOOKS - FULL MARKS MATHS (TAMIL ENGLISH)

INTEGRAL CALCULUS

Examples

1. Integrate the following with respect to x.

$(i)\, x^{10}$ $\quad (ii)\, \dfrac{1}{x^{10}}$ $\quad (iii)\, \sqrt{x}$ $\quad (iv)\, \dfrac{1}{\sqrt{x}}$

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2. Integrate the following with respect to x.

$(i)\, \dfrac{1}{\cos^2 x}$ $\quad (ii)\, \dfrac{\cot x}{\sin x}$ $\quad (iii)\, \dfrac{\sin x}{\cos^2 x}$ $\quad (iv)\, \dfrac{1}{\sqrt{1 - x^2}}$.

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3. Integrate the following with respect to x.

$(i) \dfrac{1}{e^{-x}}$ $\qquad (ii) \dfrac{x^2}{x^3}$ $\qquad (iii) \dfrac{1}{x^3}$ $\qquad (iv) \dfrac{1}{1+x^2}.$

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4. Evaluate the following with respect to x.

$(i) \displaystyle\int (4x+5)^6 dx$ $\qquad (ii) \displaystyle\int \sqrt{(15-2x)} dx$ $\qquad (iii) \displaystyle\int \dfrac{1}{(3x+7)^4} dx.$

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5. Integrate the following with respect to x.

$(i) \sin(2x+4)$ $\qquad (ii) \sec^2(3+4x)$ $\qquad (iii) \operatorname{cosec}(ax+b)\cot(ax+b).$

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6. Integrate the following with respect to x.

$(i) e^{3x}$ $(ii) e^{5-4x}$ $(iii) \dfrac{1}{(3x-2)}$ $(iv) \dfrac{1}{(5-4x)}$.

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7. Integrate the following with respect to x.

$(i) \dfrac{1}{1+(2x)^2}$ $(ii) \dfrac{1}{\sqrt{1-(9x)^2}}$ $(iii) \dfrac{1}{\sqrt{1-25x^2}}$.

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8. Integrate the following with respect to x.

$(i) 5x^4$ $(ii) 5x^2 - 4 + \dfrac{7}{x} + \dfrac{2}{\sqrt{x}}$ $(iii) 2\cos x - 4\sin x + 5\sec^2 x + \cos$

.

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9. Evaluate the following integrals.

(i) $\dfrac{12}{(4x-5)^3} + \dfrac{6}{3x+2} + 16e^{4x+3}$

(ii) $\dfrac{15}{\sqrt{5x-4}} - 8\cot(4x+2)\mathrm{cosec}(4x+2).$

10. If $f'(x) = 3x^2 - 4x + 5$ and $f(1) = 3$ then find f(x).

11. A train started from Madurai junction towards Coimbatore at 3 pm (time t = 0) with velocity $v(t) = 20t + 50$ kilometer per hour, where t is measured in hours. Find the distance covered by the train at 5 pm.

12. The rate of change of weight of person w in kg with respect to their height h in centimeters is given approximately by $\dfrac{dw}{dh} = 4.364 \times 10^{-5}h^2$. Find weight as a function of height. Also find the weight of a person whose height is $150cm$.

13. A tree is growing so that, after t- years its height is increasing at a rate of $\dfrac{18}{\sqrt{t}}cm$ per year. Assume that when $t = 0$ the height is 5 cm.

(i) Find the height of the tree after 4 years.

(ii) After how many years will the height be 149 cm ?

14. At a particular moment, a student needs to stop his speedy bike to avoid a collision with the barrier ahead at a distance 40 meters away from him. Immediately he slows (retardation) the bike under braking at a

rate of 8metre/second^2. If the bike is moving at a speed of 24 m/s, when the brakes are applied, would it stop before collision?

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15. Integrate the following with respect to x.

$(i) \left(1 - x^3\right)^2$ $(ii) \dfrac{x^2 - x + 1}{x^3}$

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16. Integrate the following with respect to x.

$(i) \cos 5x \sin 3x$ $(ii) \cos^3 x.$

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17. Integrate the following with respect to x.

$(i) \dfrac{e^{2x} - 1}{e^x}$ $(ii) e^{3x} \left(e^{2x-1}\right).$

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18. Evaluate : $\int \dfrac{1}{\sin x \cos x} dx.$

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19. Evaluate : $\int \dfrac{\cos x}{1 + \sin x} dx.$

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20. Evaluate : $\int \sqrt{1 - \cos x} dx$.

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21. Evaluate : $\int \dfrac{(x - 1)^2}{x^3 + x} dx.$

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

23. Evaluate $\int \dfrac{1 - \cos x}{1 + \cos x} dx$

24. Evaluate : $\int (1 - \sin 2x) dx$.

25. Evaluate $\int \dfrac{x^3 + 2}{x - 1} dx$

26. Evaluate: $\int e^{x \log 2} e^x dx$

27. Evaluate: $\int (x - 3)\sqrt{x + 2}\,dx.$

28. Evaluate : $\int \dfrac{1}{\sqrt{x + 1} + \sqrt{x}}\,dx.$

29. (i) $\int \dfrac{3x + 7}{x^2 - 3x + 2}\,dx$ $(ii)\int \dfrac{x + 3}{(x + 2)^2(x + 1)}\,dx.$

30. Evaluate the following integrals:

$(i)\int 2x\sqrt{1 + x^2}\,dx$ $(ii)\int e^{-x^2}x\,dx$ $(iii)\int \dfrac{\sin x}{1 + \cos x}\,dx$

$(iv)\int \dfrac{1}{1 + x^2}\,dx$ $(v)\int x(a - x)^8\,dx.$

31. Integrate the following with respect to x.

$(i) \int \tan x\, dx$ $(ii) \int \cot x\, dx$ $(iii) \int \cos ecx\, dx$ $(iv) \int \sec x\, dx.$

32. Integrate the following with respect to x.

$(i) \int \dfrac{2x+4}{x^2+4x+6}\, dx$ $(ii) \int \dfrac{e^x}{e^x-1}\, dx$ $(iii) \int \dfrac{1}{x\log x}\, dx$

$(iv) \int \dfrac{\sin x + \cos x}{\sin x - \cos x}\, dx$ $(v) \int \dfrac{\cos 2x}{(\sin x + \cos x)^2}\, dx.$

33. Evaluate the followig integrals

$(i) \int xe^x\, dx$ $(ii) \int x\cos x\, dx$ $(iii) \int \log x\, dx$ $(iv) \int \sin^{-1} x\, dx.$

34. Evaluate $\int \tan^{-1}\left(\dfrac{2x}{1-x^2}\right)dx$

35. Ingegrate the following with respect to x.

$(i)\,x^2 e^{5x}$ $\qquad (ii)\,x^3 \cos x$ $\qquad (iii)\,x^3 e^{-x}$.

36. Evaluate the following integrals

$(i)\displaystyle\int e^{3x}\cos 2x\,dx$ $\qquad (ii)\displaystyle\int e^{-5x}\sin 3x\,dx$

37. Evaluate the following integrals.

$\displaystyle\int e^x\left(\dfrac{1-x}{1+x^2}\right)^2 dx.$

38. Evaluate the following integrals.

(i) $\displaystyle\int \frac{1}{(x-2)^2+1}dx$ $\qquad (ii)$ $\displaystyle\int \frac{x^2}{x^2+5}dx$ $\qquad (iii)$ $\displaystyle\int \frac{1}{\sqrt{1+4x^2}}dx$

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39. Evaluate the following integrals.

(i) $\displaystyle\int \frac{1}{x^2-2x+5}dx$ $\qquad (ii)$ $\displaystyle\int \frac{1}{\sqrt{x^2+12x+11}}dx.$

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40. Evaluate the following integrals

$\displaystyle\int \frac{3x+5}{x^2+4x+13}dx.$

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41. Evaluate the following :

(i) $\int \sqrt{4 - x^2}\,dx$ (ii) $\int \sqrt{25x^2 - 9}\,dx$ (iii) $\int \sqrt{x^2 + x + 1}\,dx.$

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Additional Problems

1. Integrate the following with respect to x.

(i) $\sqrt{x^7}$ (ii) $\left(x^{10}\right)^{1/7}.$

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2. Integrate the following with respect to x.

(i) $\dfrac{1}{x^5}$ (ii) x^{-1} (iii) $\dfrac{1}{x^{5/2}}.$

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3. Integrate the following with respect to x

$(3x + 4)^6$

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4. Evaluate $\int \dfrac{1}{(x + 5)^4} dx$

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5. $\dfrac{1}{p + qx}$

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6. $\cos(4x + 5)$

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7. $\mathrm{cosec}^2\left(7 - 11x\right)$

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8. $\sec(3 + x)\tan(3 + x)$

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9. $\mathrm{cosec}(3 - 2x)\cot\left(3 - 2x\right)$

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10. Integrate $e^{3x + 2}$

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11. $\dfrac{1}{\sin^2\left(1 - mx\right)}$

12. Integrate $(lx + m)^{1/2}$

13. Integrate the following with respect to 'x'

$5x^4 + 3(2x + 3)^4 - 6(4 - 3x)^5$.

14. Integrate the following with respect to 'x'

$4 - \dfrac{5}{x + 2} + 3\cos 2x.$

15. Integrate the following with respect to 'x'

$$p\text{cosec}^2(px - q) - 6(1 - x)^4 + 4e^{3 - 4x}.$$

16. Integrate the following with respect to 'x'

$$\frac{4}{(3 + 4x)} + (10x + 3)^9 - 3\text{cosec}(2x + 3)\cot(2x + 3)$$

17. Integrate the following with respect to 'x'

$$a\sec^2(bx + c) + \frac{q}{e^{l - mx}}dx.$$

18. Integrate the following with respect to 'x'

$$\frac{1}{\left(3 + \frac{2}{3}x\right)} - \frac{2}{3}\cos\left(x - \frac{2}{3}\right) + 3\left(\frac{x}{3} + 4\right)^6.$$

19. Integrate the following with respect to 'x'

$$\frac{\sin x}{7} - 8\sec^2\left(4 - \frac{x}{4}\right) + 10\left(\frac{2x}{5} - 4\right)^{\frac{3}{2}}.$$

20. If $f'(x) = 2x - 7$ and $f(1) = 0$ find f(x).

21. Given $f''(x) = 6x + 6$, $f'(0) = -5$ and $f(1) = 6$ find $f(x)$.

22. Integrate

$$\frac{e^{2x} + e^{-2x} + 2}{e^x}$$

23. Integrate : $\cos^3 2x - \sin 6x$ with respect to x

24. $\int \sqrt{1 + \sin 2x}\,dx =$

25. Integrate

$\cos 2x \sin 4x$

26. Evaluate: $\int (e^x - 1)^2 e^{-4x}\,dx.$

27. Evaluate: $\int (x+1)\sqrt{x+3}\,dx$

28. Integrate

$(2x+1)\sqrt{2x+3}.$

29. Evalute $\int (2x+3)\sqrt{x^2+3x-5}\,dx$

30. Integrate with respect to x

$\dfrac{x\sin^{-1}(x^2)}{\sqrt{1-x^4}}$

31. Integrate with respect to x

$\sec^4 x \tan x$.

32. Integrate

$$\frac{\sin x}{\sin(x + a)}$$

33. $\displaystyle\int \frac{\sqrt{\cot x}}{\sin x \cos x} dx$

34. Evaluate: $\displaystyle\int x(1 - x)^{16} dx$

35. Integrate

$$x^2(2-x)^{15}$$

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36. Integrate

$$(x+1)\sqrt{2x+3}$$

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37. Integrate

$$(x^2+1)\sqrt{x+1}$$

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38. Integrate:

$$\int x\operatorname{cosec}^2 x\,dx.$$

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39. Integrate:

$$\int x\cos 5x\cos 2x\,dx$$

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40. Integrate:

$$\int x^2 e^{2x}\,dx$$

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41. Integrate with respect to x

$$\left(\sin^{-1} x\right)\frac{e^{\sin^{-1} x}}{\sqrt{1-x^2}}$$

42. Integrate:

$$\int \text{cosec}^3 x \, dx.$$

43. Integrate:

$$\int \sec^2 2x \, dx$$

44. Integrate the following with respect to x.

$$e^{2x} \sin 3x \, dx.$$

45. Integrate the following with respect to x.

$$e^x \cos 2x$$

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46. Integrate the following with respect to x.

$$e^{3x} \sin 2x.$$

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47. Integrate the following.

(i) $\dfrac{1}{16 - x^2}$ (ii) $\dfrac{1}{7 - (4x + 1)^2}$ (iii) $\dfrac{1}{5 - 6x - 9x^2}$

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48. Integrate the following with respect to x.

(i) $\dfrac{1}{(2x + 1)^2 - 16}$ (ii) $\dfrac{1}{x^2 + 3x - 3}$.

49. Integrate the following with respect to x.

$$\frac{1}{\sqrt{x^2 + 8x - 20}}$$

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

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

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

$$\frac{4x + 1}{x^2 + 3x + 1}$$

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

$$\frac{2x - 3}{\sqrt{10 - 7x - x^2}}$$

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53. $\dfrac{6x + 7}{\sqrt{(x - 4)(x - 5)}}$

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54. Integrate the following functions with respect to x.

$$\sqrt{(x + 1)^2 + 4}$$

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55. Integrate the following functions with respect to x.

$$\sqrt{(2x + 1)^2 + 9}$$

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56. Integrate the following functions with respect to x.

$$\sqrt{x^2 - 3x + 10}$$

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57. Integrate the following functions with respect to x.

$$\sqrt{169 - (3x + 1)^2}$$

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58. Integrate the following functions with respect to x.

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

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59. Integrate the following functions with respect to x.

$$\sqrt{(2-x)(3+x)}$$

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Exercise 11 1

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

(i) x^{11} (ii) $\dfrac{1}{x^7}$ (iii) $\sqrt[3]{x^4}$ (iv) $\left(x^5\right)^{\frac{1}{8}}$

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

(i) $\dfrac{1}{\sin^2 x}$ (ii) $\dfrac{\tan x}{\cos x}$ (iii) $\dfrac{\cos x}{\sin^2 x}$ (iv) $\dfrac{1}{\cos^2 x}$

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

(i) 12^3 (ii) $\dfrac{x^{24}}{x^{25}}$ (iii) e^x

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

(i) $\left(1 + x^2\right)^{-1}$ (ii) $\left(1 - x^2\right)^{\frac{1}{2}}$

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Exercise 11 2

1. Integrate the following functions w.r.to 'x' .

(i) $(x + 5)^6$ (ii) $\dfrac{1}{(2 - 3x)^4}$ (iii) $\sqrt{3x + 2}$

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2. Integrate the following functions w.r.to 'x' .

(i) $\sin 3x$ (ii) $\cos(5 - 11x)$ (iii) $\operatorname{cosec}^2(5x - 7)$

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3. Integrate the following functions w.r.to 'x' .

(i) e^{3x-6} (ii)e^{8-7x} (iii) $\dfrac{1}{6 - 4x}$

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4. Integrate the following functions w.r.to 'x' .

(i) $\sec^2 \dfrac{x}{5}$ (ii) $\operatorname{cosec}(5x + 3)\cot(5x + 3)$

(iii) $\sec(2 - 15x)\tan(2 - 15x)$

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5. Integrate the following functions w.r.to 'x' .

(i) $\dfrac{1}{\sqrt{1-(4x)^2}}$ (ii) $\dfrac{1}{\sqrt{1-81x^2}}$ (iii) $\dfrac{1}{1+36x^2}$

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Exercise 11 3

1. Integrate the following with respect to x :

$$(x+4)^5 + \dfrac{5}{(2-5x)^4} - \cos ec^2(3x-1)$$

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2. $4\cos(5-2x) + 9e^{3x-6} + \dfrac{24}{6-4x}$

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3. Integrate the following w.r.to .x.

$$\sec^2\left(\frac{x}{5}\right) + 18\cos 2x + 10\sec(5x + 3)\tan(5x + 3)$$

4. Integrate the following w.r.to .x.

$$\frac{8}{\sqrt{1 - (4x)^2}} + \frac{27}{\sqrt{1 - 9x^2}} - \frac{15}{1 + 25x^2}$$

5. Integrate the following w.r.to .x.

$$\frac{6}{1 + (3x + 2)^2} - \frac{12}{\sqrt{1 - (3 - 4x)^2}}$$

6. Integrate the following w.r.to .x.

$$\frac{1}{3}\cos\left(\frac{x}{3} - 4\right) + 7(7x + 9) + e^{\frac{x}{5} + 3}$$

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Exercise 11 4

1. If $f'(x) = 4x - 5$ and $f(2) = 1$, find f(x).

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2. If $f'(x) = 9x^2 - 6x$ and $f(0) = -3$, find f(x)

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3. If $f''(x) = 12x - 6$ and $f(1) = 30$, $f'(1) = 5$ find $f(x)$

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4. A ball is thrown vertically upward from the ground with an initial velocity of 39.2 m/sec. If the only force considered is that attributed to the accleration due to gravity , find

(i) how long will it take for the ball to strike the ground ?

(ii) the speed with which will it strike the ground ? and

(iii) how high the ball will rise ?

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5. A wound is healing in such a way that t days since Sunday the area of the wound has been decreasing at a rate of $-\dfrac{3}{(t+2)^2} cm^2$ per day. If on Monday the area of the wound was $2cm^2$

What was the area of the wound on Sunday?

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Exercise 11 5

1. Integrate the following functions with respect to x .

$$\frac{x^3 + 4x^2 - 3x + 2}{x^2}$$

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2. Integrate the following functions with respect to x .

$$\left(\sqrt{x} + \frac{1}{\sqrt{x}} \right)^2$$

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3. Integrate the following functions with respect to x .

$$(2x - 5)(36 + 4x)$$

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4. Integrate the following functions with respect to x .

$$(\cot x + \tan x)^2$$

5. Integrate the following functions with respect to x .

$$\frac{\cos 2x - \cos 2\alpha}{\cos x - \cos \alpha}$$

6. Integrate the following functions with respect to x .

$$\frac{\cos 2x}{\sin^2 x \cos^2 x}$$

7. Integrate the following functions with respect to x .

$$\frac{3 + 4\cos x}{\sin^2 x}$$

8. Integrate the following functions with respect to x .

$$\frac{\sin^2 x}{1 + \cos x}$$

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9. Integrate the following functions with respect to x .

$$\frac{\sin 4x}{\sin x}$$

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10. Integrate the following functions with respect to x .

$$\cos 3x \cos 2x$$

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11. Integrate the following functions with respect to x .

$$\sin^2 5x$$

12. Integrate the following functions with respect to x .

$$\frac{1 + \cos 4x}{\cot x - \tan x}$$

13. Integrate the following functions with respect to x .

$$e^{x \log a} e^{x}$$

14. Integrate the following functions with respect to x .

$$(3x + 4)\sqrt{3x + 7}$$

15. Integrate the following functions with respect to x .

$$\frac{8^{1+x} + 4^{1-x}}{2^x}$$

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16. Integrate the following functions with respect to x .

$$\frac{1}{\sqrt{x+3} - \sqrt{x-4}}$$

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17. Integrate the following functions with respect to x .

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

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18. Integrate the following functions with respect to x .

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

19. Integrate the following functions with respect to x .

$$\frac{3x - 9}{(x - 1)(x + 2)(x^2 + 1)}$$

20. Integrate the following functions with respect to x .

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

Exercise 11 6

1. Integrate the following with respect to x .

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

2. Integrate the following with respect to x .

$$\frac{x^2}{1 + x^6}$$

3. Integrate the following with respect to x .

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

4. Integrate the following with respect to x.

$$\frac{10x^9 + 10^x \log_e 10}{10^x + x^{10}}$$

5. Integrate the following with respect to x .

$$\frac{\sin \sqrt{x}}{\sqrt{x}}$$

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6. Integrate the following with respect to x .

$$\frac{\cot x}{\log(\sin x)}$$

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7. Integrate the following with respect to x .

$$\frac{\operatorname{cosec} x}{\log\left(\tan \frac{x}{2}\right)}$$

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8. Integrate the following with respect to x .

$$\frac{\sin 2x}{a^2 + b^2 \sin^2 x}$$

9. Integrate the following with respect to x.

$$\frac{\sin^{-1} x}{\sqrt{1 - x^2}}$$

10. Integrate the following with respect to x .

$$\frac{\sqrt{x}}{1 + \sqrt{x}}$$

11. Integrate the following with respect to x .

$$\frac{1}{x \log x \log(\log x)}$$

12. Integrate the following with respect to x .

$$\alpha \beta x^{\alpha - 1} e^{- \beta x^{\alpha}}$$

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13. Integrate the following with respect to x.

$$\tan x \sqrt{\sec x}$$

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14. Integrate the following with respect to x.

$$x(1 - x)^{17}$$

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15. Integrate the following with respect to x.

$$\sin^5 x \cos^3 x.$$

16. Integrate the following with respect to x .

$$\frac{\cos x}{\cos(x-a)}$$

Exercise 11 7

1. Integrate the following respect to x.

(i) $9xe^{3x}$ (ii) x sin 3x (iii) $25xe^{-5x}$ (iv) x sec x tan x

2. Integrate the following respect to x.

(i) x log x (ii) $27x^2e^{3x}$ (iii) $x^2 \cos x$ (iv) $x^3 \sin x$

3. Integrate the following respect to x.

(i) $\dfrac{x \sin^{-1} x}{\sqrt{1 - x^2}}$ (ii) $x^5 e^{x^2}$

(iii) $\tan^{-1}\left(\dfrac{8x}{1 - 16x^2}\right)$ (iv) $\sin^{-1}\left(\dfrac{2x}{1 + x^2}\right)$

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Exercise 11 8

1. Integrate the following with respect to x.

(i) $e^{ax} \cos bx$ (ii) $e^{2x} \sin x$ (iii) $e^{-x} \cos 2x$

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2. Integrate the following with respect to x.

$e^{-3x} \sin 2x$ (ii) $e^{-4x} \sin 2x$ (ii) $e^{-3x} \cos x$

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1. Integrate the following with respect to x :

$$e^x (\tan x + \log \sec x)$$

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2. Integrate the following with respect to x.

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

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3. Integrate the following with respect to x.

$$e^x \sec x (1 + \tan x)$$

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4. Integrate the following with respect to x.

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

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5. Integrate the following with respect to x.

$$e^{\tan^{-1} x} \left(\frac{1 + x + x^2}{1 + x^2} \right)$$

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6. Integrate the following with respect to x.

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

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Exercise 11 10

1. Find the integrals of the following :

(i) $\dfrac{1}{4 - x^2}$ (ii) $\dfrac{1}{25 - 4x^2}$ (iii) $\dfrac{1}{9x^2 - 4}$

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2. Find the integrals of the following :

(i) $\dfrac{1}{6x - 7 - x^2}$ (ii) $\dfrac{1}{(x + 1)^2 - 25}$ (iii) $\dfrac{1}{\sqrt{x^2 + 4x + 2}}$

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3. Find the integrals of the following :

$\dfrac{1}{\sqrt{(2 + x)^2 - 1}}$ (ii) $\dfrac{1}{\sqrt{x^2 - 4x + 5}}$ (iii) $\dfrac{1}{\sqrt{9 + 8x - x^2}}$

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Exercise 11 11

1. Integrate the following with respect to x :

(i) $\dfrac{2x - 3}{x^2 + 4x - 12}$ (ii) $\dfrac{5x - 2}{2 + 2x + x^2}$ (iii) $\dfrac{3x + 1}{2x^2 - 2x + 3}$

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2. Integrate the following with respect to x.

$\dfrac{x + 2}{\sqrt{x^2 - 1}}$

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Exercise 11 12

1. Integrate the following functions with respect to x .

(i) $\sqrt{x^2 + 2x + 10}$

(ii) $\sqrt{x^2 - 2x - 3}$

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2. Integrate the following functions with respect to x.

(i) $\sqrt{9 - (2x + 5)^2}$

(ii) $\sqrt{81 + (2x + 1)^2}$

(iii) $\sqrt{(x + 1)^2 - 4}$

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Exercise 11 13

1. If $\int f(x)\,dx = g(x) + c,$ then $\int f(x)g'(x)\,dx$

A. $\int (f(x))^2\,dx$

B. $\int f(x)g(x)\,dx$

C. $\int f'(x)g(x)\,dx$

D. $\int (g(x))^2\,dx.$

Answer: A

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2. If $\int \dfrac{3^{\frac{1}{x}}}{x^2} dx = k\left(3^{\frac{1}{x}}\right) + c$, then the value of k is ....

A. $\log 3$

B. $-\log 3$

C. $-\dfrac{1}{\log^3}$

D. $\dfrac{1}{\log 3}$

Answer: C

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3. $\int \dfrac{e^x(1+x)}{\cos^2(xe^x)} dx$ is

A. $\cot(xe^x) + c$

B. $\sec(xe^x) + c$

C. $\tan(xe^x) + c$

D. $\cos(xe^x) + c$

Answer: C

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4. $\int \dfrac{\sqrt{\tan x}}{\sin 2x} dx$ is ....

A. $\sqrt{\tan x} + c$

B. $2\sqrt{\tan x} + c$

C. $\dfrac{1}{2}\sqrt{\tan x} + c$

D. $\dfrac{1}{4}\sqrt{\tan x} + c.$

Answer: A

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5. $\int \sin^3 x dx$ is:

A. $\dfrac{-3}{4}\cos x - \dfrac{\cos 3x}{12} + c$

B. $\dfrac{3}{4}\cos x + \dfrac{\cos 3x}{12} + c$

C. $\dfrac{-3}{4}\cos x + \dfrac{\cos 3x}{12} + c$

D. $\dfrac{-3}{4}\sin x - \dfrac{\sin 3x}{12} + c.$

Answer: C

6. $\displaystyle\int \dfrac{e^{6\log x} - e^{5\log x}}{e^{4\log x} - e^{3\log x}} dx\text{................} .$

A. $x + c$

B. $\dfrac{x^3}{3} + c$

C. $\dfrac{3}{x^3} + c$

D. $\dfrac{1}{x^2} + c$

Answer: B

7. $\int \dfrac{\sec x}{\sqrt{\cos 2x}}\,dx$ is........................ .

A. $\tan^{-1}(\sin x) + c$

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

C. $\tan^{-1}(\cos x) + c$

D. $\sin^{-1}(\tan x) + c$

Answer: D

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8. $\int \tan^{-1}\sqrt{\dfrac{1 - \cos 2x}{1 + \cos 2x}}\,dx$. ....

A. $x^2 + c$

B. $2x^2 + c$

C. $\dfrac{x^2}{2} + c$

D. $-\dfrac{x^2}{2} + c$

Answer: C

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9. $\displaystyle\int 2^{3x+5}\,dx$ is ....

A. $\dfrac{3\left(2^{3x+5}\right)}{\log 2} + c$

B. $\dfrac{2^{3x+5}}{2\log(3x+5)} + c$

C. $\dfrac{2^{3x+5}}{2\log 3} + c$

D. $\dfrac{2^{3x+5}}{3\log 2} + c$

Answer: D

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10. $\displaystyle\int \dfrac{\sin^8 x - \cos^8 x}{1 - 2\sin^2 x \cos^2 x}\,dx$ is

A. $\frac{1}{2}\sin 2x + c$

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

C. $\frac{1}{2}\cos 2x + c$

D. $-\frac{1}{2}\cos 2x + c$

Answer: B

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11. $\int \frac{e^x \left(x^2 \tan^{-1} x + \tan^{-1} x + 1\right)}{x^2 + 1} dx$ is

A. $e^x \tan^{-1}(x + 1) + c$

B. $\tan^{-1}(e^x) + c$

C. $e^x \frac{\left(\tan^{-1} x\right)^2}{2} + c$

D. $e^x \tan^{-1} x + c$

Answer: D

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12. $\int \dfrac{x^2 + \cos^2 x}{x^2 + 1} \csc^2 x\, dx$ is ....

A. $\cot x + \sin^{-1} x + c$

B. $-\cot x + \tan^{-1} x + c$

C. $-\tan x + \cot^{-1} x + c$

D. $-\cot x - \tan^{-1} x + c$

Answer: D

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13. $\int x^2 \cos x\, dx$ is ....

A. $x^2 \sin x + 2x \cos x - 2 \sin x + c$

B. $x^2 \sin x - 2x \cos x - 2 \sin x + c$

C. $-x^2 \sin x + 2x \cos x + 2 \sin x + c$

D. $-x^2 \sin x - 2x \cos x + 2\sin x + c$

Answer: A

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14. $\int \sqrt{\dfrac{1-x}{1+x}}\, dx$ is

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

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

C. $\log\left|x + \sqrt{1-x^2}\right| - \sqrt{1-x^2} + c$

D. $\sqrt{1-x^2} + \log\left|x + \sqrt{1-x^2}\right| + c$

Answer: B

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15. $\int \dfrac{dx}{e^x - 1}$ is ....

A. $\log|e^x| - \log|e^x - 1| + c$

B. $\log|e^x| + \log(e^x - 1| + c$

C. $\log|e^x - 1| - \log|e^x| + c$

D. $\log|e^x + 1| - \log|e^x| + c$

Answer: C

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16. $\int e^{-4x} \cos x \, dx$ is ....

A. $\dfrac{e^{-4x}}{17}[4\cos x - \sin x] + c$

B. $\dfrac{e^{-4x}}{17}[-4\cos x + \sin x] + c$

C. $\dfrac{e^{-4x}}{17}[4\cos x + \sin x] + c$

D. $\dfrac{e^{-4x}}{17}[-4\cos x - \sin x] + c$

Answer: B

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17. $\int \dfrac{\sec^2 x}{\tan^2 x - 1} dx$ ....

A. $2\log\left|\dfrac{1-\tan x}{1+\tan x}\right| + c$

B. $\log\left|\dfrac{1+\tan x}{1-\tan x}\right| + c$

C. $\dfrac{1}{2}\log\left|\dfrac{\tan x + 1}{\tan x - 1}\right|$

D. $\dfrac{1}{2}\log\left|\dfrac{\tan x - 1}{\tan x + 1}\right| + c$

Answer: D

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18. $\int e^{-7x} \sin 5x\, dx$ is

A. $\dfrac{e^{-7x}}{74}\left[-7\sin 5x - 5\cos 5x\right] + c$

B. $\dfrac{e^{-7x}}{74}\left[7\sin 5x + 5\cos 5x\right] + c$

C. $\dfrac{e^{-7x}}{74}\left[7\sin 5x - 5\cos 5x\right) + c$

D. $\dfrac{e^{-7x}}{74}[-7\sin 5x + 5\cos 5x] + c$

Answer: A

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19. $\displaystyle\int x^2 e^{\frac{x}{2}}\, dx$ is

A. $x^2 e^{\frac{x}{2}} - 4xe^{\frac{x}{2}} - 8e^{\frac{x}{2}} + c$

B. $2x^2 e^{\frac{x}{2}} - 8xe^{\frac{x}{2}} - 16e^{\frac{x}{2}} + c$

C. $2x^2 e^{\frac{x}{2}} - 8xe^{\frac{x}{2}} + 16e^{\frac{x}{2}} + c$

D. $x^2 \dfrac{e^{\frac{x}{2}}}{2} - \dfrac{xe^{\frac{x}{2}}}{4} + \dfrac{e^{\frac{x}{2}}}{8} + c$

Answer: C

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20. $\displaystyle\int \dfrac{x+2}{\sqrt{x^2-1}}\, dx \ldots\ldots\ldots\ldots\ldots\ldots\ .$

A. $\sqrt{x^2 - 1} - 2\log\left|x + \sqrt{x^2 - 1}\right| + c$

B. $\sin^{-1} x - 2\log\left|x + \sqrt{x^2 - 1}\right| + c$

C. $2\log\left|x + \sqrt{x^2 - 1}\right| - \sin^{-1} x + c$

D. $\sqrt{x^2 - 1} + 2\log\left|x + \sqrt{x^2 + 1}\right| + c$

Answer: D

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21. $\int \dfrac{1}{x\left(\sqrt{(\log x)^2 - 5}\right)} \, dx$................. .

A. $\log\left|x = \sqrt{x^2 - 5}\right| + 5$

B. $\log\left|\log x + \sqrt{\log x - 5}\right| + c$

C. $\log\left|\log x + \sqrt{(\log x)^2 - 5}\right| + c$

D. $\log\left|\log x - \sqrt{(\log x)^2 - 5}\right| + c$

Answer: C

22. $\int \sin \sqrt{x}\, dx =$ ....

A. $2\left(- \sqrt{x} \cos \sqrt{x} + \sin \sqrt{x} \right) + c$

B. $2\left(- \sqrt{x} \cos \sqrt{x} - \sin \sqrt{x} \right) + c$

C. $2\left(- \sqrt{x} \sin \sqrt{x} - \cos \sqrt{x} \right) + c$

D. $2\left(- \sqrt{x} \sin \sqrt{x} + \cos \sqrt{x} \right) + c$

Answer: A

23. $\int e^{\sqrt{x}}\, dx$ is ....

A. $2\sqrt{x}\left(1 - e^{\sqrt{x}}\right) + c$

B. $2\sqrt{x}\left(e^{\sqrt{x}-1}\right) + c$

C. $2e^{\sqrt{x}}\left(1 - \sqrt{x}\right) + c$

D. $2e^{\sqrt{x}}\left(\sqrt{x} - 1\right) + c$

Answer: D

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