



MATHS

BOOKS - VIKRAM PUBLICATION (ANDHRA PUBLICATION)

INTEGRATION

Solved Example

1. Find $\int (2x^7) dx$ on \mathbb{R} .

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2. Evaluate $\int \cot^2 x dx$ on $I \subset \mathbb{R} \setminus \{n\pi : n \in \mathbb{Z}\}$

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3. Evaluate

$$\int \frac{x^6 - 1}{(x^2 + 1)} dx$$

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4. Find $\int (1 - x)(4 - 3x)(3 + 2x) dx, x \in R.$

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5. Evaluate $\int \left(x + \frac{1}{x}\right)^3 dx, x > 0$

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

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7. Evaluate $\int \frac{2x^3 - 3x + 5}{2x^2} dx$ for $x > 0$ and verify the result by differentiation.

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8. $\int \frac{x^5}{1 + x^{12}} dx$

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9. Evaluate $\int \cos^3 x \sin x dx$ on R .

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10. Find $\int \left(1 - \frac{1}{x^2}\right) e^{\left(x + \frac{1}{x}\right)} dx$ on I where $I = (0, \infty)$.

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11. Evaluate $\int \frac{1}{\sqrt{\sin^{-1} x} \sqrt{1-x^2}} dx$ on $I = (0, 1)$

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12. Evaluate $\int \frac{\sin^4 x}{\cos^6 x} dx, x \in I \subset \mathbb{R} \setminus \left\{ \frac{(2n+1)\pi}{2}, n \in \mathbb{Z} \right\}$.

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13. Evaluate $\int \sin^2 x dx$ on \mathbb{R} .

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14. Evaluate $\int \frac{1}{a \sin x + b \cos x} dx$ where
 $a, b \in \mathbb{R}$ and $a^2 + b^2 \neq 0$ on \mathbb{R} .

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15. Find $\int \frac{x^2}{\sqrt{x+5}} dx$ on $(-5, \infty)$

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16. Find $\int \frac{x}{\sqrt{1-x}} dx, x \in I = (0, 1)$.

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17. Evaluate $\int \frac{dx}{(x+5)\sqrt{x+4}}$

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18. $\int \frac{dx}{\sqrt{4-9x^2}} = ?$

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19. Evaluate $\int \frac{1}{a^2 - x^2} dx$ for $x \in I = (-a, a)$

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20. Evaluate $\int \frac{1}{1 + 4x^2} dx$ on R .

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

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22. Evaluate $\int \sqrt{4x^2 + 9} dx$ on R .

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23. Evaluate $\int \sqrt{9x^2 - 25} dx$ on $\left[\frac{5}{3}, \infty\right)$.



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24. Evaluate $\int \sqrt{16 - 25x^2} dx$ on $\left(\frac{-4}{5}, \frac{4}{5}\right)$.



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25. Evaluate $\int x \sin^{-1} x dx$ on $(-1,1)$.



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26. Evaluate $\int x^2 \cos x dx$.



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27. Evaluate $\int e^x \sin x dx$ on R .



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28. Find $\int e^{ax} \cos(bx + c) dx$ on \mathbb{R} , where a, b, c are real number and $b \neq 0$.

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29. Evaluate $\int \tan^{-1} \sqrt{\frac{1-x}{1+x}} dx$, on $(-1, 1)$

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30. Evaluate $\int e^x \left(\frac{1 - \sin x}{1 - \cos x} \right) dx$

on $I \subset \mathbb{R} \setminus \{2n\pi : n \in \mathbb{Z}\}$.

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

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32. Find $\int x^2 \cdot \left(\exp \frac{m \sin^{-1} x}{\sqrt{1-x^2}} dx \right)$ on $(-1, 1)$ where m is a real number. (Here for $Y \in R$, $\exp. \{y\}$ stands for e^y).

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33. Evaluate $\int \frac{dx}{4x^2 - 4x - 7}$

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34. Find $\int \frac{dx}{5 - 2x^2 + 4x}$

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35. Evaluate $\int \frac{dx}{x^2 + x + 1}$.

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36. Evaluate $\int \frac{dx}{\sqrt{2x^2 + 10}}$,

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37. Evaluate $\int \frac{dx}{\sqrt{1 - x - x^2}}$

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38. Evaluate $\int \sqrt{3x + 8x - 3x^2} dx$.

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39. Evaluate $\int \frac{x + 1}{x^2 + 3x + 12} dx$.

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40. Evaluate $\int (3x - 2)\sqrt{2x^2 - x + 1} dx$

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41. Evaluate $\int \frac{2x + 5}{\sqrt{x^2 - 2x + 10}} dx$.

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42. Evaluate $\int \frac{dx}{(x + 5)\sqrt{x + 4}}$.

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43. Evaluate $\int \frac{dx}{5 + 4 \cos x}$.

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44. $\int \frac{dx}{3 \cos x + 4 \sin x + 6}$

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45. Find $\int \frac{dx}{d + e \tan x}$.

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46. Evaluate $\int \frac{\cos x}{d \cos x + e \sin x} dx$ and $\int \frac{\cos x}{d \cos x + e \sin x} dx$.

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47. Evaluate $\int \frac{\cos x + 3 \sin x + 7}{\cos x + \sin x + 1} dx$.

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48. Find $\int \frac{x^3 - 2x + 3}{x^2 + x - 2} dx$.

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49. Find $\int \frac{dx}{x^2 - 81}$.



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50. Find $\int \frac{2x^2 - 5x + 1}{x^2(x^2 - 1)} dx$.



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51. Find $\int \frac{3x - 5}{x(x^2 + 2x + 4)} dx$.



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52. Find $\int \frac{2x + 1}{(x - 2)(x^2 + 4)} dx$.



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53. Evaluate $\int x^3 \cdot e^{5x} dx$.



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54. Evaluate $\int \sin^4 x dx$.

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55. Evaluate $\int \tan^6 x dx$.

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56. $\int \sec^5 x dx$.

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Solved Problems

1. Find $\int 2x^7 dx$ on \mathbb{R} .

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2. Evaluate $\int \cot^2 x dx$ on $I \subset \mathbb{R} / \{n\pi : n \in \mathbb{Z}\}$.

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3. Evaluate $\int \left(\frac{x^6 - 1}{1 + x^2} \right) dx$ for $x \in \mathbb{R}$.

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4. Find $\int (1 - x)(4 - 3x)(3 + 2x) dx$, $x \in \mathbb{R}$.

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5. Evaluate $\int \left(x + \frac{1}{x} \right) dx$, $x > 0$.

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6. Find $\int \sqrt{1 + \sin 2x} dx$ on \mathbb{R} . a

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18. Evaluate $\int \frac{dx}{\sqrt{4-9x^2}}$ on $1 = \left(-\frac{2}{3}, \frac{2}{3}\right)$.

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27. Evaluate $\int e^x \sin x dx$ on R .



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28. Evaluate $\int x \sin^{-1} x \, dx$ on $(-1, 1)$.

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29. Evaluate $\int \tan^{-1} \sqrt{\frac{1-x}{1+x}} \, dx$, on $(-1, 1)$

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30. Evaluate $\int e^x \left(\frac{1 - \sin x}{1 - \cos x} \right) dx$

on $I \subset \mathbb{R} \setminus \{2n\pi : n \in \mathbb{Z}\}$.

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52. Evaluate $\int \tan^6 x dx$.



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53. $\int \sec^5 x dx$.



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Textual Exercise 6 A

1. Evaluate the integrals.

$$\int (x^3 - 2x^2 + 3) dx \text{ on } \mathbb{R}.$$

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2. Evaluate the integrals.

$$\int 2x\sqrt{x} dx \text{ on } (0, \infty).$$

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3. Evaluate the integrals.

$$\int \sqrt[3]{2x^2} dx \text{ on } (0, \infty).$$

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4. Evaluate the integrals.

$$\int \frac{x^2 + 3x - 1}{2x} dx, x \in I \subset \mathbb{R} \setminus \{0\}$$

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5. Evaluate the integrals.

$$\frac{1 - \sqrt{x}}{x} dx \text{ on } (0, \infty)$$

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6. Evaluate the integrals.

$$\int \left(1 + \frac{2}{3}x - \frac{3}{x^2} \right) dx \text{ on } I \subset \mathbb{R} \setminus \{0\}$$

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7. Evaluate the integrals.

$$\int \left(x + \frac{4}{1 + x^2} \right) dx \text{ on } \mathbb{R}.$$



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8. Evaluate the integrals.

$$\int \left(e^x - \frac{1}{x} + \frac{2}{\sqrt{x^2 + 1}} \right) dx \quad \text{on } I \subset \mathbb{R} \setminus [-1, 1]$$



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9. Evaluate the integrals.

$$\int \left(\frac{1}{1 - x^2} + \frac{1}{1 + x^2} \right) dx \quad \text{on } (-1, 1).$$



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10. Evaluate the integrals.

$$\int \left(\frac{1}{1 - x^2} + \frac{2}{1 + x^2} \right) dx \quad \text{on } (-1, 1).$$



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11. Evaluate the integrals.

$$\int e^{\log(1+\tan^2 x)} dx \text{ on } I \subset \mathbb{R} \setminus \left\{ \frac{(2n+1)\pi}{2} : n \in \mathbb{Z} \right\}.$$

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12. Evaluate the integrals.

$$\int (1-x^2)^3 dx \text{ on } (-1, 1)$$

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13. Evaluate the integrals.

$$\int \left(\frac{3}{x} - \frac{2}{x} + \frac{1}{3x^2} \right) dx \text{ on } (0, \infty)$$

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14. Evaluate the integrals.

$$\int \left(\frac{\sqrt{x}+1}{x} \right)^2 dx \text{ on } (0, \infty)$$



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15. Evaluate the integrals.

$$\int \frac{(3x + 1)^2}{2x} dx \quad x \in I \subset \mathbb{R} \setminus \{0\}$$



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16. Evaluate the integrals.

$$\int \left(\frac{2x - 1}{3\sqrt{x}} \right) dx \quad \text{on } (0, \infty)$$



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17. Evaluate the integrals.

$$\int \left(\frac{1}{\sqrt{x}} + \frac{2}{\sqrt{x^2 - 1}} - \frac{3}{2x^2} \right) dx \quad \text{on } (1, \infty).$$



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18. Evaluate the integrals.

$$\int (\sec^2 x - \cos x + x^2) dx, x \in I \subset \mathbb{R} \setminus \left\{ \frac{n\pi}{2} : n \text{ is an odd integer} \right\}.$$



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19. Evaluate the integrals.

$$\int \left(\sec x \tan x + \frac{3}{x} - 4 \right) dx, x \in I \subset \mathbb{R} \setminus \left(\left\{ \frac{n\pi}{2} : n \text{ is an odd integer} \right\} \cup \{0\} \right)$$



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20. Evaluate the integrals.

$$\int \left(\sqrt{x} - \frac{2}{1-x^2} \right) dx \text{ on } (0, 1).$$



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21. Evaluate the integrals.

$$\int \left(x^3 - \cos x + \frac{4}{\sqrt{x^2 + 1}} \right) dx, x \in \mathbb{R}.$$



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22. Evaluate the integrals.

$$\int \left(\cos hx + \frac{1}{\sqrt{x^2 + 1}} \right) dx, x \in \mathbb{R}$$

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23. Evaluate the integrals.

$$\int \left(\sin hx + \frac{1}{(x^2 - 1)^{\frac{1}{2}}} \right) dx.$$

$$x \in I \subset (-\infty, -1) \cup (1, \infty)$$

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24. Evaluate the integrals.

$$\int \frac{(a^x - b^x)^2}{a^x b^x} dx,$$

$$(a > 0, a \neq 1 \text{ and } b > 0, b \neq 1) \text{ on } \mathbb{R}.$$

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25. Evaluate the integrals.

$$\int e \sec^2 x \cos e c^2 x dx \text{ on } I \subset \mathbb{R} \setminus \left(\{n\pi : n \in \mathbb{Z}\} \cup \left\{ (2n+1) \left(\pi \frac{0}{2} : n \in \mathbb{Z} \right) \right\} \right).$$



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26. Evaluate : $\int \frac{1 + \cos^2 x}{1 - \cos 2x} dx$, on $I \subset \mathbb{R} / \{n\pi : n \in \mathbb{Z}\}$



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27. Evaluate the integrals.

$$\int \sqrt{1 - \cos 2x} dx \text{ on}$$

$$I \subset [2n\pi, (2n+1)\pi], n \in \mathbb{Z}.$$



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28. Evaluate the integrals.

$$\int \frac{1}{\cos hx + \sin hx} dx \text{ on } R.$$

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29. Evaluate the integrals.

$$\int \frac{1}{1 + \cos x} dx \text{ on}$$

$$I \subset \{(2n + 1)\pi : n \in \mathbb{Z}\}.$$

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Textual Exercise 6 B

1. Evaluate the integrals.

$$\int e^{2x} dx, x \in R.$$

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2. Evaluate the integrals.

$$\int \sin 7x dx, x \in \mathbb{R}.$$

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3. Evaluate the integrals.

$$\int \frac{x}{1+x^2} dx, x \in \mathbb{R}.$$

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4. Evaluate the integrals.

$$\int 2x \sin(x^2 + 1) dx, x \in \mathbb{R}.$$

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5. Evaluate the integrals.

$$\int \frac{(\log x)^2}{x} dx \text{ on } I \subset (0, \infty).$$

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6. Evaluate the integrals.

$$\int \frac{e^{\tan^{-1} x}}{1+x^2} dx \text{ on } I \subset (0, \infty).$$

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7. Evaluate the integrals.

$$\int \frac{\sin(\tan^{-1} x)}{1+x^2} dx, x \in \mathbb{R}.$$

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8. Evaluate the integrals.

$$\int \frac{1}{8+2x^2} dx \text{ on } \mathbb{R}.$$

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9. Evaluate the integrals.

$$\int \frac{3x^2}{1+x^6} dx, \text{ on } \mathbb{R}.$$

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10. Evaluate the integrals.

$$\int \frac{2}{\sqrt{25+9x^2}} dx \text{ on } \mathbb{R}.$$

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11. Evaluate the integrals.

$$\int \frac{3}{\sqrt{9x^2-1}} dx \text{ on } \left(\frac{1}{3}, \infty\right).$$

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12. Evaluate the integrals.

$\int \sin mx \cos nx dx$ on \mathbb{R} , $m \neq n$, m and n are positive integers.



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13. Evaluate the integrals.

$\int \sin mx \sin nx dx$ on \mathbb{R} , $m \neq n$, m and n are positive integers.



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14. Evaluate the integrals.

$\int \cos mx \cos nx dx$ on \mathbb{R} , $m \neq n$, m and n are positive integers.



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15. Evaluate the integrals.

$\int \sin x \sin 2x \cdot \sin 3x dx$ on \mathbb{R} .



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16. Evaluate the integrals.

$$\int \frac{\sin x}{\sin(a+x)} dx \text{ on } I \subset \mathbb{R} \setminus \{n\pi - a : n \in \mathbb{Z}\}.$$

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17. Evaluate the integrals.

$$\int (2x - 2)^{\frac{1}{2}} dx \text{ on } \left(\frac{2}{3}, \infty\right)$$

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18. Evaluate the integrals.

$$\int \frac{1}{7x+3} dx \text{ on } I \subset \mathbb{R} \setminus \left\{-\frac{3}{7}\right\}.$$

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19. Evaluate the integrals.

$$\int \frac{\log(1+x)}{1+x} dx \text{ on } (-1, \infty).$$



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20. Evaluate the integrals.

$$\int (3x^2 - 4) \times dx \text{ on } R.$$



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21. Evaluate the integrals.

$$\int \frac{dx}{\sqrt{1+5x}} dx \text{ on } \left(-\frac{1}{5}, \infty\right)$$



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22. Evaluate the integrals.

$$\int (1 - 2x^3) x^2 dx \text{ on } R.$$



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23. Evaluate the integrals.

$$\int \frac{\sec^2 x}{(1 + \tan x)^3} dx$$

$$\text{on } I \subset \mathbb{R} \setminus \left\{ n\pi - \frac{\pi}{4} : n \in \mathbb{Z} \right\}.$$



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24. Evaluate the integrals.

$$\int x^3 \sin x^4 dx \text{ on } \mathbb{R}.$$



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25. Evaluate the integrals.

$$\int \frac{\cos x}{(1 + \sin x)^2} dx \text{ on}$$

$$I \subset \mathbb{R} \setminus \left\{ 2n\pi + \frac{3\pi}{2} : n \in \mathbb{Z} \right\}.$$



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26. Evaluate the integrals.

$$\int_0^{2\pi} 3\sqrt{\sin x} \cos x dx \text{ on } [2n\pi, (2n+1)\pi], (n \in \mathbb{Z}).$$

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27. Evaluate the integrals.

$$\int_0^1 2xe^{x^2} dx \text{ on } \mathbb{R}.$$

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28. Evaluate the integrals.

$$\int_1^e \frac{e^{\log x}}{x} dx \text{ on } (0, \infty).$$

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29. Evaluate the integrals.

$$\int_{-1}^1 \frac{x^2}{\sqrt{1-x^6}} dx \text{ on } I = (-1, 1).$$

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30. Evaluate the integrals.

$$\int \frac{2x^3}{\sqrt{1-x^8}} dx \text{ on } R.$$

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31. Evaluate the integrals.

$$\int \frac{x^8}{1+x^{18}} dx \text{ on } R.$$

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32. Evaluate the integrals.

$$\int \frac{e^x(1+x)}{\cos^2(ex^x)} dx \text{ on } I \subset R \setminus$$
$$\{x \in R : \cos(xe^x) = 0\}.$$

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33. Evaluate the integrals.

$$\int \frac{\cos e c^2 x}{(a + b \cot x)^5} dx \text{ on } I \subset \mathbb{R} \setminus$$

$\{x \in \mathbb{R} : a + b \cot x = 0\}$, where $a, b \in \mathbb{R}, b \neq 0$.



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34. Evaluate the integrals.

$$\int e^x \sin e^x dx \text{ on } \mathbb{R}.$$



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35. Evaluate the integrals.

$$\int \frac{\sin(\log x)}{x} dx \text{ on } (-1, \infty)$$



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36. Evaluate the integrals.

$$\int \frac{1}{x \log x} dx \text{ on } (-1, \infty)$$

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39. Evaluate the integrals.

$$\int \frac{2x + 1}{x^2 + x + 1} dx \text{ on } \mathbb{R}.$$



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40. Evaluate the integrals.

$$\int \frac{1}{x \log x [\log(\log x)]} dx \text{ on } (1, \infty)$$



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41. Evaluate the integrals.

$$\int \cot hx dx \text{ on } R.$$



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$$\int \frac{1}{\sqrt{1-4x^2}} dx \text{ on } \left(-\frac{1}{2}, \frac{1}{2}\right).$$



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43. Evaluate the integrals.

$$\int \frac{dx}{\sqrt{25 + x^2}} \text{ on } \mathbb{R}.$$

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44. Evaluate the integrals.

$$\int \frac{1}{(x + 3)\sqrt{x + 2}} dx \text{ on } I \subset (-2, \infty).$$

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45. Evaluate the integrals.

$$\int \frac{1}{1 + \sin 2x} dx$$

on $I \subset \mathbb{R} \setminus \left\{ \frac{n\pi}{2} + (-1)^n \frac{\pi}{4} : n \in \mathbb{Z} \right\}$.

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46. Evaluate the integrals.

$$\int \frac{x^2 + 1}{x^4 + 1} dx \text{ on } \mathbb{R}.$$

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47. Evaluate the integrals.

$$\int \frac{dx}{\cos^2 x + \sin 2x} \text{ on } I \subset \mathbb{R} \setminus \left(\left\{ (2n+1)\frac{\pi}{2} : n \in \mathbb{Z} \right\} \cup \left\{ 2n\pi + \frac{\tan^{-1} 1}{2} : n \in \mathbb{Z} \right\} \right)$$

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48. Evaluate the integrals.

$$\int \sqrt{1 - \sin 2x} dx \text{ on } I \subset \left\{ 2n\pi - \frac{3\pi}{4}, 2n\pi + \frac{\pi}{4} \right\}, n \in \mathbb{Z}.$$

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49. Evaluate the integrals.

$$\int \sqrt{1 + \cos 2x} dx \text{ on } I$$

$$I \subset \left\{ 2n\pi - \frac{\pi}{2}, 2n\pi + \frac{\pi}{2} \right\}, n \in \mathbb{Z}$$



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50. Evaluate the integrals.

$$\int \frac{\cos x + \sin x}{\sqrt{1 + \sin 2x}} dx \text{ on } J$$

$$I \subset \left\{ 2n\pi - \frac{\pi}{4}, 2n\pi + \frac{3\pi}{4} \right\}, n \in \mathbb{Z}.$$



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51. Evaluate the integrals.

$$\int \frac{\sin 2x}{(a + b \cos x)^2} dx \text{ on } \{R, \text{ if } |a| > |b|\}$$

$$I \subset \{x \in R : a + b \cos x \neq 0\}, \text{ if } |a| < |b|.$$



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52. Evaluate the integrals.

$$\int \frac{\sec x}{(\sec x + \tan x)^2} dx \text{ on } I \subset \mathbb{R} \setminus \left\{ (2n+1)\frac{\pi}{2} : n \in \mathbb{Z} \right\}.$$

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53. Evaluate the integrals.

$$\int \frac{dx}{a^2 \sin^2 x + b^2 \cos^2 x} \text{ on } \mathbb{R}, a \neq 0, b \neq 0.$$

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54. Evaluate the integrals.

$$\int \frac{dx}{\sin(x-a)\sin(x-b)} \text{ on } I \subset \mathbb{R} \setminus (\{a + n\pi : n \in \mathbb{Z}\} \cup \{b + n\pi : n \in \mathbb{Z}\}).$$

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55. Evaluate the integrals.

$$\int \frac{1}{\cos(x-a)\cos(x-b)} dx \text{ on } I \subset \mathbb{R} \setminus \left(\left\{ a + \frac{(2n+1)\pi}{2} : n \in \mathbb{Z} \right\} \cup \left\{ b + \frac{(2n+1)\pi}{2} : n \in \mathbb{Z} \right\} \right).$$



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56. Evaluate the integrals.

$$\int \frac{\sin 2x}{a \cos^2 x + b \sin^2 x} dx \text{ on } I \subset \mathbb{R} \setminus \{x \in \mathbb{R} \mid a \cos^2 x + b \sin^2 x = 0\}.$$



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57. Evaluate the integrals.

$$\int \frac{\cos(\log x)}{x} dx,$$
$$x \in I \subset (0, \infty) \setminus \{e^{n\pi} : n \in \mathbb{Z}\}.$$



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58. Evaluate the integrals.

$$\int e^x \cdot \cot e^x dx, x \in I \subset \setminus \{\log n\pi : n \in X\}.$$

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59. Evaluate the integrals.

$$\int \sec x (\tan x)^2 dx, \text{ on } I \subset .$$
$$\left\{ x \in E : \tan x \neq \frac{(2k+1)\pi}{2} : n \in Z \right\}.$$

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60. Evaluate the integrals.

$$\int \sqrt{\sin x} \cos x dx \text{ on } [2n\pi, (2n+1)\pi],$$

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61. Evaluate the integrals.

$$\int \tan^4 x \sec^2 x dx, x \in I \subset \mathbb{R} \setminus \left\{ \frac{(2n+1)\pi}{2} : n \in \mathbb{Z} \right\}.$$

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62. Evaluate the integrals.

$$\int \frac{2x + 3}{\sqrt{x^2 + 3x - 4}} dx, x \in I \subset \mathbb{R} \setminus [-4, q].$$

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63. Evaluate the integrals.

$$\int \cos e^x \sqrt{\cot x} dx \text{ on } \left(0, \frac{\pi}{2}\right]$$

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64. Evaluate the integrals.

$$\int \sec x \log(\sec x + \tan x) dx \text{ on } \left(0, \frac{\pi}{2}\right).$$

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65. Evaluate the integrals.

$$\int \sin^3 x dx \text{ on } R.$$

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66. Evaluate the integrals.

$$\int \cos^3 x dx \text{ on } R.$$

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67. Evaluate the integrals.

$$\int \cos x \cos 2x dx \text{ on } R.$$





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68. Evaluate the integrals.

$$\int \cos x \cos 3x dx \text{ on } R.$$



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69. Evaluate the integrals.

$$\int \cos^4 x dx \text{ on } R.$$



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70. Evaluate the integrals.

$$\int x \sqrt{4x + 3} dx \text{ on } \left(-\frac{3}{4}, \infty \right).$$



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71. Evaluate the integrals.

$$\int \frac{dx}{\sqrt{a^2 - (b + cx)^2}} \text{ on } \{x \in \mathbb{R} : |b + cx| < a\}.$$

where a, b, c are real numbers $c \neq 0$ and $a > 0$.



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72. Evaluate the integrals.

$$\int \frac{dx}{a^2 + (b + cx)^2} \text{ on } \mathbb{R}, \text{ where } a, b, c \text{ are real numbers, } c \neq 0 \text{ and } a > 0.$$



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73. Evaluate the integrals.

$$\int \frac{dx}{1 + e^x}, x \in \mathbb{R}$$



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74. Evaluate the integrals.

$$\int \frac{x^2}{(a + bx)^2} dx, x \in I \subset \mathbb{R} \setminus \left\{ -\frac{a}{b} \right\}, \text{ where } a, b, \text{ are real numbers, } b$$

$\neq 0$.



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75. Evaluate the integrals.

$$\int \frac{x^2}{\sqrt{1-x}} dx, x \in (-\infty, 1).$$



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Textual Exercise 6 C

1. Evaluate the integrals.

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

$$\text{on } I \subset \mathbb{R} \setminus \left\{ \frac{(2n+1)\pi}{2} : n \text{ in a n integer} \right\}.$$



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2. Evaluate the integrals.

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



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3. Evaluate the integrals.

$$\int \frac{\log x}{x^2} dx \text{ on } (0, \infty).$$



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4. Evaluate the integrals.

$$\int (\log x)^2 dx (0, \infty).$$



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5. Evaluate the integrals.

$$\int e^x (\sec x + \sec x \tan x) dx \text{ on } I \subset \mathbb{R} - \left\{ (2n + 1) \frac{\pi}{2} : n \in \mathbb{Z} \right\}.$$

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6. Evaluate the integrals.

$$\int e^x \cos x dx \text{ on } \mathbb{R}.$$

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7. Evaluate the integrals.

$$\int e^x (\sin x + \cos x) dx \text{ on } \mathbb{R}.$$

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8. Evaluate the integrals.

$$\int (\tan x + \log \sec x) e^x dx \text{ on } \mathbb{R}.$$

$$\left(\left(2n - \frac{1}{2} \right) \pi, \left(2n + \frac{1}{2} \right) \pi \right) n \in \mathbb{Z}.$$



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9. Evaluate the integrals.

$$\int x^n \log x dx \text{ on } (0, \infty), n \text{ is a real number and } n \neq -1.$$



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10. Evaluate the integrals.

$$\int \log(1 + x^2) dx \text{ on } \mathbb{R}.$$



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11. Evaluate the integrals.

$$\int \sqrt{x} \log x dx \text{ on } (0, \infty).$$



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12. Evaluate the integrals.

$$\int e^{\sqrt{x}} dx \text{ on } (0, \infty).$$

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13. Evaluate the integrals.

$$\int x^2 \cos x dx \text{ on } \mathbb{R}.$$

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14. Evaluate the integrals.

$$\int x \sin^2 x dx \text{ on } \mathbb{R}.$$

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15. Evaluate the integrals.

$$\int x \cos^2 x dx \text{ on } \mathbb{R}.$$



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16. Evaluate the integrals.

$$\int \cos \sqrt{x} dx \text{ on } R.$$

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17. Evaluate the integrals.

$$\int x \sec^2 2x dx \text{ on } I \subset R \setminus \left\{ (2n\pi + 1) \frac{\pi}{4} : n \in Z \right\}.$$

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18. Evaluate the integrals.

$$\int x \cot^2 x dx \text{ on } I \subset R \setminus \{n\pi : n \in Z\}.$$

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19. Evaluate the integrals.

$$\int e^x (\tan x + \sec^2 x) dx$$

$$\text{on } I \subset \mathbb{R} \setminus \left\{ (2n+1)\frac{\pi}{2} : n \in \mathbb{Z} \right\}.$$



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20. Evaluate the integrals.

$$\int e^x \left(\frac{1 + x \log x}{x} \right) dx \text{ on } (0, \infty).$$



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21. Evaluate the integrals.

$$\int e^{ax} \sin bx dx \text{ on } \mathbb{R}, a, b, \in \mathbb{R}.$$



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22. Evaluate the integrals.

$$\int \frac{x \cdot e^x}{(x+1)^2} dx \text{ on } I \subset \mathbb{R} \setminus \{-1\}$$



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23. Evaluate the integrals.

$$\int \frac{dx}{(x^2 + a^2)^2}, (a > 0) \text{ on } \mathbb{R}.$$



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24. Evaluate the integrals.

$$\int e^x \log(e^{2x} + 5e^x + 6) dx \text{ on } \mathbb{R}.$$



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25. Evaluate the integrals.

$$\int \cos(\log x) dx \text{ on } (0, \infty).$$



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26. Evaluate the integrals.

$$\int x \tan^{-1} x dx, x \in \mathbb{R}.$$



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27. Evaluate the integrals.

$$\int \frac{\tan^{-1} x}{x^2} dx, x \in I \subset \mathbb{R} \setminus \{0\}.$$



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28. Evaluate the integrals.

$$\int x \cos^{-1} x dx, x \in (-1, 1).$$



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29. Evaluate the integrals.

$$\int x^2 \sin^{-1} x dx, x \in (-1, 1).$$



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30. Evaluate the integrals.

$$\int x \log(1+x) dx, x \in (-1, \infty).$$

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31. Evaluate the integrals.

$$\int \sin \sqrt{x} dx, \text{ on } (0, \infty).$$

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32. Evaluate the integrals.

$$\int a^x \cos 2x dx \text{ on } \mathbb{R} (a > \text{ and } a \neq 1).$$

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33. Evaluate the integrals.

$$\int \tan^{-1} \left(\frac{3x - x^3}{1 - 3x^2} \right) dx \text{ on } I \subset \mathbb{R} \setminus \left\{ -\frac{1}{\sqrt{3}}, \frac{1}{\sqrt{3}} \right\}.$$



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34. Evaluate the integrals.

$$\int \sinh^{-1} x dx \text{ on } \mathbb{R}.$$



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35. Evaluate the integrals.

$$\int \cosh^{-1} x dx \text{ on } [1, \infty).$$



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1. Evaluate the integrals.

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

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2. Evaluate the integrals.

$$\int \frac{\cos x}{\sin^2 x + 4 \sin x + 5} dx$$

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3. Evaluate the integrals.

$$\int \frac{\cos x}{\sin^2 x + 4 \sin x + 5} dx$$

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4. Evaluate the integrals.

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

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5. Evaluate the integrals.

$$\int \frac{1}{1 + \tan x} dx$$

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6. Evaluate the integrals.

$$\int \frac{1}{1 - \cot x} dx$$

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7.
$$\int \frac{9 \cos x - \sin x}{4 \sin x + 5 \cos x} dx$$

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8. Evaluate the integrals.

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

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9. Evaluate the integrals.

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

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10.
$$\int \frac{1}{1 + \sin x + \cos x} dx$$

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11. Evaluate the integrals.

$$\int \frac{dx}{\sqrt{5 - 2x^2 + 4x}}$$

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12. Evaluate the integrals.

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



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13. $\int (6x + 5)\sqrt{6 - 2x^2 + x} dx$



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14. Evaluate the integrals.

$$\int \frac{dx}{4 + 5 \sin x}$$



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15. Evaluate the integrals.

$$\int \frac{1}{2 - 3 \cos 2x} dx$$





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16. Evaluate the integrals.

$$\int x \sqrt{1 + x - x^2} dx$$



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17. Evaluate the integrals.

$$\int x \sqrt{1 + x - x^2} dx$$



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18. Evaluate the integrals.

$$\int \frac{dx}{4 \cos x + 3 \sin x}$$



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19. Evaluate the integrals.

$$\int \frac{1}{\sin x + \sqrt{3} \cos x} dx$$

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20. Evaluate the integrals.

$$\int \frac{dx}{5 + 4 \cos 2x}.$$

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

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22. Evaluate the integrals.

$$\int \sqrt{\frac{5-x}{x-2}} dx \text{ on } (2, 5)$$

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23. Evaluate the integrals.

$$\int \sqrt{\frac{1+x}{1-x}} dx \text{ on } (-1, 1).$$

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24. Evaluate the integrals.

$$\int \frac{dx}{(1-x)\sqrt{3-2x-x^2}} \text{ on } (-1, 3).$$

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25. Evaluate the integrals.

$$\int \frac{dx}{(x+2)\sqrt{x+1}} \text{ on } (-1, \infty).$$

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26. Evaluate the integrals.

$$\int \frac{dx}{(2x+3)\sqrt{x+2}} \text{ on } I \subset (-2, \infty) \setminus \left\{ \frac{-3}{2} \right\}.$$



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27. Evaluate the integrals.

$$\int \sqrt{e^x - 4} dx \text{ on } [\log_e 4, \infty].$$



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28. Evaluate the integrals.

$$\int \sqrt{1 + \sec x} dx$$

on $\left[\left(2n - \frac{1}{2}\right)\pi, \left(2n + \frac{1}{2}\right)\pi \right], (n \in \mathbb{Z})$.



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29. Evaluate the integrals.

$$\int \frac{dx}{1+x^2} \text{ on } \mathbb{R}.$$

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Textual Exercise 6 E

1. Evaluate the integrals.

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

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2. Evaluate the integrals.

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

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3. Evaluate the integrals.

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



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4. Evaluate the integrals.

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



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5. Evaluate the integrals.

$$\int \frac{dx}{e^x + e^{2x}}$$



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6. Evaluate the integrals.

$$\int \frac{dx}{(x + 1)(x + 2)}$$



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7. Evaluate the integrals.

$$\int \frac{1}{e^x - 1} dx$$



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8. Evaluate the integrals.

$$\int \frac{1}{(1-x)(4+x^2)} dx$$



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9. Evaluate the integrals.

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



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10. Evaluate the integrals.

$$\int \frac{dx}{6x^2 - 5x + 1}$$

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11. Evaluate the integrals.

$$\int \frac{dx}{x(x+1)(x+2)}$$

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12. Evaluate the integrals.

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

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13. Evaluate the integrals.

$$\int \frac{7x - 4}{(x - 1)^2(x + 2)} dx$$



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14. Evaluate the integrals.

$$\int \frac{1}{(a-x)(x-b)(x-c)} dx$$



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15. Evaluate the integrals.

$$\int \frac{2x+3}{(x+3)(x^2+4)} dx$$



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16. Evaluate the integrals.

$$\int \frac{2x+3}{(x+3)(x^2+4)} dx$$



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17. Evaluate the integrals.

$$\int \frac{dx}{x^3 + 1}$$

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18. Evaluate the integrals.

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

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Textual Exercise 6 F

1. Evaluate the integrals.

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

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2. Evaluate the integrals.

$$\int x^2 e^{-3x} dx$$

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3. Evaluate the integrals.

$$\int x^3 e^{ax} dx \text{ a}$$

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4. Show that

$$\int x^n \cdot e^{-x} dx = -x^n e^{-x} + n \int x^{n-1} \cdot e^{-x} dx$$

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5. Show that

If $I_n = \int \cos^n x dx$, then show that

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

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6. Obtain reduction formula for $I_n = \int \cot^n x dx$, n being a positive integer, $n \geq 2$ and deduce the value of $\int \cot^4 x dx$.

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7. Obtain reduction formula for

$I_n = \int \cos e c^n x dx$, n being a positive integer, $n \geq 2$ and deduce the value of $\int \cos e c^5 x dx$.

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8. Evaluate $\int_0^{\pi/2} \sin^5 x \cos^4 x dx$

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9. Obtain reduction formula for

If $I_n = \int (\log x)^n dx$, then show that

$I_n = x(\log x)^n - nI_{n-1}$, and hence find $\int (\log x)^4 dx$.

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Dam Sure Vsaq 2 Marks

1. $\int \left(\frac{1}{1-x^2} + \frac{2}{1+x^2} \right) dx$ on $(-1, 1)$

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2. $\int \sec^2 x \cos ec^2 x dx$ on $I \subset \mathbb{R} \setminus$
 $\left(\{n\pi : n \in \mathbb{Z}\} \cup \left\{ (2n+1)\frac{\pi}{2}, n \in \mathbb{Z} \right\} \right)$.

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3. Evaluate : $\int \frac{1 + \cos^2 x}{1 - \cos 2x} dx$, on $\mathbb{C} \setminus R / \{n\pi : n \in \mathbb{Z}\}$

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4. Evaluate the integrals.

$$\int \sqrt{1 - \cos 2x} dx \text{ on } I$$

$$I \subset [2n\pi, (2n + 1)\pi], n \in \mathbb{Z}.$$

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5. Evaluate the integrals.

$$\int \frac{1}{\cos hx + \sin hx} dx \text{ on } \mathbb{R}.$$

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$$6. \int \frac{1}{1 + \cos x} dx \text{ on } I$$

$$I \subset \mathbb{R} \setminus \{(2n + 1)\pi : n \in \mathbb{Z}\}.$$

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$$7. \int \frac{\sin(\tan^{-1} x)}{1 + x^2} dx, x \in \mathbb{R}.$$

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$$8. \int \frac{\log(1 + x)}{1 + x} dx \text{ on } (-1, \infty).$$

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$$9. \int \frac{x^2}{\sqrt{1 - x^6}} dx \text{ on } I = (-1, 1).$$

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$$10. \int \frac{x^8}{1 + x^{18}} dx \text{ on } \mathbb{R}.$$

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11. $\int \frac{1}{x \log x [\log(\log x)]} dx$ on $(1, \infty)$.

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12. $\int \frac{1}{(x+3)\sqrt{x+2}} dx$ on $I \subset (-2, \infty)$.

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13. $\int \frac{\cot(\log x)}{x} dx,$

$x \in I \subset (0, \infty) \setminus \{e^{n\pi} : n \in \mathbb{Z}\}.$

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14. Evaluate the integrals.

$$\int e^x (\tan x + \sec^2 x) dx$$

on $I \subset \mathbb{R} \setminus \left\{ (2n+1)\frac{\pi}{2} : n \in \mathbb{Z} \right\}.$

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15. $\int \sqrt{x} \log x dx$ on $(0, \infty)$.

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16. Evaluate the integrals.

$$\int e^x (\tan x + \sec^2 x) dx$$

on $I \subset \mathbb{R} \setminus \left\{ (2n + 1) \frac{\pi}{2} : n \in \mathbb{Z} \right\}$.

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17. Evaluate the integrals.

$$\int e^x \left(\frac{1 + x \log x}{x} \right) dx \text{ on } (0, \infty).$$

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18. Evaluate the integrals.

$$\int \frac{\cos x}{\sin^2 x + 4 \sin x + 5} dx$$



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19. $\int \frac{dx}{(x+1)(x+2)}$



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20. Evaluate the integrals.

$$\int \frac{e^x(1+x)}{\cos^2(ex^x)} dx \text{ on } I \subset \mathbb{R} \setminus$$

$$\{x \in \mathbb{R} : \cos(xe^x) = 0\}.$$



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Dam Sure Saq 4 Marks

1. $\int x \tan^{-1} x dx, x \in \mathbb{R}.$



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2. Evaluate: $\int \sqrt{1 + 3x - x^2} dx$

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

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4. $\int \frac{dx}{5 + 4 \cos 2x}$

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5. Obtain reduction formula for $I_n = \int \cot^n x dx$, n being a positive integer, $n \geq 2$ and deduce the value of $\int \cot^4 x dx$.

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6. Obtain reduction formula for

$I_n = \int \cos ec^n x dx$, n being a positive integer, $n \geq 2$ and deduce the value of $\int \cos ec^5 x dx$.



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7. Evaluate $\int \frac{2x + 5}{\sqrt{x^2 - 2x + 10}} dx$.



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8. Evaluate $\int \sin^4 x dx$.



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Dam Sure Laq 8 Marks

1. Evaluate the integrals.

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

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

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3.
$$\int (6x + 5) \sqrt{6 - 2x^2 + x} dx$$

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4. Evaluate the integrals.

$$\int \frac{dx}{4 + 5 \sin x}$$

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$$5. \int \frac{dx}{(1+x)\sqrt{3+2x-x^2}}$$

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$$6. \int \frac{dx}{4 \cos x + 3 \sin x}$$

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$$7. \int \frac{2 \sin x + 3 \cos x + 4}{3 \sin x + 4 \cos x + 5} dx.$$

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$$8. \int \frac{x+3}{(x-1)(x^2-1)} dx$$

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$$9. \int \frac{dx}{3 \cos x + 4 \sin x + 6}$$



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