

(Use Trigonometric substitution)

1. Evaluate the following indefinite integrals.

- | | | |
|---|--|--|
| (1) $\int \frac{1}{\sqrt{1-4x^2}} dx$ | (2) $\int \frac{1}{x^2+25} dx$ | (3) $\int \frac{x}{x^4+16} dx$ |
| (4) $\int \frac{1}{\sqrt{2-5x^2}} dx$ | (5) $\int \frac{3}{x\sqrt{x^2-9}} dx$ | (6) $\int \frac{x}{\sqrt{16-9x^4}} dx$ |
| (7) $\int \frac{1}{x\sqrt{16x^2-9}} dx$ | (8) $\int \frac{e^x}{7+e^{2x}} dx$ | (9) $\int \frac{\sin x}{\sqrt{2-\cos^2 x}} dx$ |
| (10) $\int \frac{1}{\sqrt{x}(1+x)} dx$ | (11) $\int \frac{1}{x^2\sqrt{4-x^2}} dx$ | (12) $\int \frac{1}{x\sqrt{x^2+4}} dx$ |
| (13) $\int \frac{\sqrt{9-x^2}}{x^2} dx$ | (14) $\int \frac{1}{x\sqrt{25-x^2}} dx$ | (15) $\int \frac{1}{\sqrt{x^2-a^2}} dx$ |

(Use Partial fraction)

EXERCISES Find the indefinite integral.

- | | | |
|--|---|---|
| 1. $\int \frac{6x+5}{x+2} dx$ | 2. $\int \frac{4x^2-12x-25}{x-5} dx$ | 3. $\int \frac{5x^3+3x-2}{x-1} dx$ |
| 4. $\int \frac{x^3+3x^2-4x-6}{x^2+2x-15} dx$ | 5. $\int \frac{4x^2-8x+3}{x^2-3x-4} dx$ | 6. $\int \frac{x^3-3x^2}{x^2-3x-10} dx$ |

EXERCISES Find the indefinite integral.

- | | | |
|--|---|---|
| 1. $\int \frac{3-4x}{x^2+x} dx$ | 2. $\int \frac{x}{x^2+7+10} dx$ | 3. $\int \frac{6}{3x^2-14x+8} dx$ |
| 4. $\int \frac{3x^2+8x-7}{(x+4)(x+3)(x+1)} dx$ | 5. $\int \frac{2-4x^2}{(x+2)(x-2)(x-5)} dx$ | 6. $\int \frac{3x}{(x+4)(x-1)(x-3)} dx$ |
| 7. $\int \frac{3-2x}{x^2+6x+9} dx$ | 8. $\int \frac{3x-1}{x^3-2x^2} dx$ | 9. $\int \frac{2x^2+x+4}{(x+1)(x-4)^2} dx$ |
| 10. $\int \frac{5x^2+8x+6}{(x+4)(x^2+2)} dx$ | 11. $\int \frac{12x+18}{(x+3)(2x^2+8x+9)} dx$ | 12. $\int \frac{15-25x}{(x-4)(2x^2-6x+9)} dx$ |

ANSWERS

1. $\frac{1}{2} \arcsin 2x + C$

2. $\frac{1}{5} \arctan\left(\frac{x}{5}\right) + C$

3. $\frac{1}{8} \arctan\left(\frac{x^2}{4}\right) + C$

4. $\frac{1}{\sqrt{5}} \arcsin\left(\frac{x\sqrt{5}}{\sqrt{2}}\right) + C$

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

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

7. $\frac{1}{3} \sec^{-1}\left(\frac{4x}{3}\right) + C$

8. $\frac{1}{\sqrt{7}} \arctan\left(\frac{e^x}{\sqrt{7}}\right) + C$

9. $-\arcsin\left(\frac{\cos x}{\sqrt{2}}\right) + C$

10. $2 \arctan \sqrt{x} + C$

11. $-\frac{\sqrt{4-x^2}}{4x} + C$

12. $\frac{1}{2} \ln \left| \frac{\sqrt{x^2+4}-2}{x} \right| + C$

ANSWERS

$$1. \int \frac{3-4x}{x(x+1)} dx = \int \left[\frac{3}{x} - \frac{7}{x+1} \right] dx = 3 \ln|x| - 7 \ln|x+1| + C$$

$$2. \int \frac{x}{(x+5)(x+2)} dx = \int \left[\frac{5}{3} \cdot \frac{1}{x+5} - \frac{2}{3} \cdot \frac{1}{x+2} \right] dx = \frac{5}{3} \cdot \ln|x+5| - \frac{2}{3} \cdot \ln|x+2| + C$$

$$3. \int \frac{6}{(3x-2)(x-4)} dx = \int \left[-\frac{9}{5} \cdot \frac{1}{3x-2} + \frac{3}{5} \cdot \frac{1}{x-4} \right] dx = -\frac{3}{5} \cdot \ln|3x-2| + \frac{3}{5} \cdot \ln|x-4| + C$$

$$4. \int \left[\frac{3}{x+4} + \frac{2}{x+3} - \frac{2}{x+1} \right] dx = 3 \ln|x+4| + 2 \ln|x+3| - 2 \ln|x+1| + C$$

$$5. \int \left[-\frac{1}{2} \cdot \frac{1}{x+2} + \frac{7}{6} \cdot \frac{1}{x-2} - \frac{14}{3} \cdot \frac{1}{x-5} \right] dx = -\frac{1}{2} \cdot \ln|x+2| + \frac{7}{6} \cdot \ln|x-2| - \frac{14}{3} \cdot \ln|x-5| + C$$

$$6. \int \left[-\frac{12}{35} \cdot \frac{1}{x+4} - \frac{3}{10} \cdot \frac{1}{x-1} + \frac{9}{14} \cdot \frac{1}{x-3} \right] dx = -\frac{12}{35} \cdot \ln|x+4| - \frac{3}{10} \cdot \ln|x-1| + \frac{9}{14} \cdot \ln|x-3| + C$$

$$7. \int \frac{3-2x}{(x+3)^2} dx = \int \left[\frac{-2}{x+3} - \frac{9}{(x+3)^2} \right] dx = -2 \ln|3x-2| + \frac{9}{x+3} + C$$

$$8. \int \frac{3x-1}{x^2(x-2)} dx = \int \left[-\frac{5}{4} \cdot \frac{1}{x} + \frac{1}{2} \cdot \frac{1}{x^2} + \frac{5}{4} \cdot \frac{1}{x-2} \right] dx = -\frac{5}{4} \cdot \ln|x| - \frac{1}{2} \cdot \frac{1}{x} + \frac{5}{4} \cdot \ln|x-2| + C$$

$$9. \int \left[\frac{1}{5} \cdot \frac{1}{x+1} + \frac{9}{5} \cdot \frac{1}{x-4} + \frac{8}{(x-4)^2} \right] dx = \frac{1}{5} \cdot \ln|x+1| + \frac{9}{5} \cdot \ln|x-4| - \frac{8}{x-4} + C$$

$$10. \int \left[\frac{3}{x+4} + \frac{2x}{x^2+2} \right] dx = 3 \ln|x+4| + \ln|x^2+2| + C$$

$$11. \int \left[\frac{-6}{x+3} + \frac{12x+24}{2x^2+8x+9} \right] dx = -6 \ln|x+3| + 3 \ln|2x^2+8x+9| + C$$

$$12. \int \left[\frac{-5}{x-4} + \frac{10x-15}{2x^2-6x+9} \right] dx = -5 \ln|x-4| + \frac{5}{2} \ln|2x^2-6x+9| + C$$