

Indefinite Integration

Integration Day 6

1-10: Find the general indefinite integral

1. $\int(\sqrt{x^3} + \sqrt[3]{x^2})dx$ $\int x^{3/2} + x^{2/3}$

$$\frac{2}{5}x^{5/2} + \frac{3}{5}x^{5/3} + C$$

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

$$\frac{x^5}{5} - \frac{1}{2} \frac{x^4}{4} + \frac{1}{4} \frac{x^2}{2} - 2x + C$$

$$\frac{1}{5}x^5 - \frac{1}{8}x^4 + \frac{1}{8}x^2 - 2x + C$$

3. $\int(u+4)(2u+1)du$

$$\int 2u^2 + u + 8u + 4 du$$

$$\int 2u^2 + 9u + 4 du$$

$$\frac{2u^3}{3} + \frac{9u^2}{2} + 4u + C$$

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

$$\int x^2 - 2x^{-1/2} dx$$

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

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

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

$$\frac{x^3}{3} + x + \tan^{-1}(x) + C$$

$$\frac{1}{3}x^3 + x + \tan^{-1}x + C$$

6. $\int(\csc^2 t - 2e^t)dt$

$$-\cot t - 2e^t + C$$

7. $\int \sec t (\sec t + \tan t) dt$

$$\int \sec^2 t + \sec t \tan t dt$$

$$\boxed{\tan t + \sec t + C}$$

8. $\int (1 + \tan^2 \alpha) d\alpha$

$$\int \sec^2 \alpha d\alpha$$

$$\boxed{\tan \alpha + C}$$

9. $\int v(v^2 + 2)^2 dv$

$$\int v(v^4 + 4v^2 + 4) dv$$

$$\int v^5 + 4v^3 + 4v dv$$

$$\frac{v^6}{6} + \frac{4v^4}{4} + \frac{4v^2}{2} + C$$

$$\boxed{\frac{1}{6}v^6 + v^4 + 2v^2 + C}$$

10. $\int (y^3 + 1.8y^2 - 2.4y) dy$

$$\frac{y^4}{4} + \frac{1.8y^3}{3} - \frac{2.4y^2}{2} + C$$

$$\frac{1}{4}y^4 + \frac{18}{30}y^3 - \frac{24}{20}y^2 + C$$

$$\boxed{\frac{1}{4}y^4 + \frac{3}{5}y^3 - \frac{6}{5}y^2 + C}$$

11. $\int (x^2 + x^{-2}) dx$

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

$$\boxed{\frac{1}{3}x^3 - \frac{1}{x} + C}$$

12. $\int (e^x - 2x^2) dx$

$$e^x - \frac{2x^3}{3} + C$$

$$\boxed{e^x - \frac{2}{3}x^3 + C}$$