

Indefinite Integrals

3.1 Integration by basic rules

1. Find $\int (3 \sin x + x^2) dx$
2. Find $\int (\tan x + \cot x)^2 dx$
3. Find $\int (3 \cos ecx \cot x + \cos ec^2 x) dx$
4. Find $\int \frac{3 \cos x + 4}{\sin^2 x} dx$
5. Find $\int \frac{3 + \sin x}{\cos^2 x} dx$
6. Find $\int \frac{2 + 3 \sin x}{\cos^2 x} dx$
7. Find $\int \frac{2 + \sin x}{\cos^2 x} dx$
8. Find $\int \frac{1 + \sin x}{\cos^2 x} dx$
9. Find $\int \frac{1}{1 + \sin x} dx$
10. Find $\int \frac{\sin^3 x + \cos^3 x}{\sin^2 x \cos^2 x} dx$
11. Find $\int \sqrt{1 + \sin 2x} dx$
12. Find $\int (x^2 + 1)(3 - x) dx$
13. Find $\int (1-x)(3 + 2x^2) dx$
14. Find $\int x(x-1)(x-2) dx$
15. Find $\int \frac{x^3 + 5x^2 - 4}{x} dx$
16. Find $\int (\sin x + \frac{1}{x} + \operatorname{cosec}^2 x) dx$
17. Find $\int (\sec^2 x + e^x - 5) dx$

3.2 Integration by Substitution

1. Find $\int \cot x dx$
2. Find $\int \tan x dx$
3. Find $\int \cos ecx dx$
4. Find $\int \sec x dx$
5. Find $\int \frac{1}{1-7x} dx$
6. Find $\int \sqrt{4x-3} dx$
7. Find $\int \frac{1}{(2x+5)^3} dx$
8. Find $\int \cos(2x+3) dx$
9. Find $\int \sin(4x+1) dx$
10. Find $\int \frac{2x^4}{1+x^5} dx$
11. Find $\int \frac{4x+2}{x^2+x+3} dx$
12. Find $\int \frac{x}{1+x^2} dx$
13. Find $\int \frac{x^2+1}{x^3+3x} dx$
14. Find $\int \frac{\sec^2 x}{1+\tan x} dx$
15. Find $\int \frac{\cos x}{2+\sin x} dx$
16. Find $\int \frac{e^{2x}}{1+e^{2x}} dx$
17. Find $\int \frac{1}{x \log x} dx$
18. Find $\int \frac{\sin x}{\sqrt{1+\cos x}} dx$
19. Find $\int \sin x \sqrt{1+\cos x} dx$
20. Find $\int x \sqrt{x^2+9} dx$
21. Find $\int (3x^2 - 4x + 1)^3 (3x - 2) dx$
22. Find $\int (x^2 + 2)^5 x dx$
23. Find $\int \frac{x^2}{(8+x^3)^4} dx$
24. Find $\int \frac{1+\cos x}{(x+\sin x)^2} dx$
25. Find $\int \frac{1-\sin x}{(x+\cos x)^2} dx$
26. Find $\int \frac{(\tan^{-1} 5x)^2}{1+25x^2} dx$
27. Find $\int \frac{(\tan^{-1} 3x)^2}{1+9x^2} dx$

28. Find $\int \frac{\sin^{-1} 2x}{\sqrt{1-4x^2}} dx$

29. Find $\int \frac{x^2}{1+x^6} dx$

30. Find $\int \frac{2x^4}{1+x^{10}} dx$

31. Find $\int \frac{3x^5}{1+x^{12}} dx$

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

33. Find $\int x \sin(x^2) dx$

34. Find $\int e^{\tan x} \sec^2 x dx$

35. Find $\int e^{\sin x} \cos x dx$

36. Find $\int \frac{1}{\sqrt{a^2-x^2}} dx$

37. Find $\int \frac{1}{x^2+a^2} dx$

38. Find $\int \frac{1-\sin x}{x+\cos x} dx$

39. Find $\int \sin^3 x \cos^2 x dx$

40. Find $\int (\sec x + \cos x + e^{-5x}) dx$

3.3 Integration by T-identities

1. Find $\int \sin^2 x dx$

2. Find $\int \cos^2 x dx$

3. Find $\int \cos^2 2x dx$

4. Find $\int \sin^2 2x dx$

5. Find $\int \sin^3 x dx$

6. Find $\int \cos^3 x dx$

7. Find $\int \sin^3 2x dx$

8. Find $\int \cos^3 2x dx$

9. Find $\int \sin 3x \cos x dx$

10. Find $\int \cos 4x \sin x dx$

11. Find $\int \cos 2x \cos x dx$

12. Find $\int \sin x \sin 3x dx$

3.4 Integration by parts

1. Find $\int x \cos x dx$

2. Find $\int x \sin x dx$

3. Find $\int x e^{-x} dx$

4. Find $\int x \sin 2x dx$

5. Find $\int x \cos 3x dx$

6. Find $\int x^2 e^x dx$

7. Find $\int x^2 \sin x dx$

8. Find $\int x^2 \cos x dx$

9. Find $\int x^2 e^{-x} dx$

10. Find $\int x^2 e^{3x} dx$

11. Find $\int x^2 \sin 3x dx$

12. Find $\int x^2 e^{ax} dx$

13. Find $\int x \log x dx$

14. Find $\int x^2 \log x dx$

15. Find $\int (\log x)^2 dx$

16. Find $\int \tan^{-1} x dx$

17. Find $\int \sin^{-1} x dx$

18. Find $\int \log x dx$

3.5 Definite Integrals

1. Evaluate $\int_0^1 (3x^2 + 2x) dx$

2. Evaluate $\int_0^1 x(1-x^2) dx$

3. Evaluate $\int_0^3 x(x^2+1) dx$

4. Evaluate $\int_0^1 x^2(x^3+1) dx$

5. Evaluate $\int_0^1 x^2(x+1)^2 dx$

6. Evaluate $\int_{-1}^0 x(x-1)^2 dx$

7. Evaluate $\int_0^1 \frac{1}{1+x^2} dx$
8. Evaluate $\int_0^{\frac{1}{\sqrt{2}}} \frac{1}{\sqrt{1-x^2}} dx$
9. Evaluate $\int_0^1 \frac{1}{\sqrt{1-x^2}} dx$
10. Evaluate $\int_2^4 \frac{1}{x} dx$
11. Evaluate $\int_0^{\pi/2} \cos x dx$
12. Evaluate $\int_0^{\pi/4} \tan x dx$
13. Find $\int_0^{\pi/2} (\sin x + \cos x) dx$
14. Find $\int_{\frac{\pi}{4}}^{\frac{\pi}{2}} \cos ec^2 x dx$
15. Evaluate $\int_{\frac{\pi}{4}}^{\frac{\pi}{2}} \frac{\sin 2x}{\sin^2 x} dx$
16. Find $\int_0^{\pi/2} \sqrt{1+\sin 2x} dx$
17. Find $\int_0^{\pi} \frac{1}{1+\sin x} dx$
18. Find $\int_0^{\pi/4} \frac{\sec^2 x}{1+\tan x} dx$
19. Find $\int_1^2 \frac{x^2+1}{x^3+3x} dx$
20. Find $\int_0^1 \frac{2x+1}{x^2+x+1} dx$
21. Find $\int_0^{\pi/2} \frac{\cos x}{2+\sin x} dx$
22. Find $\int_{\frac{\pi}{2}}^{\pi} \frac{1-\cos x}{x-\sin x} dx$
23. Find $\int_0^{\pi/2} \sin x \sqrt{1+\cos x} dx$
24. Find $\int_0^{\sqrt{3}} x \sqrt{1+x^2} dx$
25. Find $\int_0^4 x \sqrt{x^2+9} dx$
26. Find $\int_0^{\pi/2} \sin x (1-\cos x)^5 dx$
27. Find $\int_0^1 \frac{x^7}{(1+x^8)^4} dx$
28. Find $\int_0^{\pi/2} \cos^2 x dx$
29. Find $\int_0^{\pi/2} \sin^2 x dx$
30. Find $\int_0^{\pi/2} \sin^3 x dx$
31. Find $\int_0^{\pi/2} \sin 3x \cos x dx$
32. Find $\int_0^{\pi/2} \sin 5x \cos 2x dx$
33. Find $\int_0^{\pi/2} \cos 4x \cos x dx$
34. Find $\int_0^{\pi/2} \cos 4x \cos x dx$
35. Find $\int_0^{\pi/2} x \sin x dx$
36. Find $\int_0^{\pi/2} x \cos x dx$
37. Find $\int_0^2 x^2 \log x dx$
38. Find $\int_1^e \log x dx$
39. Find $\int_0^1 \sin^{-1} x dx$
40. Find $\int_0^2 x^2 e^x dx$