201-SH3-AB - Exercises #3: Basic Integration

Integrate

1. $\int \sqrt{2}\,dx$

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

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

4. $\int (e^t + t^e)dt$

5. $\int \dfrac{14 - 2\sqrt{x} + 3xe^x}{7x}\,dx$

6. $\int \dfrac{4\sqrt[4]{x} - 5\sqrt{x} + 4x^3}{\sqrt[3]{x}}\,dx$

7. $\int \dfrac{6\sqrt{x} - 5x^2}{30\sqrt[3]{x}}\,dx$

8. $\int (4\sqrt{x} - 3x^3)^2\,dx$

9. $\int \dfrac{(5x + 3\sqrt{x})^2}{x^2}\,dx$

10. $\int \dfrac{\sqrt[5]{x} + x^3e^x + 6x^5}{3x^3}\,dx$

11. $\int \dfrac{6\sqrt[5]{x^2} + 3\sqrt[3]{x^4} - 8x^4}{2\sqrt{x}}\,dx$

12. $\int \dfrac{9x^5 - 12\sqrt[3]{x}}{30\sqrt{x^5}}\,dx$

13. $\int (8\sqrt[4]{x} + 2x^2)^2\,dx$

14. $\int \dfrac{(3x^2 - \sqrt[3]{x})^2}{3x^2}\,dx$

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

16. $\int \sqrt[3]{x}(3x - 2\sqrt{x} + 6)\,dx$

17. $\int (2x^2 + 9)^2\,dx$

18. $\int (3\sqrt{x} + 4x)^2\,dx$

19. $\int [4x - \sqrt[3]{x}(2x - 5x^2)]\,dx$

20. $\int \dfrac{(3 + 5x)(x^2 + 1)^2}{2x}\,dx$

21. $\int \left(\csc(x)\cot(x) + \cos x \right)\,dx$

22. $\int \left(3\sin(x) - 5\csc^2(x) \right)\,dx$

23. $\int \sec(x)\left(\tan(x) + \sec(x) \right)\,dx$

24. $\int \dfrac{18\sqrt{x^3}\sin(x) - 5\sqrt{x} + 2x\sqrt{x}\sec^2(x)}{6x^{\frac{3}{2}}}\,dx$

1

ANSWERS:

1. $\sqrt{2}\,x + C$

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

3. $\frac{3}{5}\sqrt[3]{x^5} + \frac{1}{x} + C$

4. $e^t + \frac{1}{e+1}t^{e+1} + C$

5. $2\ln|x| - \frac{4}{7}\sqrt{x} + \frac{3}{7}e^x + C$

6. $\frac{48}{11}x^{11/12} - \frac{30}{7}x^{7/6} + \frac{12}{11}x^{11/3} + C$

7. $\frac{6}{35}x^{7/6} - \frac{1}{16}x^{8/3} + C$

8. $8x^2 - \frac{16}{3}x^{9/2} + \frac{9}{7}x^7 + C$

9. $25x + 60\sqrt{x} + 9\ln|x| + C$

10. $\frac{-5}{27x^{9/5}} + \frac{1}{3}e^x + \frac{2}{3}x^3 + C$

11. $\frac{10}{3}x^{9/10} + \frac{9}{11}x^{11/6} - \frac{8}{9}x^{9/2} + C$

12. $\frac{3}{35}x^{7/2} + \frac{12}{35x^{7/6}} + C$

13. $\frac{128}{3}x^{3/2} + \frac{128}{13}x^{13/4} + \frac{4}{5}x^5 + C$

14. $\frac{-1}{x^{1/3}} - \frac{3}{2}x^{4/3} + x^3 + C$

15. $\frac{-9}{x} + 24\ln|x| + 16x + C$

16. $\frac{9}{7}x^{7/3} - \frac{12}{11}x^{11/6} + \frac{9}{2}x^{4/3} + C$

17. $\frac{4}{5}x^5 + 12x^3 + 81x + C$

18. $\frac{9}{2}x^2 + \frac{48}{5}x^{5/2} + \frac{16}{3}x^3 + C$

19. $2x^2 - \frac{6}{7}x^{7/3} + \frac{3}{2}x^{10/3} + C$

20. $\frac{1}{2}x^5 + \frac{3}{8}x^4 + \frac{5}{3}x^3 + \frac{3}{2}x^2 + \frac{5}{2}x + \frac{3}{2}\ln|x| + C$

21. $-\csc(x) + \sin(x) + C$

22. $-3\cos(x) + 5\cot(x) + C$

23. $\sec(x) + \tan(x) + C$

24. $-3\cos(x) - \frac{5}{6}\ln|x| + \frac{1}{3}\tan(x) + C$