Sheet 4 – Integration

Evaluate the following integrals.

1. $\displaystyle\int_1^3 \frac{dx}{1-9x^2}$

2. $\displaystyle\int_3^4 \frac{dx}{\sqrt{16-9x^2}}$

3. $\displaystyle\int \frac{dx}{\sqrt{7+6x-x^2}}$

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

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

6. $\displaystyle\int_0^4 \frac{dx}{6x-x^2-7}$

7. $\displaystyle\int \frac{(6x-7)\,dx}{3x^2-7x+11}$

8. $\displaystyle\int \frac{\sec x \tan x \, dx}{\sqrt{\sec^2 x - 2\sec x}}$

9. $\displaystyle\int \frac{6+x}{\sqrt{4-x^2}}\,dx$

10. $\displaystyle\int \frac{\sec^2 x}{\tan^2 x - 6\tan x + 10}\,dx$

11. $\displaystyle\int_1^2 \frac{dx}{\sqrt{x^2+4x}}$

12. $\displaystyle\int \frac{e^x}{e^{2x}+2e^x+5}\,dx$

13. $\displaystyle\int \frac{dx}{\sqrt{2x-x^2}}$

Evaluate the following integrals.

1. $\displaystyle\int \sin(2x)\cos(3x)\,dx$

2. $\displaystyle\int \cos(4x)\cos(x)\,dx$

1

3. $\displaystyle\int \sin\left(\frac{x}{2}\right)\sin(2x)\,dx$

4. $\displaystyle\int \sin^5(x)\cos^5(x)\,dx$

5. $\displaystyle\int \sin^3(x)\cos^9(x)\,dx$

6. $\displaystyle\int \sin^4(x)\cos^4(x)\,dx$

7. $\displaystyle\int \frac{\cos^3(x)}{\sin^2(x)}\,dx$

8. $\displaystyle\int \cot^3(x)\sec^4(x)\,dx$

9. $\displaystyle\int \tan^3(x)\sec^6(x)\,dx$

10. $\displaystyle\int \tan^3(x)\sec^7(x)\,dx$

11. $\displaystyle\int \tan^6(x)\sec^4(x)\,dx$

12. $\displaystyle\int \tan^7(x)\,dx$

13. $\displaystyle\int \cot^4(x)\,dx$

14. $\displaystyle\int \sin^4(x)\cos^2(x)\,dx$

15. $\displaystyle\int \sec^6(x)\,dx$

16. $\displaystyle\int \frac{\cos^3(x)}{\sqrt{\sin(x)}}\,dx$

17. $\displaystyle\int \csc^4(x)\,dx$

18. $\displaystyle\int \frac{\sec^3(x)}{\cot^3(x)}\,dx$

19. $\displaystyle\int \csc^2(x)\cot^2(x)\,dx$

Evaluate the following integrals.

1. $\int_2^3 \dfrac{x^4}{(x^2+1)^2}\,dx$

2. $\int \dfrac{1}{x^2\sqrt{1-x^2}}\,dx$

3. $\int \dfrac{1}{x\sqrt{9+x^2}}\,dx$

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

5. $\int_6^8 \dfrac{x^3}{\sqrt{x^2-25}}\,dx$

6. $\int \dfrac{1}{(1-x^2)^2}\,dx$

7. $\int \dfrac{x^2}{\sqrt{1-x^2}}\,dx$

8. $\int x^3\sqrt{4+x^2}\,dx$

9. $\int \dfrac{\sqrt{2x^2-4}}{x}\,dx$

10. $\int \dfrac{1}{(4x^2-9)^{3/2}}\,dx$

Evaluate the following integrals.

1. $\int_0^\pi x\sin 3x\,dx$

2. $\int_1^2 xe^{-4x}\,dx$

3. $\int_1^2 x\ln x\,dx$

4. $\int_1^4 x\sec x\tan x\,dx$

5. $\int_1^4 x^4\ln x^4\,dx$

6. $\int \dfrac{\ln(\ln x)}{x}\,dx$

7. $\displaystyle\int_0^2 x^2 e^{5x}\,dx$

8. $\displaystyle\int_1^e (\ln x)^2\,dx$

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

10. $\displaystyle\int x \tan^{-1}(3x)\,dx$

11. $\displaystyle\int \sinh^{-1}(x)\,dx$

12. $\displaystyle\int x^3 \tanh^{-1}(x)\,dx$

13. $\displaystyle\int \sec^3 x\,dx$

14. $\displaystyle\int \cos(\ln x)\,dx$

15. $\displaystyle\int \ln x\,dx$

16. $\displaystyle\int x \sec^2 x\,dx$

17. $\displaystyle\int e^{x+2}(4x+3)\,dx$

18. $\displaystyle\int x^2 \sin x\,dx$

19. $\displaystyle\int x^3 (\ln x)^2\,dx$

20. $\displaystyle\int e^{-x} \cos x\,dx$