

Find the indefinite integral.

1. $\int \frac{x}{\sqrt{9-x^2}} dx$

2. $\int \frac{x^3-6x-20}{x+5} dx$

3. $\int \tan(5\theta) d\theta$

4. $\int \frac{1}{x^2-6x+12} dx$

5. $\int \frac{\csc^2 t}{\cot(t)} dt$

6. $\int \frac{t}{\sqrt{1-t^4}} dt$

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

8. $\int \frac{e^{-x}}{1+e^{-x}} dx$

9. $\int \frac{e^x - e^{-x}}{e^x + e^{-x}} dx$

10. $\int \ln(e^{2x-1}) dx$

11. $\int (3-x)7^{(3-x)^2} dx$

12. $\int \csc(2x) dx$

13. $\int \frac{\sec x \tan x}{\sec x - 1} dx$

14. $\int \frac{4}{x\sqrt{9x^2 - 1}} dx$

Solve the differential equation. Find the equation that passes through the given point.

15. $\frac{dr}{dt} = \frac{\sec^2 t}{\tan t + 1} \quad (\pi, 4)$

Evaluate the definite integral. (You may check with a calculator, but do the work by hand.)

16. $\int_1^e \frac{(1+\ln x)^2}{x} dx$

17. $\int_0^1 \frac{x-1}{x+1} dx$

18. $\int_1^2 \frac{1-\cos\theta}{\theta-\sin\theta} d\theta$

19. $\int_0^1 xe^{-x^2} dx$

20. $\int_{-1}^2 2^x dx$

21. $\int_0^1 \frac{1}{\sqrt{4-x^2}} dx$