9.4 EXERCISES

PRACTICE

In Exercises 1–4, find the value in degrees without using a calculator.

1. $\sin^{-1}\left(\frac{\sqrt{3}}{2}\right)$

2. $\cos^{-1}\left(-\frac{1}{2}\right)$

3. $\tan^{-1}\left(-\sqrt{3}\right)$

4. $\sin^{-1}\left(\frac{1}{\sqrt{2}}\right)$

In Exercises 5–8, find the value in radians without using a calculator.

5. $\cos^{-1}\left(-\frac{1}{\sqrt{2}}\right)$

6. $\tan^{-1} 0$

7. $\tan^{-1}\left(\frac{1}{\sqrt{3}}\right)$

8. $\sin^{-1}\left(\frac{1}{2}\right)$

In Exercises 9–14, use a calculator to find the value in radians. Round your answer to two decimal places.

9. $\sin^{-1}(-0.5913)$

10. $\tan^{-1}(1.5763)$

11. $\cos^{-1}(0.8136)$

12. $\cos^{-1}(-0.3876)$

13. $\tan^{-1}(-0.8752)$

14. $\sin^{-1}(0.6971)$

In Exercises 15–24, find the derivative of each function.

15. $y = \cos^{-1}\left(x^2\right)$

16. $y = \tan^{-1}\left(\frac{1}{x}\right)$

17. $f(x) = \sin^{-1}\left(\sqrt{x}\right)$

18. $f(x) = \cos^{-1}\left(\ln|x|\right)$

19. $f(x) = \tan^{-1}\left(e^x\right)$

20. $f(x) = \sin^{-1}\left(e^{2x}\right)$

21. $y = \cos^{-1}(2x+1)$

22. $y = \tan^{-1}\left(\sqrt{2x}\right)$

23. $y = \sin^{-1}(1-3x)$

24. $y = \cos^{-1}\left(\frac{1}{x^2}\right)$

In Exercises 25–34, evaluate each integral.

25. $\int \frac{1}{1+4x^2}\,dx$

26. $\int \frac{1}{\sqrt{1-16x^2}}\,dx$

27. $\int \frac{e^x}{1+e^{2x}}\,dx$

28. $\int \frac{x}{\sqrt{1-0.25x^4}}\,dx$

29. $\int \frac{1}{\sqrt{x}\left(\sqrt{1-x}\right)}\,dx$ (**Hint:** Let $u = \sqrt{x}$.)

30. $\int \frac{1}{x\left[1+\left(\ln(2x)\right)^2\right]}\,dx$ (**Hint:** Let $u=\ln(2x)$.)

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

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

33. $\int_{-\frac{\pi}{2}}^{\frac{\pi}{2}} \frac{\cos x}{1+\sin^2 x}\,dx$ (**Hint:** Let $u=\sin x$.)

34. $\int_1^3 \frac{4}{\sqrt{x}(1+x)}\,dx$ (**Hint:** Let $u=\sqrt{x}$.)

35. Find the volume of the solid of revolution generated when the region bounded by $y=\frac{1}{\sqrt{1+x^2}}$, $x=0$, and $x=1$ is rotated about the x-axis.

APPLICATIONS

36. Worker efficiency: A manufacturer estimates the time it takes for a new employee to produce the x^{th} item is given by $T(x)=90-25\tan^{-1}(0.2x)$ minutes.

a. Find $T'(6)$.

b. Interpret the result in part a.

37. Election campaign: A candidate for the board of trustees for a college plans to do an intensive door-to-door campaign. She predicts that the number of votes gained from this activity will be $N(x)=900\sin^{-1}(0.007x)$, where x is the percent of the homes in the district visited by her workers and $0<x\le 100$.

a. Find $N'(60)$.

b. Interpret the result in part a.

38. Drug acceptance: The percent of doctors who are prescribing a new drug is changing at a rate given by $P'(t)=\frac{16.5}{1+0.09t^2}$ percent per month, where t is the number of months after the drug is made available. What percent of the doctors are prescribing the drug at the end of 6 months?