

374 CHAPTER 6 THE TRIGONOMETRIC FUNCTIONS

Exer. 29–34: Approximate to four decimal places, when appropriate.

- 29 (a) $\sin 42^\circ$ (b) $\cos 77^\circ$
 (c) $\csc 123^\circ$ (d) $\sec (-190^\circ)$
 30 (a) $\tan 282^\circ$ (b) $\cot (-81^\circ)$
 (c) $\sec 202^\circ$ (d) $\sin 97^\circ$
 31 (a) $\cot (\pi/13)$ (b) $\csc 1.32$
 (c) $\cos (-8.54)$ (d) $\tan (3\pi/7)$
 32 (a) $\sin (-0.11)$ (b) $\sec \frac{3}{27}$
 (c) $\tan (-\frac{3}{13})$ (d) $\cos 2.4\pi$
 33 (a) $\sin 30^\circ$ (b) $\sin 30$
 (c) $\cos \pi$ (d) $\cos \pi$
 34 (a) $\sin 45^\circ$ (b) $\sin 45$
 (c) $\cos (3\pi/2)^\circ$ (d) $\cos (3\pi/2)$

Exer. 35–38: Use the Pythagorean identities to write the expression as an integer.

- 35 (a) $\tan^2 4\beta - \sec^2 4\beta$ (b) $4 \tan^2 \beta - 4 \sec^2 \beta$
 36 (a) $\csc^2 3\alpha - \cot^2 3\alpha$ (b) $3 \csc^2 \alpha - 3 \cot^2 \alpha$
 37 (a) $5 \sin^2 \theta + 5 \cos^2 \theta$
 (b) $5 \sin^2 (\theta/4) + 5 \cos^2 (\theta/4)$
 38 (a) $7 \sec^2 \gamma - 7 \tan^2 \gamma$
 (b) $7 \sec^2 (\gamma/3) - 7 \tan^2 (\gamma/3)$

Exer. 39–42: Simplify the expression.

- 39 $\frac{\sin^3 \theta + \cos^3 \theta}{\sin \theta + \cos \theta}$ 40 $\frac{\cot^2 \alpha - 4}{\cot^2 \alpha - \cot \alpha - 6}$
 41 $\frac{2 - \tan \theta}{2 \csc \theta - \sec \theta}$ 42 $\frac{\csc \theta + 1}{(1/\sin^2 \theta) + \csc \theta}$

Exer. 43–48: Use fundamental identities to write the first expression in terms of the second, for any acute angle θ .

- 43 $\cot \theta, \sin \theta$ 44 $\tan \theta, \cos \theta$
 45 $\sec \theta, \sin \theta$ 46 $\csc \theta, \cos \theta$
 47 $\sin \theta, \sec \theta$ 48 $\cos \theta, \cot \theta$

Exer. 49–70: Verify the identity by transforming the left-hand side into the right-hand side.

- 49 $\cos \theta \sec \theta = 1$ 50 $\tan \theta \cot \theta = 1$
 51 $\sin \theta \sec \theta = \tan \theta$ 52 $\sin \theta \cot \theta = \cos \theta$
 53 $\frac{\csc \theta}{\sec \theta} = \cot \theta$ 54 $\cot \theta \sec \theta = \csc \theta$
 55 $(1 + \cos 2\theta)(1 - \cos 2\theta) = \sin^2 2\theta$
 56 $\cos^2 2\theta - \sin^2 2\theta = 2 \cos^2 2\theta - 1$
 57 $\cos^2 \theta (\sec^2 \theta - 1) = \sin^2 \theta$
 58 $(\tan \theta + \cot \theta) \tan \theta = \sec^2 \theta$
 59 $\frac{\sin (\theta/2)}{\csc (\theta/2)} + \frac{\cos (\theta/2)}{\sec (\theta/2)} = 1$
 60 $1 - 2 \sin^2 (\theta/2) = 2 \cos^2 (\theta/2) - 1$
 61 $(1 + \sin \theta)(1 - \sin \theta) = \frac{1}{\sec^2 \theta}$
 62 $(1 - \sin^2 \theta)(1 + \tan^2 \theta) = 1$
 63 $\sec \theta - \cos \theta = \tan \theta \sin \theta$
 64 $\frac{\sin \theta + \cos \theta}{\cos \theta} = 1 + \tan \theta$
 65 $(\cot \theta + \csc \theta)(\tan \theta - \sin \theta) = \sec \theta - \cos \theta$
 66 $\cot \theta + \tan \theta = \csc \theta \sec \theta$
 67 $\sec^2 3\theta \csc^2 3\theta = \sec^2 3\theta + \csc^2 3\theta$
 68 $\frac{1 + \cos^2 3\theta}{\sin^2 3\theta} = 2 \csc^2 3\theta - 1$
 69 $\log \csc \theta = -\log \sin \theta$
 70 $\log \tan \theta = \log \sin \theta - \log \cos \theta$

Exer. 71–74: Find the exact values of the six trigonometric functions of θ if θ is in standard position and P is on the terminal side.

- 71 $P(4, -3)$ 72 $P(-8, -15)$
 73 $P(-2, -5)$ 74 $P(-1, 2)$

Trigonometry

Definition of Trigonometric Functions