

## EXERCISES 1-2

When the acute angle  $\theta$  is placed in standard position, its terminal side passes through the given point. Find  $\sin \theta$ ,  $\cos \theta$ , and  $\tan \theta$  to four decimal places. Use a calculator or the table of square roots on page 407 as necessary.

- A** 1. (3, 4)    2. (12, 5)    3. (24, 7)    4. (20, 21)    5. (2, 1)    6. (3, 2)  
7. (10, 15)    8. (4, 12)    9.  $(1, \sqrt{3})$     10.  $(\sqrt{5}, 2)$     11.  $(\sqrt{21}, 2)$     12.  $(3, \sqrt{7})$

One function of the acute angle  $\alpha$  is given. Find the other five trigonometric functions of  $\alpha$ . Leave answers in simplest radical form.

13.  $\cos \alpha = \frac{4}{5}$

14.  $\sin \alpha = \frac{5}{13}$

15.  $\tan \alpha = \frac{21}{20}$

16.  $\cot \alpha = \frac{24}{7}$

17.  $\sec \alpha = \frac{7}{3}$

18.  $\csc \alpha = \frac{9}{7}$

19.  $\cot \alpha = \frac{2\sqrt{10}}{3}$

20.  $\tan \alpha = \frac{4\sqrt{2}}{7}$

21.  $\csc \alpha = 2$

22.  $\cos \alpha = \frac{1}{4}$

23.  $\sin \alpha = \frac{2}{5}$

24.  $\csc \alpha = \sqrt{5}$

When the acute angle  $\phi$  is placed in standard position, its terminal side passes through the given point. Find  $\phi$  without using a calculator or tables.

25.  $(3, 3)$

26.  $(3, 3\sqrt{3})$

27.  $(\sqrt{3}, 1)$

28.  $(\sqrt{2}, \sqrt{2})$

The triangle at the right establishes the notation used in Exercises 29–34. Find the lengths and the angle measures that are not given. Leave answers in simplest radical form.

29.  $\angle A = 60^\circ; c = 12$

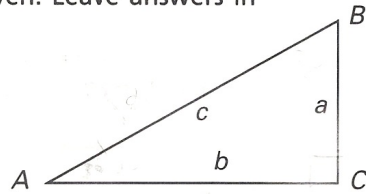
30.  $c = 18; \angle B = 45^\circ$

31.  $\angle B = 45^\circ; b = 4$

32.  $\angle A = 30^\circ; b = 6$

33.  $a = \sqrt{3}; b = 1$

34.  $a = 3; c = 6$



Find the exact value of the acute angle  $\phi$ .

35.  $\sin \phi = \cos 25^\circ$

36.  $\cot \phi = \tan 75^\circ$

37.  $\csc \phi = \frac{1}{\sin 10^\circ}$

38.  $\sec \phi = \frac{1}{\sin 80^\circ}$

39.  $\sin \phi \sec 70^\circ = 1$

40.  $\tan 50^\circ \cot \phi = 1$

In Chapter 3, we shall prove the following formulas.

$$\sin(a + b) = \sin a \cos b + \cos a \sin b \quad \cos(a + b) = \cos a \cos b - \sin a \sin b$$

$$\sin(a - b) = \sin a \cos b - \cos a \sin b \quad \cos(a - b) = \cos a \cos b + \sin a \sin b$$

Use these formulas to find exact values of the following in simplest radical form. (Hint: In Exercise 41,  $15^\circ = 45^\circ - 30^\circ$ .)

41.  $\sin 15^\circ$

42.  $\sin 75^\circ$

43.  $\cos 15^\circ$

44.  $\cos 75^\circ$

Use the results of Exercises 41–44 to find exact values of the following in simplest radical form.

45.  $\sec 15^\circ$

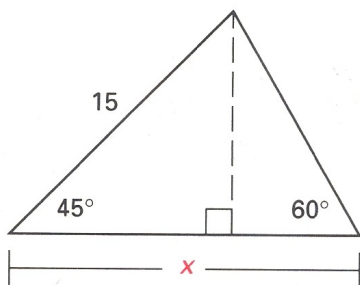
46.  $\sec 75^\circ$

47.  $\csc 15^\circ$

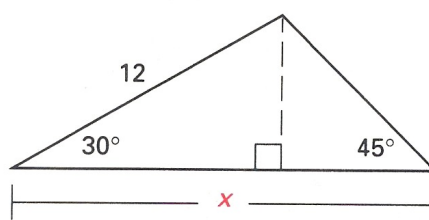
48.  $\csc 75^\circ$

In Exercises 49–52, find the length  $x$ . Leave answers in simplest radical form.

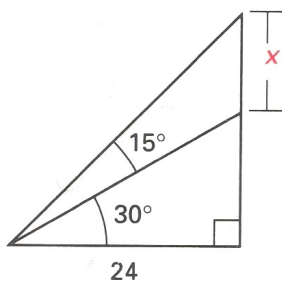
49.



50.



51.



52.

