

# 13-3 Skills Practice

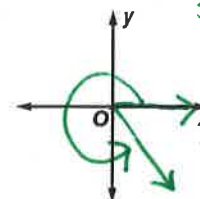
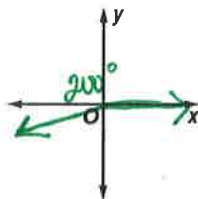
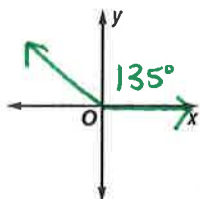
## Trigonometric Functions of General Angles

Find the exact values of the six trigonometric functions of  $\theta$  if the terminal side of  $\theta$  in standard position contains the given point.

- |   |   |
|---|---|
| 1. (5, 12) $r=13$<br>$\sin \theta = \frac{12}{13}$ , $\cos \theta = \frac{5}{13}$ , $\tan \theta = \frac{12}{5}$<br>$\csc \theta = \frac{13}{12}$ , $\sec \theta = \frac{13}{5}$ , $\cot \theta = \frac{5}{12}$       | 2. (3, 4) $r=5$<br>$\sin \theta = \frac{4}{5}$ , $\cos \theta = \frac{3}{5}$ , $\tan \theta = \frac{4}{3}$<br>$\csc \theta = \frac{5}{4}$ , $\sec \theta = \frac{5}{3}$ , $\cot \theta = \frac{3}{4}$                 |
| 3. (8, -15) $r=17$<br>$\sin \theta = -\frac{15}{17}$ , $\cos \theta = \frac{8}{17}$ , $\tan \theta = -\frac{15}{8}$<br>$\csc \theta = -\frac{17}{15}$ , $\sec \theta = \frac{17}{8}$ , $\cot \theta = -\frac{8}{15}$  | 4. (-4, 3) $r=5$<br>$\sin \theta = \frac{3}{5}$ , $\cos \theta = -\frac{4}{5}$ , $\tan \theta = -\frac{3}{4}$<br>$\csc \theta = \frac{5}{3}$ , $\sec \theta = -\frac{5}{4}$ , $\cot \theta = -\frac{4}{3}$            |
| 5. (-9, -40) $r=41$<br>$\sin \theta = -\frac{40}{41}$ , $\cos \theta = -\frac{9}{41}$ , $\tan \theta = \frac{40}{9}$<br>$\csc \theta = -\frac{41}{40}$ , $\sec \theta = -\frac{41}{9}$ , $\cot \theta = \frac{9}{40}$ | 6. (1, 2) $r=\sqrt{5}$<br>$\sin \theta = \frac{2\sqrt{5}}{5}$ , $\cos \theta = \frac{\sqrt{5}}{5}$ , $\tan \theta = 2$<br>$\csc \theta = \frac{\sqrt{5}}{2}$ , $\sec \theta = \sqrt{5}$ , $\cot \theta = \frac{1}{2}$ |

Sketch each angle. Then find its reference angle.

7.  $135^\circ$       $180 - 135 = 45^\circ$      8.  $200^\circ$       $200 - 180 = 20^\circ$      9.  $\frac{5\pi}{3}$       $2\pi - \frac{5\pi}{3} = \frac{\pi}{3}$



Find the exact value of each trigonometric function.

- |                                    |  |                                      |   |
|------------------------------------|--|--------------------------------------|---|
| 10. $\sin 150^\circ$ $\frac{1}{2}$ | 11. $\cos 270^\circ$ $0$                 | 12. $\cot 135^\circ$ $-1$            | 13. $\tan (-30^\circ)$ $-\frac{\sqrt{3}}{3}$                  |
| 14. $\tan \frac{\pi}{4}$ $1$       | 15. $\cos \frac{4\pi}{3}$ $-\frac{1}{2}$ | 16. $\cot (-\pi)$ $\text{undefined}$ | 17. $\sin \left(-\frac{3\pi}{4}\right)$ $-\frac{\sqrt{2}}{2}$ |

Suppose  $\theta$  is an angle in standard position whose terminal side is in the given quadrant. For each function, find the exact values of the remaining five trigonometric functions of  $\theta$ .

18.  $\sin \theta = \frac{4}{5}$ , Quadrant II      $\frac{y}{r} = \frac{4}{5}$   
 $x=3$ ,  $y=4$ ,  $r=5$   
 II:  $x$  is -,  $y$  is +  
 $\cos \theta = -\frac{3}{5}$ ,  $\sec \theta = -\frac{5}{3}$   
 $\tan \theta = -\frac{4}{3}$ ,  $\cot \theta = -\frac{3}{4}$   
 $\csc \theta = \frac{5}{4}$

19.  $\tan \theta = -\frac{12}{5}$ , Quadrant IV      $\frac{y}{x} = -\frac{12}{5}$   
 IV:  $x$  is +,  $y$  is -  
 $\sin \theta = -\frac{12}{13}$ ,  $\csc \theta = -\frac{13}{12}$   
 $\sec \theta = \frac{13}{5}$   
 $\cos \theta = \frac{5}{13}$   
 $\cot \theta = -\frac{5}{12}$