1. a) Change $52^\circ 46' 56''$ to degrees in decimal notation.
   b) Change $252.31794^\circ$ to degrees, minutes, seconds.
2. a) Change $118^\circ$ from degrees to radians.
   b) Change $\frac{13\pi}{9}$ from radians to degrees.
3. Find the exact values of the remaining trigonometric functions if $\csc \theta = \frac{25}{24}$ and $\cos \theta > 0$.
   \begin{align*}
   \sin \theta &= \underline{\quad} \\
   \csc \theta &= \frac{25}{24} \\
   \cos \theta &= \underline{\quad} \\
   \sec \theta &= \underline{\quad} \\
   \tan \theta &= \underline{\quad} \\
   \cot \theta &= \underline{\quad}
   \end{align*}
4. Find the exact values of the six trigonometric functions if a point on the terminal side of an angle $\theta$ in standard position is given as $(-5, -12)$.
   \begin{align*}
   \sin \theta &= \underline{\quad} \\
   \csc \theta &= \underline{\quad} \\
   \cos \theta &= \underline{\quad} \\
   \sec \theta &= \underline{\quad} \\
   \tan \theta &= \underline{\quad} \\
   \cot \theta &= \underline{\quad}
   \end{align*}
5. Find the exact value. DO NOT USE A CALCULATOR.
   \begin{align*}
   \tan 315^\circ &= \underline{\quad} \\
   \sin(-330^\circ) &= \underline{\quad} \\
   \cos\left(-\frac{5\pi}{6}\right) &= \underline{\quad} \\
   \sec\left(\frac{2\pi}{3}\right) &= \underline{\quad} \\
   \csc\left(-\frac{7\pi}{4}\right) &= \underline{\quad} \\
   \cot(-240^\circ) &= \underline{\quad}
   \end{align*}
6. The radius of each wheel of a bicycle is 20 inches. If you are traveling at a speed of 46 miles per hour on this bicycle, through how many revolutions per minute are the wheels turning?

7. A pendulum in a grandfather clock is 2 feet long and swings back and forth along a 12-inch arc. Approximate the angle (in degrees) through which the pendulum passes during one swing.

8. Find all six trigonometric functions if the angle is in quadrant III and the terminal side shares the line \( x - 3y = 0 \).

\[
\begin{align*}
\sin \theta &= \ldots \\
\csc \theta &= \ldots \\
\cos \theta &= \ldots \\
\sec \theta &= \ldots \\
\tan \theta &= \ldots \\
\cot \theta &= \ldots 
\end{align*}
\]

9. Find the exact value. DO NOT USE A CALCULATOR.

a) \( \sin \left( -\frac{\pi}{3} \right) + \cot \left( -\frac{4\pi}{3} \right) \)

b) \( \left( \csc 120^\circ \right) \left( \sec 150^\circ \right) \)

10. Find the exact value of \( \tan \frac{\pi}{3} - 3\sin \frac{3\pi}{4} + \sec \frac{\pi}{6} \)

11. If \( \cot \theta = 9 \), find \( \cot \theta + \cot \left( \theta - \pi \right) + \cot \left( \theta + 3\pi \right) \).

Solve the identity.

12. \( \cot \theta + \frac{\sin \theta}{1 + \cos \theta} = \csc \theta \)

13. \( \frac{\cos \alpha \cot \alpha}{1 - \sin \alpha} = \csc \alpha + 1 \)

14. Approximate the angle to the nearest 0.1 degree on the interval \([0^\circ, 360^\circ]\)

\( \sec \theta = -1.1326 \)

15. Approximate the angle to the nearest 0.01 radian on the interval \([0, 2\pi]\)

\( \tan \theta = -0.0224 \)
SOLUTIONS:

1. a) 52.7822°  b) 252.195°
2. a) $\frac{59\pi}{90}$  b) 260°
3. $\frac{24}{25}, \frac{7}{24}, \frac{25}{24}, \frac{25}{7}, \frac{7}{24}$
4. $\frac{-12}{13}, \frac{-5}{13}, \frac{12}{5}, \frac{-13}{12}, \frac{-13}{5}, \frac{5}{12}$
5. $-1, \frac{-\sqrt{3}}{2}, -\sqrt{2}, \frac{1}{2}, -2, \frac{-\sqrt{3}}{3}$
6. 386.56 rpm
7. 28.65°
8. $\frac{-\sqrt{10}}{10}, \frac{-3\sqrt{10}}{10}, \frac{1}{3}, -\sqrt{10}, \frac{-\sqrt{10}}{3}, 3$
9. a) $\frac{-5\sqrt{3}}{6}$  b) $\frac{-4}{3}$
10. $\frac{10\sqrt{3} - 9\sqrt{2}}{6}$
11. 18
12. & 13. Prove the identity
14. $152°, 208°$
15. 3.1192, 6.2608