

Unit 1.1 Notes Angles

Complementary angles add to 90°

If you have angle x and you want to find its complementary angle just take $90^\circ - x$

Supplementary angles add to 180°

If you have angle x and you want to find its supplementary angle just take $180^\circ - x$

Degree, Minutes, and Seconds

There are 360 degrees in a full circle. 15 degrees is shown as: 15°

There are 60 minutes in 1 degree. 15 minutes is shown as: $15'$

There are 60 seconds in 1 minute. 15 seconds is shown as: $15''$

So, 23 degrees 13 minutes and 49 seconds is shown as: $23^\circ 13' 49''$

The highest number for minutes and seconds should be 59, since 60 minutes would make 1 degree and 60 seconds would make 1 minute.

Add $51^\circ 29' + 32^\circ 46'$

Stack and add the minutes and degrees separately

$$\begin{array}{r} 51^\circ 29' \\ + 32^\circ 46' \\ \hline 83^\circ 75' \end{array}$$

Since $75' = 60' + 15' = 1^\circ + 15'$, then

$$\begin{array}{r} 83^\circ \\ + 1^\circ 15' \\ \hline 84^\circ 15' \end{array}$$

Converting between Decimal Degrees and Degrees, Minutes, and Seconds.

Convert $74^\circ 8' 14''$ to decimal degrees rounded to the nearest thousandth.

$$74^\circ 8' 14'' = 74^\circ + \frac{8^\circ}{60} + \frac{14''}{60} \text{ or } 74^\circ + \frac{8^\circ}{60} + \frac{14''}{3600} = 74.137^\circ$$

Convert 34.817° to degrees, minutes, and seconds.

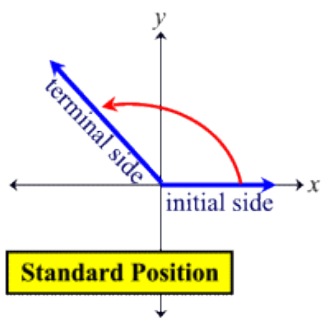
$$34.817^\circ = 34^\circ + 0.817^\circ \rightarrow 34^\circ + 0.817(60') \rightarrow 34^\circ + 49.02'$$

$$34^\circ + 49.02' = 34^\circ + 49' + 0.02' \rightarrow 34^\circ + 49' + 0.02(60'') \rightarrow 34^\circ + 49' + 1.2''$$

This gives us $34^\circ 49' 1.2''$, which would usually round to $34^\circ 49' 1''$

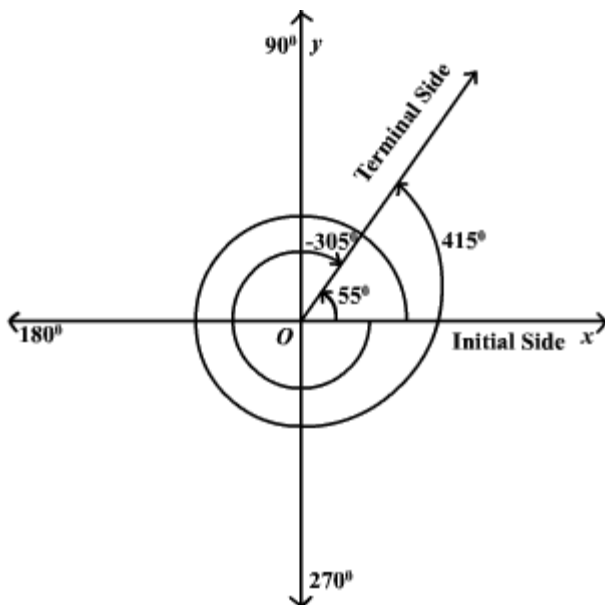
Standard Position

An angle is in standard position if its vertex is at the origin and its initial side is along the positive x-axis. The side along the positive x-axis is called the **initial side**. The other side of the angle is called the **terminal side**.



Coterminal Angles

A complete rotation of a ray results in an angle measuring 360° . By continuing the rotation, angles of measure larger than 360° can be produced. Angles that have the same initial side and same terminal side, but different amounts of rotation are called **coterminal angles**.



In the diagram above angles 55° , 415° , and -305° are all coterminal angles because they have the same initial side and same terminal side.