How to Calculate the Distance Between two Positions Represented in Latitude-Longitude

The equations below define the calculations required to calculate the distance between two positions, that are represented in latitude-longitude measurements.

The positions are represented as:

\[
\begin{align*}
\text{lat1Deg} & \quad \text{latitude of position 1 measured in degrees} \\
\text{lon1Deg} & \quad \text{longitude of position 1 measured in degrees} \\
\text{lat2Deg} & \quad \text{latitude of position 2 measured in degrees} \\
\text{lon2Deg} & \quad \text{longitude of position 2 measured in degrees}
\end{align*}
\]

The first step is to convert lat1Deg, lon1Deg, lat2Deg, and lon2Deg into radians. This can be done using the Math class:

\[
\begin{align*}
\text{lat1Rad} & = \text{toRadians}( \text{lat1Deg} ); \\
\text{lon2Rad} & = \text{toRadians}( \text{lon2Deg} ); \\
\text{lat2Rad} & = \text{toRadians}( \text{lat2Deg} ); \\
\text{lon2Rad} & = \text{toRadians}( \text{lon2Deg} );
\end{align*}
\]

Next, calculate some intermediate values:

\[
\begin{align*}
\text{lonDiffDeg} & = \text{lon1Deg} - \text{lon2Deg}; \\
\text{lonDiffRad} & = \text{toRadians}( \text{lonDiffDeg} );
\end{align*}
\]

Then, the difference is calculated with the following equation:

\[
\begin{align*}
\text{distanceRadians} & = \cos( \\
& \sin( \text{lat1Rad} ) \ast \sin( \text{lat2Rad} ) + \\
& \cos( \text{lat1Rad} ) \ast \cos( \text{lat2Rad} ) \ast \cos( \text{lonDiffRad} ) ); \\
\text{distDegrees} & = \text{toDegrees}( \text{distanceRadians} ); \\
\text{distMiles} & = \text{distDegrees} \ast 69;
\end{align*}
\]

If you want the distance in kilometers, then multiply distMiles by 1.61.

This was taken from [http://sniptools.com/latitudeLongitude.php](http://sniptools.com/latitudeLongitude.php), which may be helpful in determining if you have correctly implemented the calculation.