

In Activity 6, we are making sure that the student understands where the restrictions are on each of the functions in order for them to have an inverse that is also a function. This activity shows graphically how, where and why we restrict this domain. We also talk about why there are restrictions on the functions and where they occur on the graphs. In this activity, we realize that we have to restrict the domain of the sine function in order for the function to have an inverse. In Aleks, we are taking the inverse of function to simplify expressions, evaluate expressions and solve equations. This activity also helps the students see that when we are taking the inverse sine of a number, we are looking for the angle measure. When we evaluate  $\sin^{-1}\left(\frac{1}{2}\right)$ , we are finding the angle measure whose sine of that angle measure is equal to  $\frac{1}{2}$ . Since there are infinite possibilities for this, it is not only important to remember the domain but also the range restriction that goes with it so that the inverse remains a function.

Review questions:

1. Explain what it means for a function to have an inverse.
2. Explain what it means to restrict the domain of a function.
3. Why must we restrict the domain of the sine function in order for the function to have an inverse?
4. What are you finding when you are find the arcsine of a value?
5. What is the accepted restricted domain of the cosine function? Choose another domain restriction that would also work. Explain your domain and why it would work.
6. Find  $\cos^{-1}\left(\frac{1}{2}\right)$  by showing where the solution is located on both the unit circle and the graph of the cosine function.
7. When evaluating  $\sin^{-1}\left(\frac{\sqrt{2}}{2}\right)$ , describe what you are finding.
8. Explain why the  $\tan^{-1}\left(\tan\frac{5\pi}{3}\right)$  is not  $\frac{5\pi}{3}$ . Use a graph to describe your reasoning.
9. Define the angle measurement system of **degrees** and give a rationale for its importance.
10. Define the angle measurement system of **radians** and give a rationale for its importance.