Class Discussion

Unit 4 topic 7 Part 1 Inverse Sine Function

Objective: what is the purpose of inverse trigonometric function? The limitation and how to evaluate

Based on the observation,

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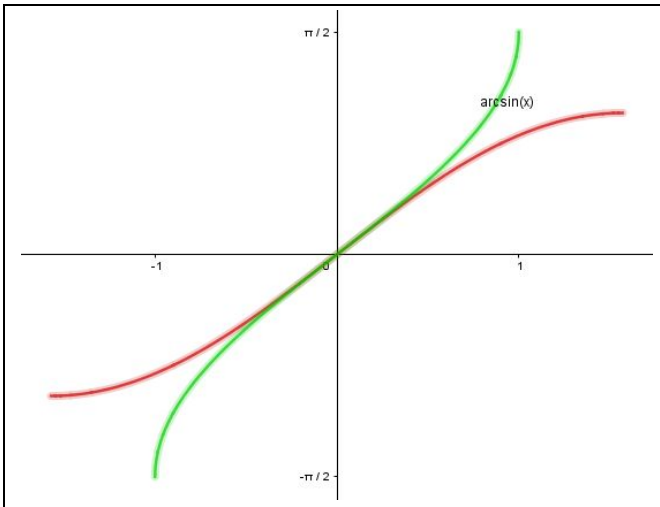
<td> 
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<td>for $y = \sin x$
when domain is $x \in \left[-\frac{\pi}{2}, \frac{\pi}{2}\right]$
range of the sine function is $y \in [-1,1]$</td>
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<td>for $y = \sin^{-1} x$
This is one of the place we can use to inverse, because it covers the whole range
for the inverse function, our implied domain is
$x \in [-1,1]$
and the range is
$y \in \left[-\frac{\pi}{2}, \frac{\pi}{2}\right]$</td>
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Steps to evaluate $\arcsin x$

1. Let $\theta = \arcsin x$

2. step 1 implies, $x = \sin\theta$, use unit circle to find the value of θ

3. when θ is found, the solution must be θ 's coterminal where $\theta \in \left[-\frac{\pi}{2}, \frac{\pi}{2}\right]$

Ex1 Evaluate

1. $\arcsin\left(-\frac{1}{2}\right)$

2. $\cos\left(\frac{\pi}{2} + \arcsin\left(\frac{\sqrt{3}}{2}\right)\right)$

Ex 2 Evaluate $\tan\left(\arcsin\left(\frac{4}{5}\right)\right)$

Ex 3 Write the trigonometric expression in the algebraic form: $\cos\left(\arcsin\frac{1}{\sqrt{x^2+1}}\right)$

Ex 4 Solve $\sin x = -\frac{2}{3}$ if $0 \le \theta < 2\pi$