**4.7 Inverse Trig Functions**

**Objective: Evaluate and graph inverse functions**

Remember: In order for a function to have an inverse, it must be one-to-one (must pass Horizontal Line Test). doesn’t pass, but if we focus on domain it will pass.

1. On this interval is increasing.
2. On this interval takes on full range of values,
3. On this interval is one-to-one

Therefore, on restricted domain has an inverse.

Denoted: or

**Definitions of Inverse Sine Function**

The inverse sine function is defined by

Examples:

If possible, find the exact value.

since (for

it follows that

since (for

it follows that

**Not possible because 5 is not in the range**

**for**

**Definitions of the Inverse Trig Functions**

*Functions Domain Range*

**Graphs on page 343 for a visual**

**Examples**

since (for

it follows that

since (for

it follows that

since (

it follows that

**Inverse Properties of Trig Functions**

and , then

sin(arcsin x) = x and arcsin(sin y) = y

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and , then

cos(arccos x) = x and arccos(cos y) = y

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and , then

tan(arctan x) = x and arctan(tan y) = y

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**Examples**

tan(arctan 7) Since 7 is in the domain and is a real number, the   
 inverse property applies

**tan(arctan 7) = 7**

does not lie within range of arcsine, but its   
coterminal angle of

is not defined because the domain is [-1,1]

**Calculus Preview Examples**:

Find the exact value.

If you let [note tan(arccos(u)) now]

Then (since it is positive it is in Quad I)

And we know that and therefore

(Draw triangle if needed)

Therefore,

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If you let [note cos(arcsin(u)) now]

Then (since it is negative it is in Quad IV)

And we know that and therefore

(Draw triangle if needed)

Therefore,

**Homework**

Pg 347 #1-4, 5-9 (odd), 23-27 (odd), 43, 49-51, 55, 105, 111