Recall: If and are inverse functions, then

1. iff (usually the definition)
2. for all , so and undo each other (usually a theorem)
3. The graphs of and are reflections of each other across the line . (graphical interpretation)
4. The dom = range and vice-versa
5. If and , the inverse of is . In particular, and are inverse functions.

Theorem: Continuity and Differentiability of Inverse Functions

Let be a function whose domain is an interval I. If has an inverse functions, then the following statements are true:

1. If is continuous on its domain, then is continuous on its domain.
2. If is differentiable at and then is differentiable at .
* Given , if exists, instead of finding it then differentiating, we can find using the following Theorem:

*Recall that if the point lies on , then as a consequence will lie on .*

*Theorem The Derivative for Inverses*

Let be a function that is differentiable on an interval . If has an inverse function , then is differentiable at any for which . Furthermore,

So the derivative of a function, inverse, is the reciprocal of derivative evaluated at .

If is defined at and exists and is not zero there, then is differentiable at . Furthermore,

Proof:

***Derivatives of Inverse Trig Functions***

1) 2)

3) 4)

5) 6)

Ex 4 Find , then find the derivative of :

Ex 3 Find the derivative of the inverse Tangent function:

Ex 3 Find the derivative of the inverse Secant function:



Ex 5 Find the following derivatives:

1. (3.6.20)
2. (3.6.24)
3. (3.6.27)
4. (3.6.31)
5. (3.6.34)
6. (3.6.58) Find :