

**Purpose:** To use CAS and a variety of examples to discover the procedure for computing the derivative of a composite function.

**Open the Chain Rule document on your handheld and follow the directions.**

1. To discover the *Chain Rule*, first practice taking derivatives of a few functions using the handheld. Since each function will soon be an inner and outer function in the derivative of a composite, it will be helpful to keep a catalog of these derivatives in front of you.

Function	Inner	Outer	$\frac{d}{dx}$ (inner)	$\frac{d}{dx}$ (outer)
$\sqrt{1+x^2}$				
$\sin(2x)$				
$(x-1)^3$				
$(3x+2)^4$				
$\tan(x^2)$				
$\sin^2 x$				

2. Use the handheld to compute the following derivatives.

Function	Derivative
$\sqrt{1+x^2}$	
$\sin(2x)$	
$(x-1)^3$	
$(3x+2)^4$	
$\tan(x^2)$	
$\sin^2 x$	

3. Based on these examples, can you see a pattern? Write out your guess by filling in the right side of the following equation.

$$\frac{d}{dx}(f(g(x))) = \underline{\hspace{10em}}$$

4. Try these out (Use your handheld to check your results):

$$\frac{d}{dx} \tan^2(3x) =$$

$$\frac{d}{dx} \sqrt{16-4x^2} =$$