Name: _____ **AP**

CLASSWORK 61

1. Use the "fake product rule" (just multiplying the two derivatives), the **real** product rule, and then simplifying the function to find the derivatives. **Remember,** the REAL product rule is

Derivative of the 1st · (keep the 2nd) + Derivative of the 2nd · (keep the first)

Function	**Fake product rule** $f'(x) \cdot g'(x)$	**REAL product rule** $f'(x) \cdot g(x) + g'(x) \cdot f(x)$	**Simplify and take the derivative normally**
$y=x \cdot x^4$			
$y=(3x)(x^5)$			
$y=(x)(1/x^2)$			
$y=(x+3)(x+2)$			

2. a) What is the derivative of $y = \sin x$?
Sketch a graph of the function and its derivative.

b) What is the derivative of $y = \cos x$?
Sketch a graph of the function and its derivative.

c) Use the product rule to find the derivative of $y = \sin x \cdot \cos x$

d) In the calculator, enter Y1 = sin x • cos x
Have the calculator get its derivative like this Y2 = nDeriv (Y1, x, x)
Now, enter what you calculated for the derivative Y3 = ...

Are Y2 and Y3 the same? What does that mean?

e) Use calculus to find the EXACT answer for the slope of the curve at $x = \pi / 4$

f) Use the table function on your calculator to find the calculator's answer for $x = \pi / 4$

Is that the same answer? Explain.

3. a) Use the product rule to find the derivative of $y = x \cdot \sin x$

b) What's the slope of this graph at $x = \pi$?

c) Find the slope of the curve between $x = \pi$ and $x = 3.15$.

4. a) Use the product rule to find the derivative of $y = \sin^2 x$

b) What's the slope of this graph at $x = \pi$?

c) Find the slope of the curve between $x = \pi$ and $x = 3.15$.

5. A new topic..... Find **(USE x instead of n)**

$\lim_{n\to\infty}\left(1+\frac{1}{n}\right)^n$ using the calculator. What will the part inside the parentheses approach?

What will the exponent approach?

n	$\left(1+\frac{1}{n}\right)^n$

What is this special limit?

6. Find the following sum to the 5th decimal place:

$$\frac{1}{0!}+\frac{1}{1!}+\frac{1}{2!}+\frac{1}{3!}+\frac{1}{4!}+\frac{1}{5!}+\frac{1}{6!}+\frac{1}{7!}\ldots$$