

Name: _____

TC

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) Use the product rule to find the derivative of $y = 1/x \cdot \cos x$

b) In the calculator, enter
 Have the calculator get its derivative like this
 Now, enter what you calculated for the derivative

Y1 = $1/x \cdot \cos x$
 Y2 = nDeriv (Y1, x, x)
 Y3 = ...

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

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

d) 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

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

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:

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