

REQUIRED REFERENCE

Maple Directions and Reference Page (hard copy or linked to your class homework page)

GOALS: Use Maple to help focus on precisely what "rules" we are using in our calculations and learn to use Maple to work with derivatives.

F1: Quick Help List

Ctrl F1: Help

F5: Toggle between Math and Text

Open and save a new "document mode" Maple worksheet in your home directory.

First lines, type in (exactly)

`with(student):`

`with(plots):`

`with(Student[Calculus1]):` **>>Note new 3rd line<<**

Tutor

T1: Use the *Differentiation Tutor* (directions below) on the following functions. When you are finished with each function, the function should be completely differentiated.

a. $y = 7x^5 - 13x^3 + \frac{2}{3}x^2 + \sqrt{42}x + \pi$

b. $y = x^5 e^x$ [use `exp(x)` for e^x , e^x will not work]

c. $y = \frac{x^5 + 1}{\sqrt{2}x}$

d. $y = e^{x^2} \sin(x)$

e. $y = \sqrt{\pi} \tan(3x - 7)$

Differentiation Tutor Directions

- 1) Type the formula for a function (use *Maple Math*)
- 2) Hit *Enter*
- 3) Right click on the displayed function
- 4) Select Tutor>Calculus-Single Variable>Differentiation Methods (NOT Derivatives)
- 5) Tell Maple what derivative rule to apply by clicking the correct Rule button.
Maple will apply the rule and record the result. If the rule does not apply, then Maple gives a hint.
- 6) Once you chosen the correct rules and closed, Maple displays the correct derivative (no d/dx should show).

Derivatives (explore different ways to have Maple differentiate for you)

D1a: Define the squaring function, $s(x) = x^2$

Maple Code

$s := x \rightarrow x^2$ [You can use \rightarrow or an \rightarrow from the arrow menu in the left bar]

D1b. Use the already defined $s(x)$ squaring function to find $s'(x)$

>>Right click on displayed $s(x)$ and select Differentiate > x

D1c. Use the already defined $s(x)$ squaring function to find $s'(x)$

Maple Code

$s'(x)$

D1d. Use the already defined $s(x)$ squaring function to find $s'(x)$

Maple Code

$\text{diff}(s(x), x)$ [This tells Maple that x is the variable]

D1e. Use the already defined $s(x)$ squaring function to calculate $s'(4)$

Maple Code

$s'(4)$

D2a. Differentiate x^3 directly, without first defining x^3

Maple Code

x^3 [Right click on displayed x^3 and select Differentiate > x]

D2b. Differentiate x^3 directly, without first defining or typing in x^3

Maple Code

$\text{diff}(x^3, x)$

D3a: Define the rational function $f(t) = \frac{t^2 + 1}{t + 2}$

Maple Code

$f := t \rightarrow (t^2 + 1) / (t + 2)$ [Be sure to use t , not x]

D3b: Use the already defined $f(t)$ rational function to find $f''(t)$

Maple Code

$\text{diff}(f(t), t, t)$

D3c. Use the already defined $f(t)$ rational function to find $f''(t)$ and then $f'''(t)$

Maple Code

$f^{(2)}(t)$ [Note the 2 MUST be in parentheses]

$f^{(3)}(t)$ [Note the 3 MUST be in parentheses]

This works in general for determining higher derivatives (fourth, fifth, etc.)

Email subject line: Maple Derivative Lab