Natural Logarithm Function 3/10/17

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I.-

1.- $y = \frac{\ln 2x}{\ln 3x}$

$u' = \frac{2}{2x} = \frac{1}{x}$ $v' = \frac{3}{3x} = \frac{1}{x}$

$$\frac{\frac{(\ln 3x)\left(\frac{1}{x}\right) - (\ln 2x)\left(\frac{1}{x}\right)}{(\ln 3x)^2}}{1} = \frac{\ln 3x - \ln 2x}{(x)(\ln 3x)^2}$$

2.- $f(x) = \sqrt{1 + \ln x}$

$f'(x) = (1 + \ln x)^{1/2} = \frac{1}{2}(1 + \ln x)^{-1/2}\left(\frac{1}{x}\right)$

$$= \frac{1}{2x\sqrt{1 + \ln x}}$$

3.- $h(x) = \ln(e^x)$

$e^x = (1)(e^x) = e^x$ $h'(x) = \frac{e^x}{e^x} = 1$

Rules of Differentiation- Product & Quotient Rule practice
By: *Ing Ziad Najjar*

Name: Roberto García F. ID: A0530172 Date:

Find the derivative of the following functions: BOX YOUR FINAL ANSWER

1) $f(x)=4x^3(2x+5)^4 =$
$= 12x^2(2x+5)^4 + 32x^3(2x+5)^3$

2) $f(x)=2x\sqrt{(4x-2)^3}$ = [illegible]

3) $f(x)=(4x+1)^3(3-x^2)^4$
= [illegible]

4) $f(x)=x^2(x^2+1)^4$ = [illegible]

5) $f(x)=(\frac{x}{2}+1)^4(x^2-3)^4$
= [illegible]

6) $f(x)=\frac{3x^2}{2}(2x-3)^4$ = [illegible]

7) $f(x)=\frac{(2x-1)^3}{2x^3}$ = [illegible]

8) $f(x)=\frac{2x^3}{(x^2+1)^3}$ = [illegible]

9) $f(x)=\frac{8x}{x+1}$ $= \frac{8(x+1)-8x}{(x+1)^2} = \frac{8}{(x+1)^2}$

10) $f(x)=\frac{(2x-3)^4}{1-2x}$ = [illegible]

11) $f(x)=-\frac{x^2}{(2x+1)^3}$
= [illegible]

12) $f(x)=\frac{(x^2+1)^8}{(1-3x)^3}$
= [illegible]

13) *Find the equation of tangent line to the given function at the indicated point:*

$f(x)=x(2x-3)^4$ at $x=1$

$= -7$

14) Find the equation of tangent line to the given function at the indicated point:

$f(x)=\frac{(2x-1)^3}{x}$ at $x=1$

$= 9$

*Procedure on the back

*Respuesta simplificadas atrás.

$4x(3x-1)^4 \quad [\ldots]$

$6x-2+15$

$4x(3x-1)^4[21x-2]$

2.-

$$\frac{3(1-2x)^4\left[-4x-(1-2x)^2\right]}{x^4}$$

$[\cancel{-4x}-4x^2\cancel{+4x}-1]$

$$\frac{3(1-2x)^4\left[-4x^2-1\right]}{x^4}$$

$$\frac{48\cancel{x^4}-96x^3+72x^2-24x+3\left[-4x^2-1\right]}{\cancel{x^4}}$$

$-96x^3+72x^2-24x+51[-4x^2-1]$

$3(-32x^3+24x^2-8x+17)[-4x^2-1]$ //

3.- $2x^4(1-x)^2[5(1-x)-3x]$ $\quad (-x+1)(-x+1)$

$2x^4(1-x)^2[5-8x]$ // $\quad 2x^4(x^2-2x+1$

$8x^6-4x^5+$

4.- $$\frac{4(3x-7)^3[3x-3x+7]}{x^5} \quad \frac{14(3x-7)^3}{x^5}$$

$$\frac{4(3x-7)^3[7]}{x^5} = \frac{28(3x-7)^3}{x^5}$$

More on rules of derivatives
By: Designing team

Name: Roberto Garcia F. Id: A01570178 Date: 26/09/17

1. If $f(5)=1$, $f'(5)=6$, $g(5)=-3$, $g'(5)=2$. Find the values of

a) $(f\cdot g)'(5) = (1)(2)+(6)(-3) = 2-18 = \underline{-16}$

b) $(f/g)'(5)$ $(-3)(6)-(1)(2) = -20/9$

c) $(g/f)'(5)$ $(1)(2)+(6)(-3) = 20/1 = \underline{20}$

2. If $f(3)=4$, $g(3)=2$, $f'(3)=-6$ and $g'(3)=5$, find the following values

a) $(f+g)'(3)$ $f'(3)+g'(3) = -6+5 = \underline{-1}$

b) $(f\cdot g)'(3)$ $(2)(-6)+(4)(5) = \underline{8}$

c) $(f/g)'(3)$ $(4)(5)-(2)(-6)$ $\frac{20+12}{4} = \underline{-8}$

3. If $h(x)=f(x)g(x)$, use the table to find $h'(-1)$, $h'(0)$ and $h'(1)$

x	$f(x)$	$f'(x)$	$g(x)$	$g'(x)$
-1	2	1	1	2
0	-1	0	-1	3
1	2	-1	0	5

$h'(-1) = (1)(1)+(2)(2) = \underline{5}$

$h'(0) = (-1)(0)+(-1)(3) = \underline{-3}$

$h'(1) = (0)(-1)+(2)(5) = \underline{10}$

4. If $h(x)=f(x)/g(x)$, use the table to find $h'(-1)$, $h'(0)$ and $h'(1)$

x	$f(x)$	$f'(x)$	$g(x)$	$g'(x)$
-1	2	1	1	2
0	-1	0	-1	3
1	2	-1	2	5

$h'(-1) = \frac{(1)(1)-(2)(2)}{(1)^2} = \frac{-3}{1} = \underline{-3}$

$h'(0) = \frac{(-1)(0)-(-1)(3)}{(-1)^2} = \frac{3}{1} = \underline{3}$

$\frac{\ldots-(2)(5)}{(2)^2} = \frac{-12}{4} = \underline{-3}$