Calculus Unit #1

7.4 The Chain Rule (General)

Composition of Functions

$f(x)$	$g(x)$	$f(g(x))$
$\sqrt{x}$	x^2+1	$\sqrt{x^2+1}$
$\sin x$	$6x$	$\sin 6x$
x^5	$3x+2$	$(3x+2)^5$
$x+\tan x$	x^2	$x^2+\tan x^2$

$y = (3x+1)^2$

$y = 9x^2 + 6x + 1$

$y' = 18x + 6$

$y = (x^2+1)^2$

$y = x^4 + 2x^2 + 1$

$y' = 4x^3 + 4x$

$F(x) = (\quad)^2 \rightarrow 2(\quad)$ $\quad 3 \cdot 2(3x+1)$

$u(x) = 3x+1 \rightarrow 3$

$x^2 \rightarrow 2x$

$x^2+1 \rightarrow 2x$

$f(x) = (6x-5)^4$

$f(u) = u^4$

$u = 6x-5$

$f'(u) = 4u^3$

$u' = 6$

$f'(x) = 6 \cdot 4(6x-5)^3$

$= 24(6x-5)^3$

$y = \sqrt{3x^2 - x + 1}$

$y = (3x^2 - x + 1)^{1/2}$

$f(u) = u^{1/2}$

$u = 3x^2 - x + 1$

$f'(u) = \frac{1}{2}u^{-1/2}$

$u' = 6x - 1$

$f'(x) = \frac{1}{2}(3x^2 - x + 1)^{-1/2}(6x-1)$

$$f(x)=\frac{5}{3x+1}$$

$f(u)=\frac{5}{u}=5u^{-1}$ $f'(u)=-5u^{-2}$

$u=3x+1$

$u'=3$

$f'(x)=-5(3x+1)^{-2}(3)$

$=\frac{-15}{(3x+1)^2}$

$$y=\frac{-2}{\sqrt{x^2+1}}$$

$F(u)=-2u^{-1/2}$

$u=x^2+1$

$f'(u)=u^{-3/2}$ $u'=2x$

$y'=(x^2+1)^{-3/2}\cdot 2x$

$=\frac{2x}{(x^2+1)^{3/2}}$

Practice with #1-10

Homework:

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