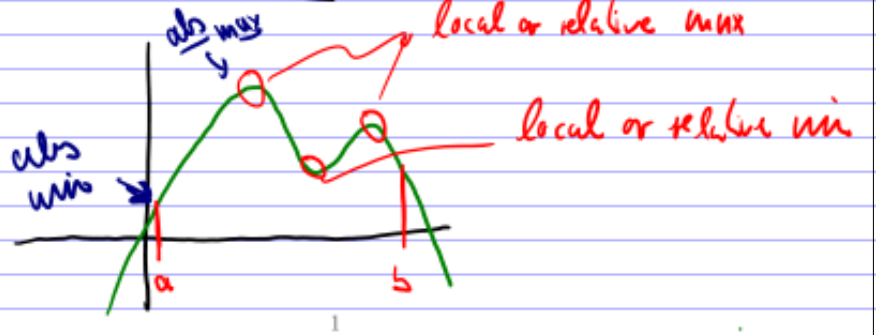
Panel 1

Last Time:

Chain Rule: $\frac{d}{dx} f(g(x)) = f'(g(x)) \cdot (\text{inner function})'$ ($g'(x)$)

$f(x) = \sin(x^2)$, $f' = \cos(x^2)\, 2x$

Rel. and absolute Extrema:



1

Panel 2

Derivatives with Chain Rule: Find derivatives of:

a) $f(x) = (3 - 2x - 5x^2)^{10}$

$f'(x) = 10(3 - 2x - 5x^2)^9 \cdot (-2 - 10x)$

b) $f(x) = \sqrt{1-2x} = (1-2x)^{1/2}$

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

2

Panel 3

c) $f(x) = \frac{15}{(3x^2-5)^5} = 15\cdot(3x^2-5)^{-5}$

$f'(x) = 15(-5)(3x^2-5)^{-6}(6x)$

d) $f(x) = \sin(x^2)$

$f'(x) = \cos(x^2)\cdot(2x)$

e) $f(x) = \sin^3(x^2) = [\sin(x^2)]^3$

$f'(x) = 3(\sin(x^2))^2\cdot\cos(x^2)\cdot 2x$

3

Panel 4

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

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

g) $f(x) = \sin\left(\sqrt{x^3(x^2-3)^2}\right)$

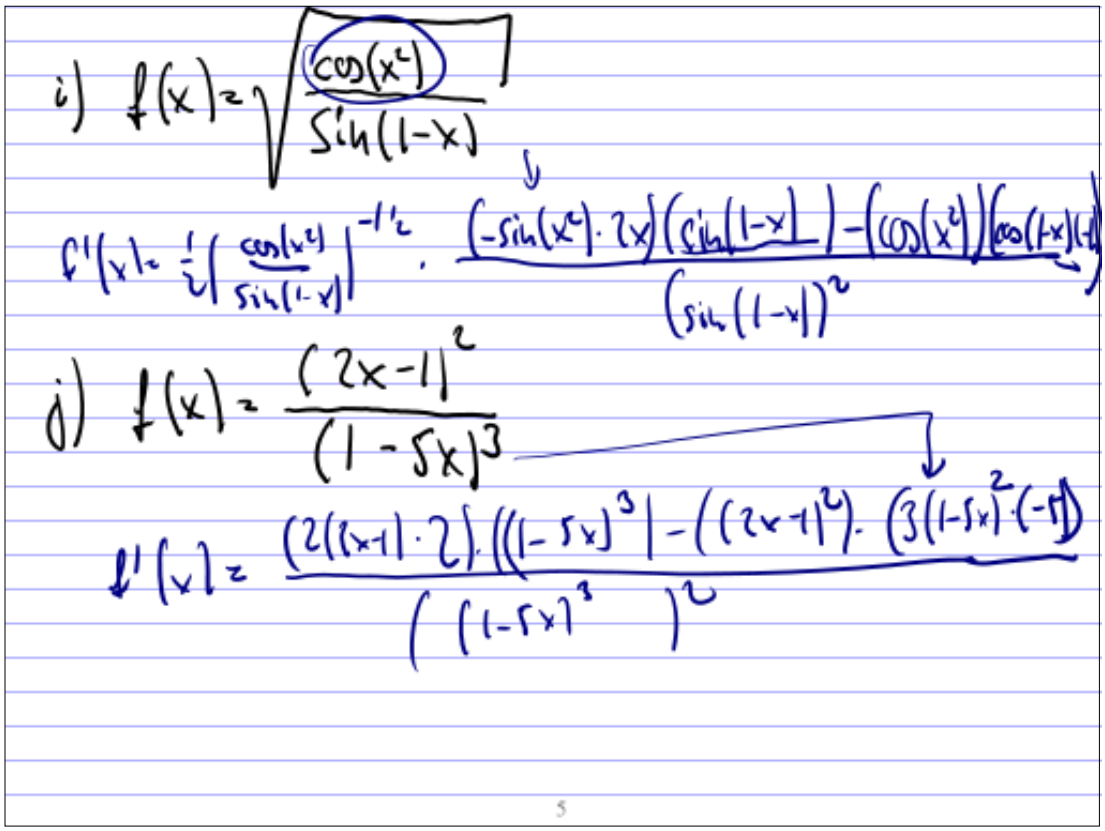
$f'(x) = \cos\left(\sqrt{x^3(x^2-3)^2}\right)\cdot\frac{1}{2}\left(x^3(x^2-3)^2\right)^{-1/2}\cdot\left(3x^2(x^2-3)^2 + x^3\cdot 2(x^2-3)^1\cdot 2x\right)$

h) $f(x) = \sqrt{x^2-1}\tan(x^3)$

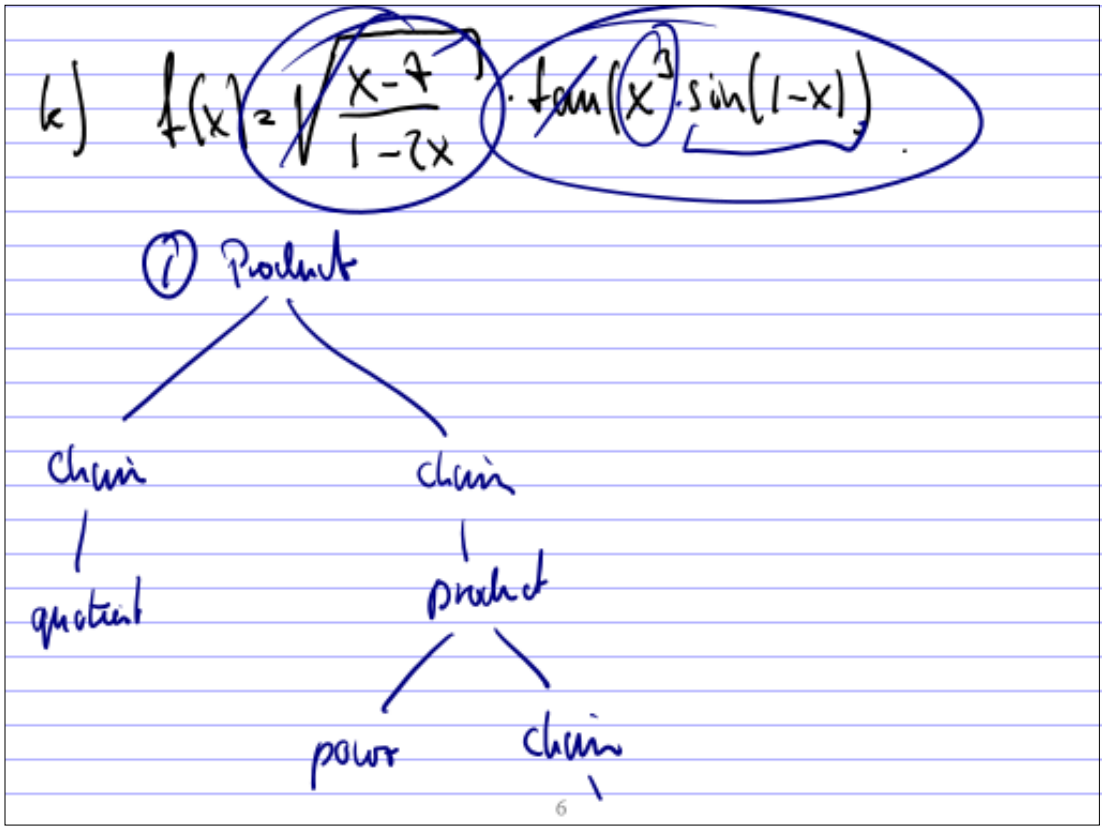
$f'(x) = \left(\frac{1}{2}(x^2-1)^{-1/2}\cdot 2x\right)(\tan(x^3)) + \left(\sqrt{x^2-1}\right)\cdot(\sec^2(x^3)\cdot 3x^2)$

4

Panel 5



Panel 6



Panel 7

Quiz #6

Name: _____

(1) Find the derivatives of the following functions:

a) $f(x) = (x^4 - 7x^2)^5$

b) $f(x) = \sin(7 - 4x^2)$

c) $f(x) = \dfrac{(x-7)^2}{(6-9x)^3}$

7

Panel 8

d) $f(x) = x^5 \sin\left((3x+2)^4\right)$

e) $f(x) = \cos\left(\dfrac{x+5}{(7-x)^3}\right)$

8