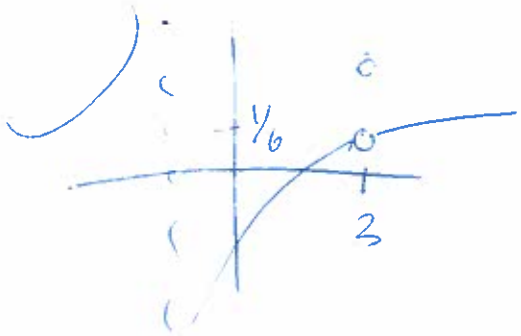
Removably Discontinuous

*

"Hole is"

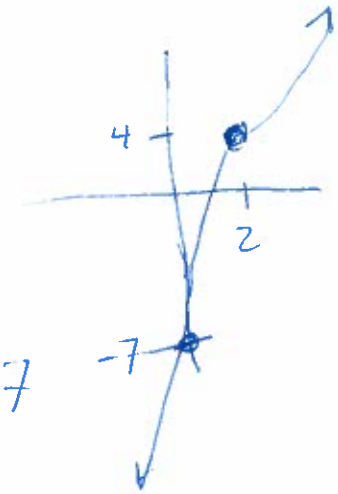
$$y = \frac{x^2 - 5x + 6}{x^2 - 9}$$



Continuity

1) limit exists
2) f(a) exists
3) lim = f(a)

$$f(x) = \begin{cases} Ax - 7 & x < 2 \\ x^2 & x \geq 2 \end{cases}$$



$$\lim_{x \to 2^+} f(x) = \lim_{x \to 2^+} x^2 = 4$$

$$\lim_{x \to 2^-} f(x) = \lim_{x \to 2^-} Ax - 7 = 2A - 7$$

$$\lim_{x \to 2} f(x) = 4 = 2A - 7$$

$$11 = 2A$$

$$11/2 = A$$

Derivatives

A function is Not differentiable at

1. Points of Discontinuity
2. Corner
3. Cusp

$$\frac{d}{dx}(af(x)) = af'(x)$$

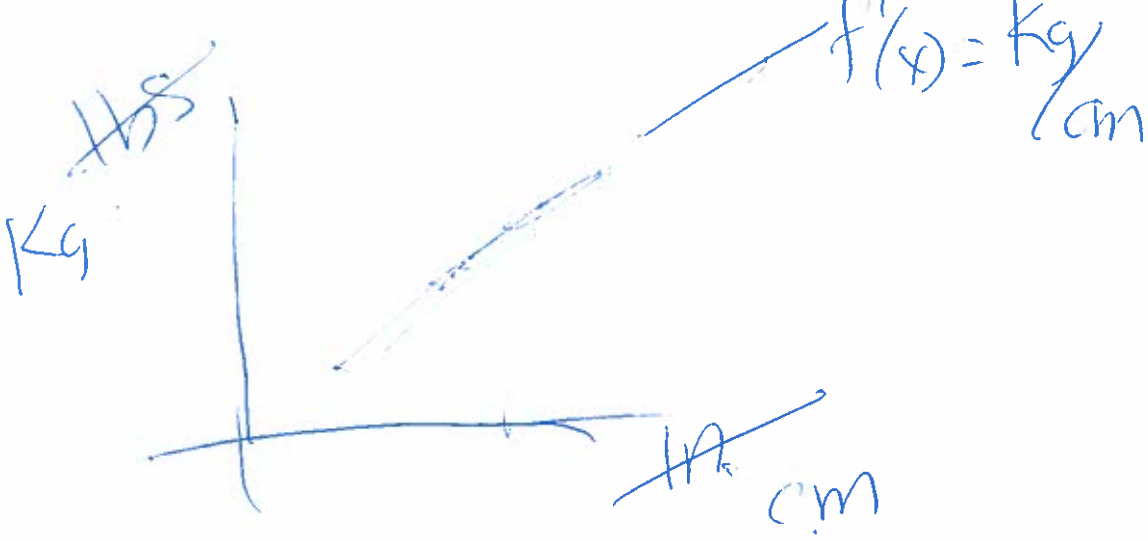
$$\sin(\pi/6) = .866$$

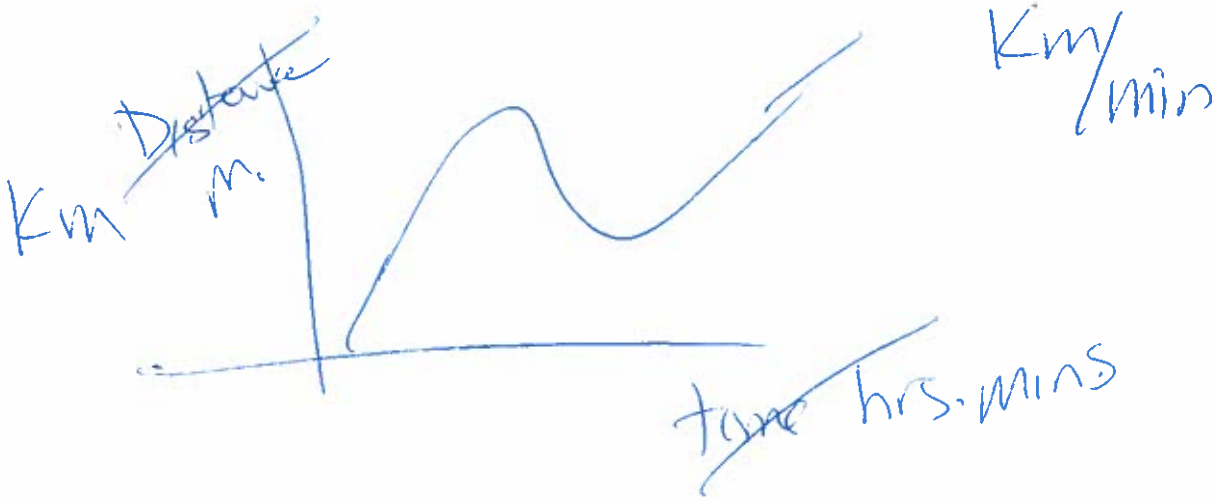
Ex $\frac{d}{dx}\left(\sqrt{x}\sin(\pi/6)\right) = \sin(\pi/6)\frac{d}{dx}\sqrt{x}$ ($\sqrt{x} = x^{1/2}$)

$\sin(\pi/6)\cdot\frac{1}{2}x^{-1/2}$

$$\frac{d}{dx}x^n = nx^{n-1}$$

Ex $\frac{d}{dx}\frac{5}{x^4} = \frac{d}{dx}5x^{-4} = -20x^{-4-1} = \frac{-20}{x^5}$


Kg
cm
f'(x) = Kg/cm


Km
Distance
m.
Km/min
time hrs. mins

Transformation of Functions

X	Y
2001	50000
2002	60000
203	70000

Exponential Regress.

Data overflow

Trans of Transcript

Input

2001
2002
2003

X	Y
1	5
2	6
3	7

50,000
60,000
70,000

STAT EDT

L1	L2
1	5
2	6
3	7

$Y_1 =$ [illegible] $(X - 2000) * 10{,}000$

X	Y
2001	50,000

$Y_2 = 1/(X - 2000) * 10{,}000$