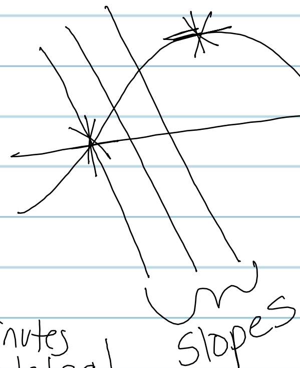
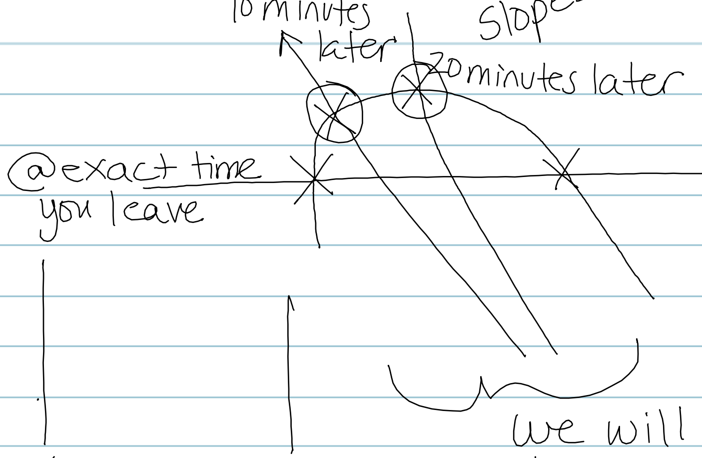
$\boxed{\text{Section 3.5}}$ Instantaneous rate of Δ

Example:



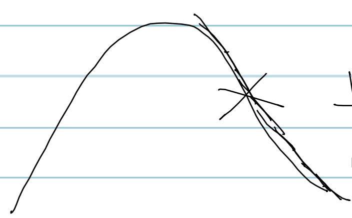
m = average rate of Δ (aka: secant) line



$\emptyset \longrightarrow 10$

$\lim\limits_{x \to 10}$

we will find each individual slope and then find how the value changes as closer to end



tangent line
(instantaneous rate of Δ)

Technical Formula we will be working with:

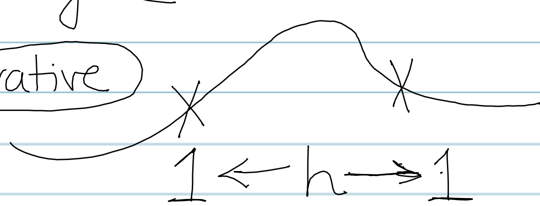
Instantaneous rate of change $\Big\{$ $\lim\limits_{h \to \emptyset} \dfrac{f(x+h)}{h}$

↓

first derivative

↓

$f'(x)$



* Average rate of Δ = average velocity (slope)

* Difference quotient aka: $\lim_{h \to \emptyset} \frac{f(x+h)-f(x)}{h}$
AKA
Instantaneous rate of Δ
AKA
Instantaneous velocity
(first derivative)

* Leibniz d notation

Example of uses:

instantaneous rate of Δ of (y) with respect to (x) $= f'(x) = \frac{dy}{dx} =$

$\lim_{h \to \emptyset} \frac{f(x+h)-f(x)}{h}$
(first derivative)

$\boxed{\text{HW Questions Review 3.5}}$

Pg 253 #2 Estimate $g'(7) = 5$ because both sides getting closer to 5.

Clue: $[7, 7+h]$ on right $(7+h)$

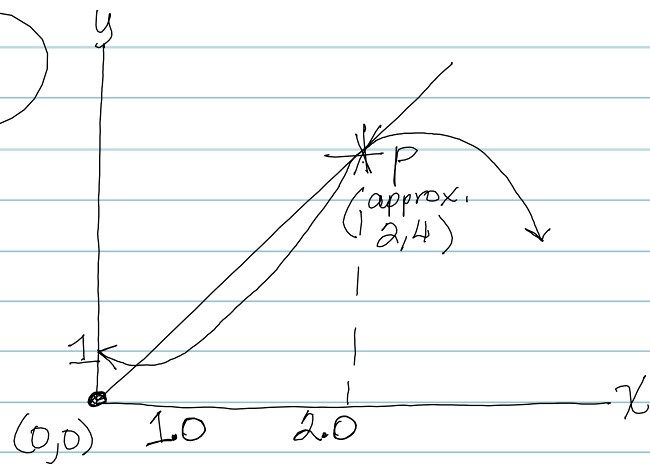
$[7th, 7]$ on left $(7+h)$

#4 Estimate $s'(\emptyset) = -.6$ b/c both approaching on right and left to $-.6$

\# Remember This

** First derivative represents the slope of the tangent line (red line on HW #13–#16) **

#14



$m = \frac{4}{2} = 2$

Same as $f'(2) = 2$

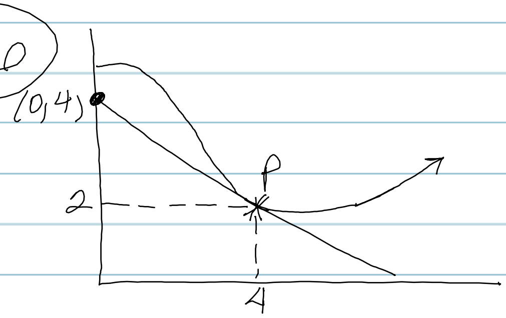
* If horizontal line = $y = C$

Slope always = $\emptyset$

* Vertical lines = $x = C$

Slope always und

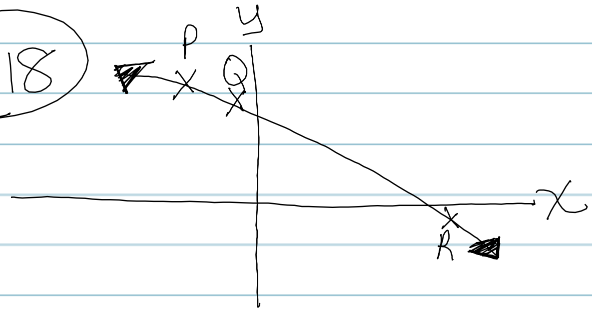
#16



$(\emptyset, 4)$
$(4, 2$ } then determine slope by finding

$\frac{\Delta y}{\Delta x} = \frac{-2}{4} = \boxed{-\frac{1}{2}}$

#18



$P = -\frac{1}{2}$

$Q = -2$

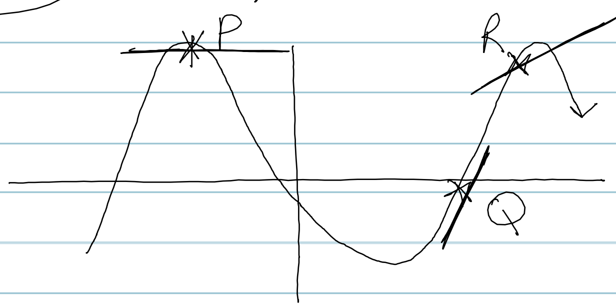
$R = -3$

Just to get an idea of how steep slopes are.

greatest slope = P because is largest of the slopes.

least slope = R

#26 a. ∅ b. 3 c. 1



P = ∅ flattest

Q = 3 Steepest

R = 1 b|c not as flat