

REVIEW 2.1-2.3 (OUTLINE)

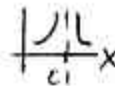
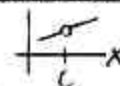
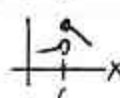
(1.3) FUNCTIONS)

(2.1) LIMITS

Using Tables, Graphs

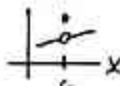
Using Algebra to Simplify

Using Direct Sub ("Plugging in if you can")

One-Sided Limits, Notation ($+$, $-$)Knowing when to write ∞ , $-\infty$, or DNE. $\lim_{x \rightarrow \infty}$ or $-\infty$ CONTINUITYDefinition of cont. at a point (at c).① $f(c)$ exists/is definedFailures② $\lim_{x \rightarrow c} f(x)$ exists

again

③ They're =.

Where is f discont.? Why?

(2.2) f' , THE DERIVATIVE OF f

Limit definition of f'

$$f'(x) = \lim_{h \rightarrow 0} \frac{f(x+h) - f(x)}{h} \quad (\text{Know and use!})$$

f' as slope (of tangent line) (+, 0, -)
instantaneous rate of change
marginal (2.3)

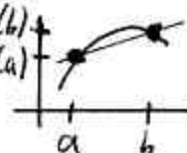
Notation (different types, like D_x , $\frac{d}{dx}$, etc.)

Evaluating $f'(9)$, for example. Notation such as $\left. \frac{df}{dx} \right|_{x=9}$

Finding Eqs. of Tangent Lines

Average Rate of Change of f from a to b

$$\begin{aligned} &= \text{Slope of secant line} : \frac{f(b) - f(a)}{b - a} \\ &= \frac{f(b) - f(a)}{b - a} \end{aligned}$$



(2.3) D_x SHORTCUTS

Rewrite $f(x)$ so it looks like a poly.
 Radical form $\Rightarrow$ Exponential form
 Ex $\sqrt{x} \Rightarrow x^{1/2}$

$$D_x(\text{constant}) = 0$$

$$D_x(x^n) = nx^{n-1} \quad (\text{Power Rule})$$

Linearity
 Can D_x term-by-term
 Constant factors pop out.

Rewriting answers using only "+" exponents
 or radical form.

Evaluating $f'(9)$, for example.

Marginals

Word Problems

Interpreting answers (including marginals)

Units, of rate^{incl. units} of change: $\frac{y}{x} \times \frac{y \text{ units}}{x \text{ units}}$
 (say, f')

$$P = R - C \quad (\text{Profit} = \text{Revenue} - \text{Cost})$$