

Derivatives ch #3

(3.1)

① Slope of a curve: $\lim_{h \rightarrow 0} \frac{f(x_0 + h) - f(x_0)}{h}$

a- Find slope of curve $y = \frac{1}{x}$ at $x = a$; $a \neq 0$. What is the slope at $x = -1$?

$$\lim_{h \rightarrow 0} \frac{f(x_0 + h) - f(x_0)}{h}$$

$$= \lim_{h \rightarrow 0} \left(\frac{\frac{1}{a+h} - \frac{1}{a}}{h} \right)$$

$$= \lim_{h \rightarrow 0} \frac{a - a - h}{ah(a+h)}$$

$$= \lim_{h \rightarrow 0} \frac{-h}{ah(a+h)} = \lim_{h \rightarrow 0} \frac{1}{-a(a+h)} = -\frac{1}{a^2}$$

b) $m = \frac{-1}{(-1)^2} = -1$

$$\lim_{h \rightarrow 0} \frac{f(x_0 + h) - f(x_0)}{h}$$

· Probs: Q # 5-22 (All examples)

→ slope of a graph

→ Rate of Change of $f(x)$ w.r.t to x

→ Derivative of $f(x)$

→ slope of tangent line

3.2