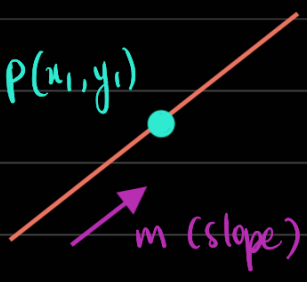
Point Slope Form

$$y = m(x - x_1) + y_1$$



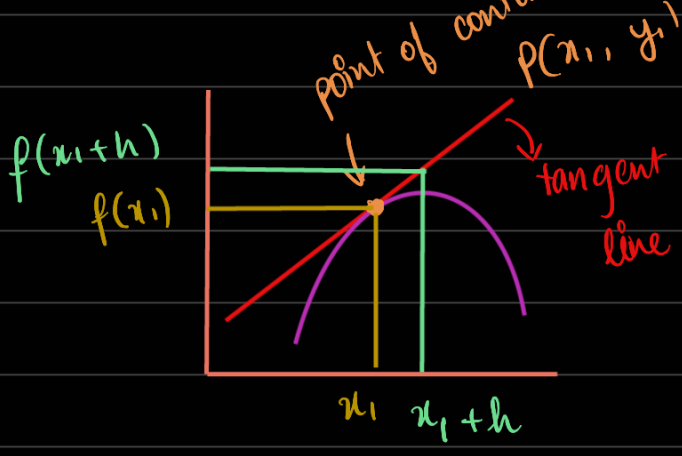
Slope Intercept Form

m, y-intercept $(0, b)$

$$y = mx + b$$

$$\text{Slope} = \frac{y_2 - y_1}{x_2 - x_1}$$

↳ when only two points are given



$y_2 \Rightarrow f(x_1 + h)$ $\qquad$ $y_1 \Rightarrow f(x_1)$

$$\therefore \text{slope} = \frac{f(x_1 + h) - f(x_1)}{(x_1 + h) - (x_1)}$$

$$= \frac{f(x_1 + h) - f(x_1)}{h} \Rightarrow \text{Rate of change of function at the point}$$

As the value of h decreases, the secant line becomes the tangent line.

Slope of tangent line

$$\lim_{h \to 0} \frac{f(x_1 + h) - f(x_1)}{h}$$

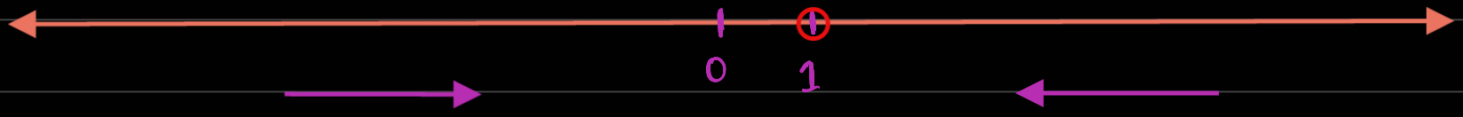
Limit & Limit Laws

Consider the function

$$f(x) = \frac{x^3 - 1}{x - 1}$$

Domain = All real numbers except 1

OR $\mathbb{R} - \{1\}$



1. $\lim_{x \to 1} \frac{x^3 - 1}{x - 1}$

x	0.75	0.9	0.99	0.999	1	1.001	1.01	1.1	1.25
$f(x)$	2.313	2.71	2.97	2.997	?	3.003	3.03	3.31	3.813

$\lim_{\substack{x \to 1 \\ x < 1}} f(x)$ $\qquad$ $\lim_{x \to 1^-} f(x) = 3$

$\lim_{\substack{x \to 1 \\ x > 1}} f(x)$ $\qquad$ $\lim_{x \to 1^+} f(x) = 3$

DEFINITIONS

* If a function $f(x)$ would want to become a number L as x approaches c both from left and right, we say that $\lim$