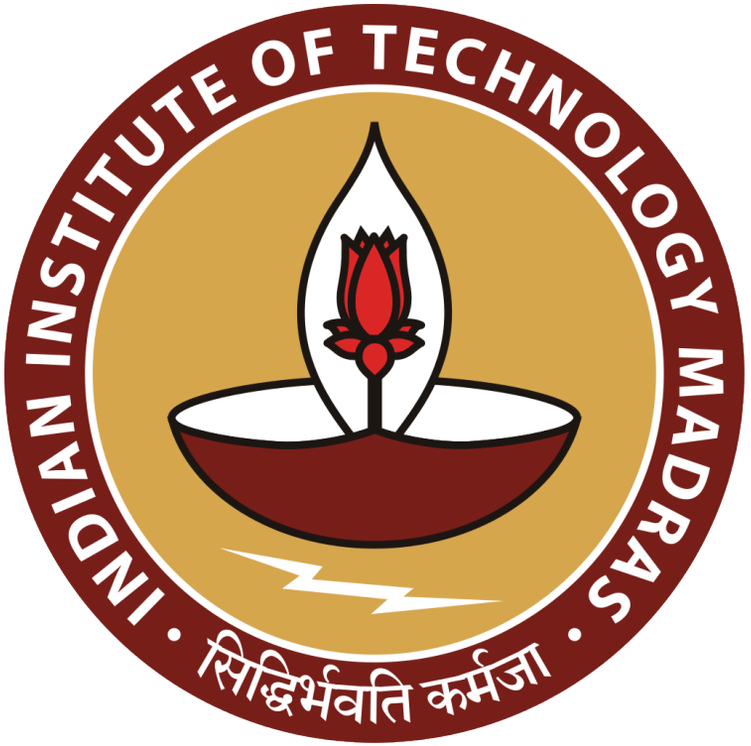


IIT Madras

ONLINE DEGREE

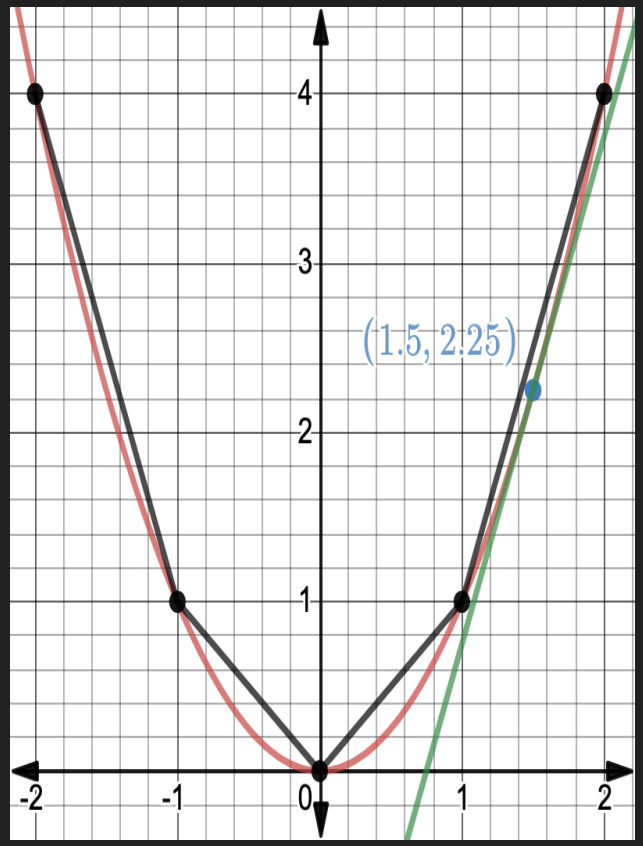
Slope of a quadratic function

Given a quadratic function, $f(x) = ax^2 + bx + c$, where $a \neq 0$, how to determine the slope of f?

Let $y = x^2$ be a quadratic function given.

Let us tabulate the ordered pairs

x_i	y_i	$y_i - y_{i-1}$
-2	4	
-1	1	-3
0	0	-1
1	1	1
2	4	3



The slope of $f(x) = x^2$ is $2x$.

Slope of a quadratic function

Given a quadratic function, $f(x) = ax^2 + bx + c$, where $a \neq 0$, how to determine the slope of f?

x_i	y_i	$y_i - y_{i-1}$	
-2	$4a - 2b + c$		
-1	$a - b + c$	$-3a + b$	
0	c	$-a + b$	$2a$
1	$a + b + c$	$a + b$	$2a$
2	$4a + 2b + c$	$3a + b$	$2a$

From the table, it is clear that the slope of $f = 2ax + b$.

Also note that, the slope denotes the rate of change of y with respect to x.
Hence, slope =0 means the function has either maximum or minimum which happens when $2ax + b = 0$. That is, $x = -b/(2a)$.