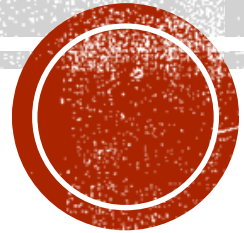
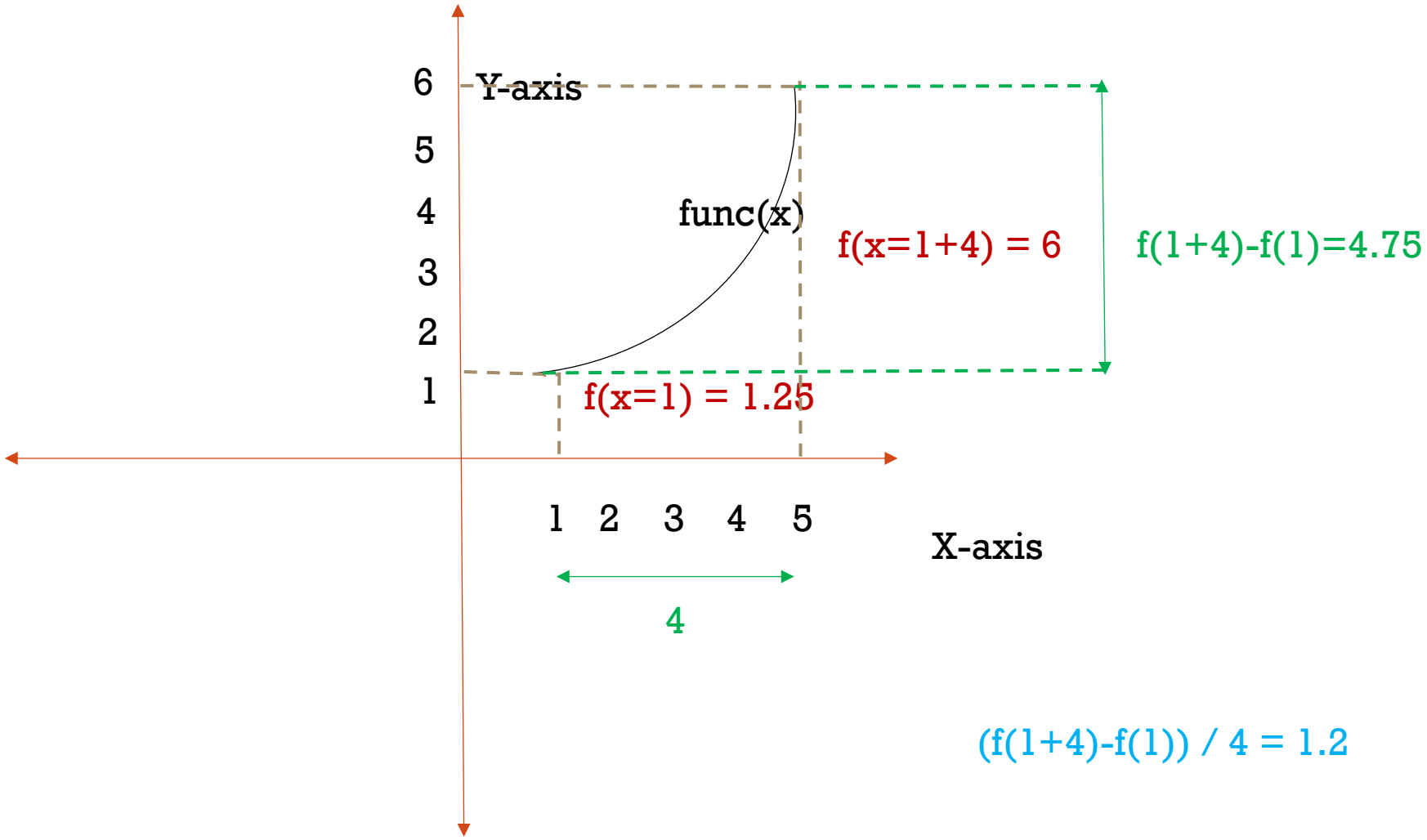
بسم الله الرحمن الرحيم

DERIVATIVE | SLOPE | GRADIENT

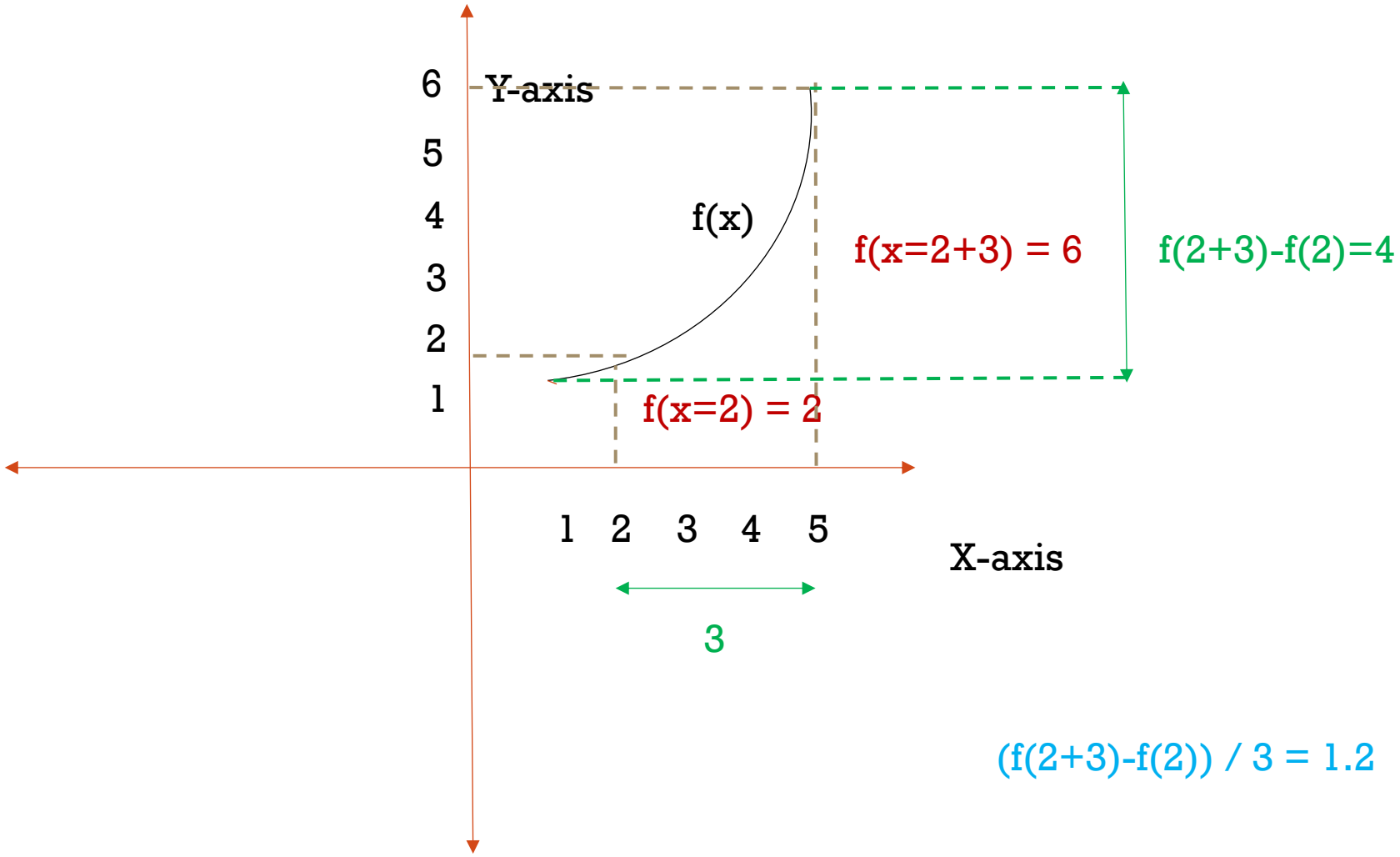


X: 0 | 2 | 4 | 6

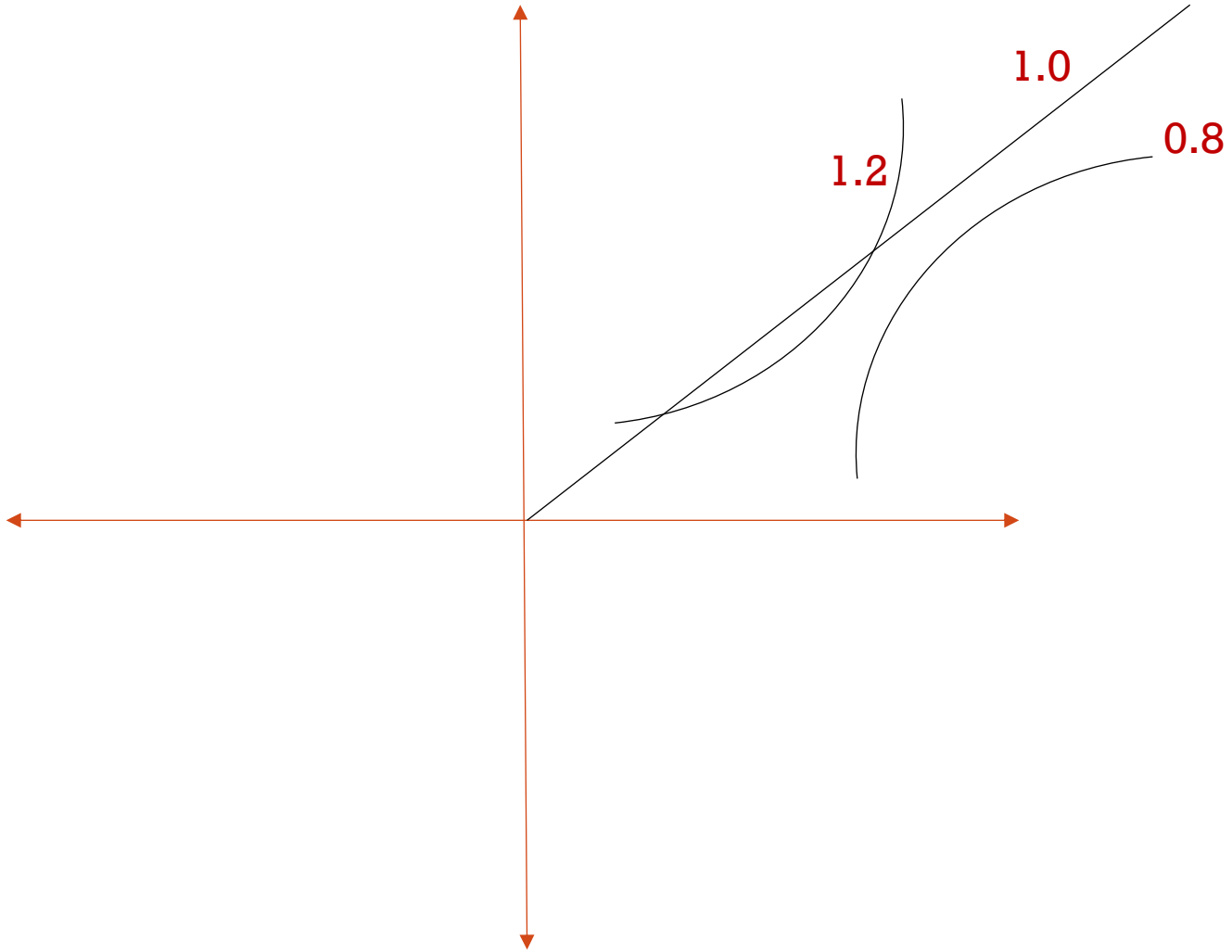
	0%	50%	100%	150%
Y:	0.0	0.5	1.0	1.5



(f(1+4)-f(1)) / 4 = 1.2

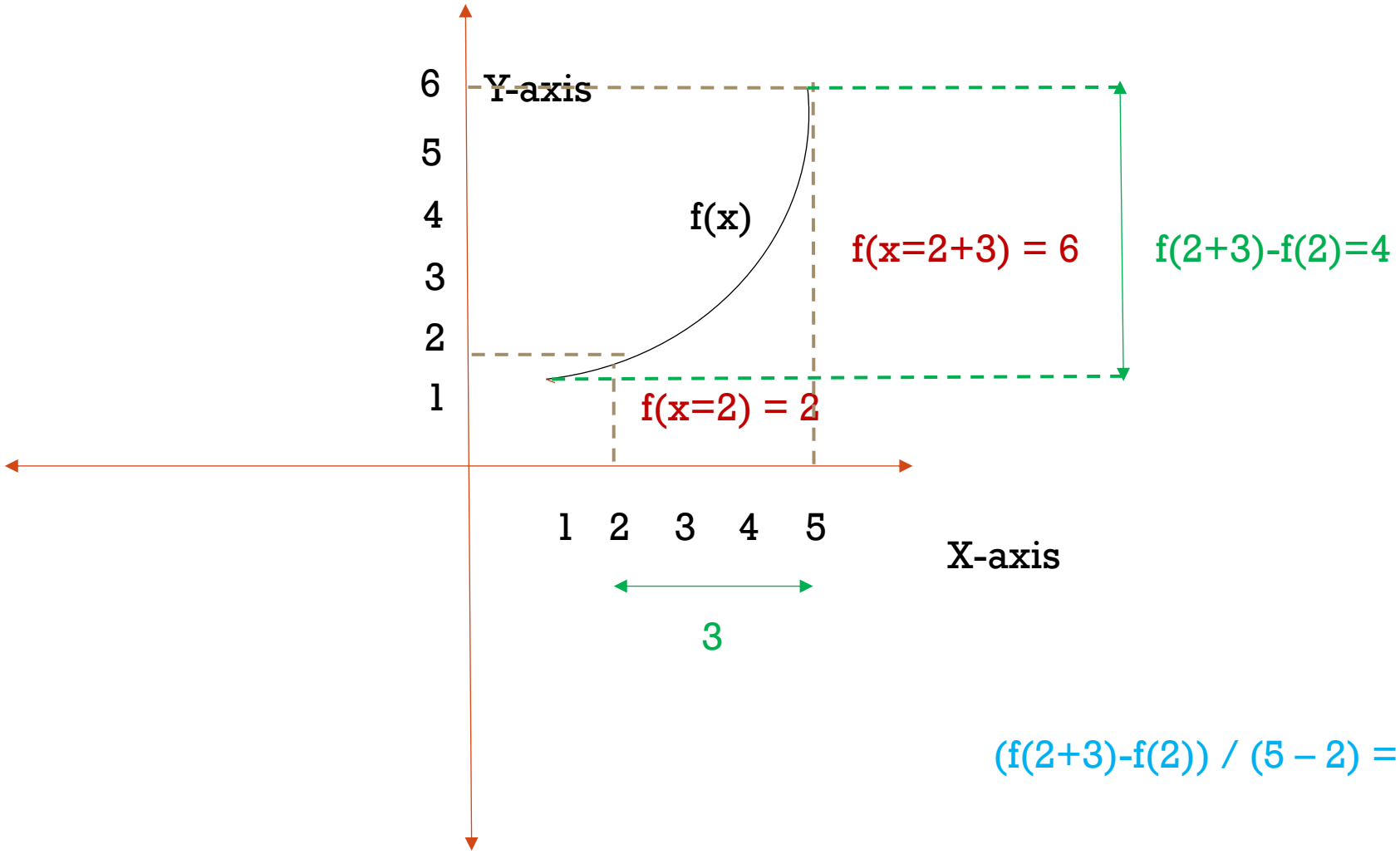


(f(2+3)-f(2)) / 3 = 1.2



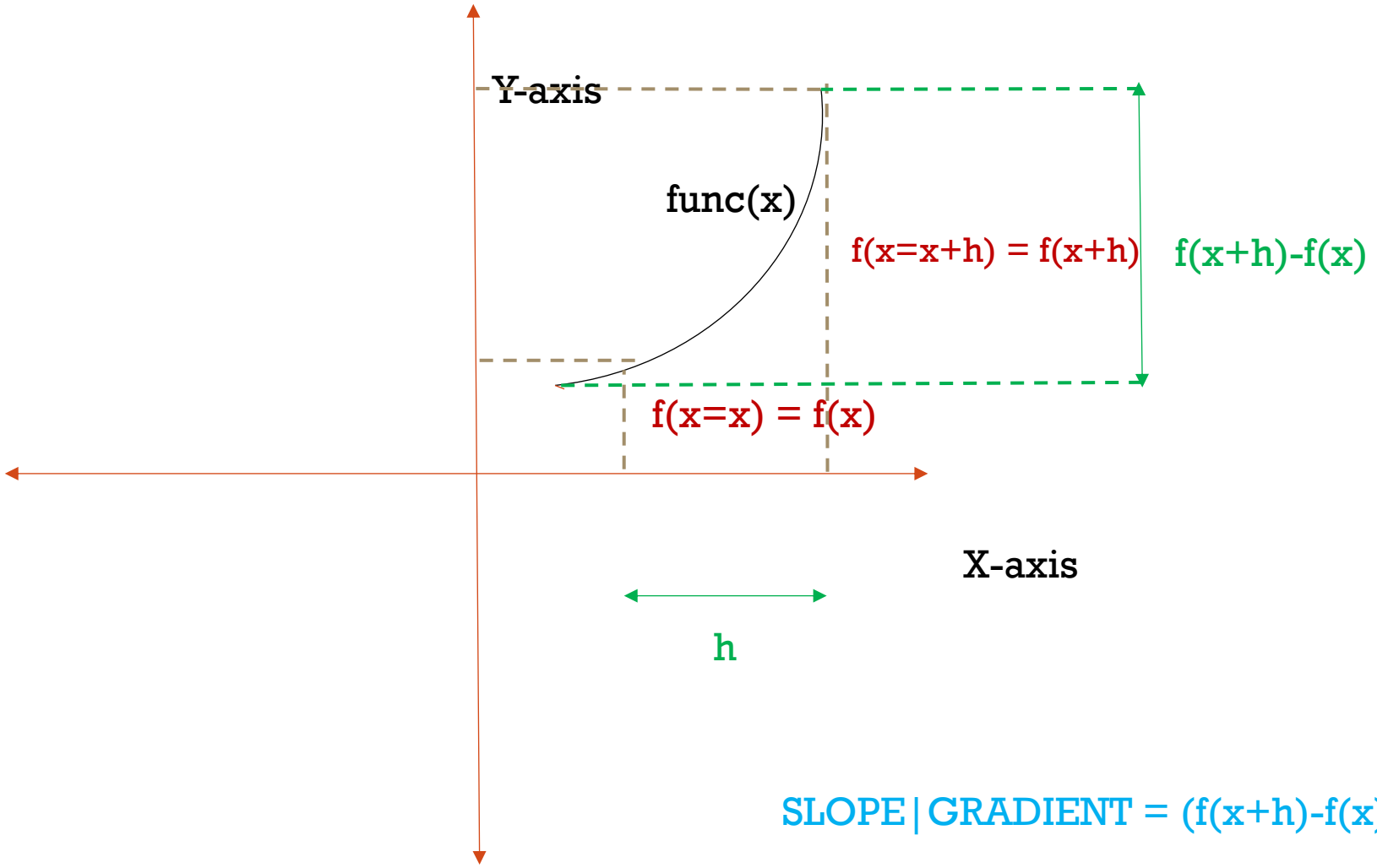
Derivative | Slope | Gradient

م. يوسف مجدي



(f(2+3)-f(2)) / (5 – 2) = 1.2

LET's GENERALIZE



SLOPE | GRADIENT = (f(x+h)-f(x)) / h

GRADIENT

- If we changed the function with some ‘h’, how will the output change

$$\frac{f(x+h)-f(x)}{h}$$

$$f(x) = 2 * x + 4$$

$$\frac{f(x+h) - f(x)}{h}$$

f(x+h) = 2 * (x+h) + 4

(f(x+h) – f(x)) / h

(2*(x+h) + 4 – (2*x+4)) / h

(~~2*x~~ + 2*h + 4 – ~~2*x~~ – 4) / h

df/dx = 2*h / h = 2 Differentiating f with respect to x

f(a, b, c) = a * b + c

$$\frac{f(x+h) - f(x)}{h}$$

f(a+h, b, c) = (a+h) * b + c

(f(a+h, b, c) – f(a, b, c)) / h

((a+h) * b + c – (a*b + c)) / h

(~~a*b~~ + h*b + ~~c~~ – ~~a*b~~ – ~~c~~) / h

df/da = h*b / h = b

Differentiating f with respect to a

NEXT...Backpropagation