

# intro to mathematics in software engineering

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April 14, 2025

# objectives

scary looking functions

math related software engineering concepts

translate math to programming

# fundamentals of mathematical and function notation

$$f(x) = x^2$$

# fundamentals of mathematical and function notation

$$a \cdot f(x)$$

$$f(x/b)$$

$$f(x - c)$$

$$f(x) + d$$

# fundamentals of mathematical and function notation

$a \cdot f(x) \Rightarrow$  multiplies the y-value by  $a$

$f(x/b) \Rightarrow$  multiplies the x-value by  $b$

$f(x - c) \Rightarrow$  shifts graph  $c$  units to the right

$f(x) + d \Rightarrow$  shifts graph  $d$  units upward

breaking down a scary looking function

$$g(x) = \frac{4}{\pi} \sum_{n=1}^{\infty} \frac{\sin(2\pi(2n-1)ft)}{2n-1}$$

(where  $t$  = time,  $f$  = frequency,  $n$  = iterations)

breaking down a scary looking function

$$g(x) = \frac{4}{\pi} \sum_{n=1}^{\infty} \frac{\sin(2\pi(2n-1)ft)}{2n-1}$$

we are dealing with a function built from multiple  
smaller functions added together

breaking down a scary looking function

$$g(x) = \frac{4}{\pi} \sum_{n=1}^{\infty} \frac{\sin(2\pi(2n-1)ft)}{2n-1}$$

the *sin* on the inside suggests we are dealing with  
waves or oscillations



breaking down a scary looking function

$$g(x) = \frac{4}{\pi} \sum_{n=1}^{\infty} \frac{\sin(2\pi(2n-1)ft)}{2n-1}$$

denominator  $2n-1$  hints that terms get smaller as  $n$  increases - later terms have less influence

breaking down a scary looking function

$$g_1(t) = \frac{4}{\pi} \cdot \frac{\sin(2\pi(2(1) - 1)ft)}{2(1) - 1}$$

$$= \frac{4}{\pi} \cdot \frac{\sin(2\pi(1)ft)}{1}$$

$$= \frac{4}{\pi} \cdot \sin(2\pi ft)$$

$$g_1(t) = \frac{4}{\pi} \sin(2\pi ft)$$

breaking down a scary looking function

