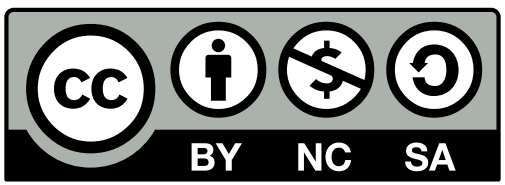
# Lambda Calculus

## Now you can bring a computer to your tests!

Vincent Macri

William Lyon Mackenzie C.I. Math Club






# Table of Contents



# What is lambda calculus?
## Introduction

- Created by Alonzo Church

# What is lambda calculus?
## Introduction

- Created by Alonzo Church
- A way of representing pure mathematical functions

# What is lambda calculus?
## Introduction

- Created by Alonzo Church
- A way of representing pure mathematical functions
- Can represent any computer program

# What is lambda calculus?
## Introduction

- Created by Alonzo Church
- A way of representing pure mathematical functions
- Can represent any computer program
- Equivalent to Turing machines

In math class, we would define a function that accepts an argument $x$ and outputs $x + 1$ as so:

$$f(x)$$

In math class, we would define a function that accepts an argument $x$ and outputs $x + 1$ as so:

$$f(x) = x + 1$$

In math class, we would define a function that accepts an argument $x$ and outputs $x + 1$ as so:

$$f(x) = x + 1$$

In lambda calculus, we do it like this:

$$\lambda$$

In math class, we would define a function that accepts an argument $x$ and outputs $x + 1$ as so:

$$f(x) = x + 1$$

In lambda calculus, we do it like this:

$$\lambda x$$

In math class, we would define a function that accepts an argument $x$ and outputs $x + 1$ as so:

$$f(x) = x + 1$$

In lambda calculus, we do it like this:

$$\lambda x.$$

In math class, we would define a function that accepts an argument $x$ and outputs $x + 1$ as so:

$$f(x) = x + 1$$

In lambda calculus, we do it like this:

$$\lambda x.x + 1$$

In math class, we would define a function that accepts an argument $x$ and outputs $x + 1$ as so:

$$f(x) = x + 1$$

In lambda calculus, we do it like this:

$$\lambda x.x + 1$$

If we wanted to find $4 + 1$, we could do this:

$$f(4) = 4 + 1 = 5$$

In math class, we would define a function that accepts an argument $x$ and outputs $x + 1$ as so:

$$f(x) = x + 1$$

In lambda calculus, we do it like this:

$$\lambda x.x + 1$$

If we wanted to find $4 + 1$, we could do this:

$$f(4) = 4 + 1 = 5$$

In lambda calculus, we do this:

$$(\lambda x.x + 1)4 = 4 + 1 = 5$$

In math class, we would define a function that accepts an argument $x$ and outputs $x + 1$ as so:

$$f(x) = x + 1$$

In lambda calculus, we do it like this:

$$\lambda x.x + 1$$

If we wanted to find $4 + 1$, we could do this:

$$f(4) = 4 + 1 = 5$$

In lambda calculus, we do this:

$$(\lambda x.x + 1)4 = 4 + 1 = 5$$

You can think of $\lambda$ as $f$, and . as $=$.