
Part 3 of the Fundamental Theorem of Calculus
Class 11: Friday February 21

THE FUNDAMENTAL THEOREM OF CALCULUS (PART THREE)

Theorem: For any continuous function $f(x)$ the solution of the initial value problem

$$y'(x) = f(x), \quad y(a) = b$$

can be written as $F(x) = \int_a^x f(t)dt + b$

Recall that the solution of an initial value problem is a _____, not a number.

The solution function has to have the property that its derivative obeys **the rate equation** and **the initial condition**.

GroupWork Use the Fundamental Theorem of Calculus to find the solution of the following...

1. $y' = 2, y(0) = 3$

2. $y' = 2, y(1) = 3$

3. $y' = 2^t, y(1) = 4$

4. $y' = \cos(t), y(\pi/2) = -1$

5. $y' = \sin(t^2), y(\pi/2)$