

Applying the FTC:

(Notes, not
the worksheet)

e.g. $F(x) = \int_3^x \sin^2(t) dt$

Find $F'(x)$.

$$F'(x) = \frac{d}{dx} \int_3^x \sin^2(t) dt$$

$\sin^2(x)$

$$F(x) = \int_x^5 e^{t^2} dt$$

Find $F'(x)$. Rewrite.

$$\frac{d}{dx} F(x) = \frac{d}{dx} - \int_5^x e^{t^2} dt$$

$$\underline{F'(x) = -e^{x^2}}$$

Applying the FTC with the chain rule:

$$F(x) = \int_3^{x^2} \sin(t) dt$$

Find $F'(x)$.

$$\frac{d}{dx} F(x) = \frac{d}{dx} \int_3^{x^2} \sin(t) dt$$

$$F'(x) = \sin(x^2) 2x$$

$$2x \cdot \sin(x^2)$$

$$F(x) = \int_x^{x^2} e^t dt$$
$$\int_x^{x^2} e^t dt = \int_a^{x^2} e^t dt + \int_a^x e^t dt$$
$$= \int_a^{x^2} e^t dt + \int_a^x e^t dt$$

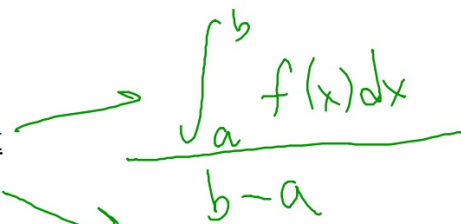
Average Value:

(Notes)

How do you take the average of 5 items?

Average: $\frac{\text{sum of the things}}{\text{number of things}}$

Average: $\frac{\text{sum of the set}}{\text{size of the set}}$

$$\frac{\int_a^b f(x) dx}{b-a}$$


The diagram shows two green arrows. One arrow points from the text 'sum of the set' to the integral $\int_a^b f(x) dx$ in the formula. The other arrow points from the text 'size of the set' to the denominator $b-a$ in the formula.

Average Value Formula: (add to notes + booklet)

The average value (output, y-value, etc.) of a function on an interval $[a,b]$ is

$$\underbrace{\frac{1}{b-a}}_{\text{size of the set}} \underbrace{\int_a^b f(x) dx}_{\text{sum of set from a to b}}$$

ex: Consider all the values $f(x) = 25x - x^3$ takes on from 0 to 3. What is the average of all infinity of these things?

Find the average value of $25x - x^3$ over the interval $[0, 3]$

$$\frac{1}{3-0} \int_0^3 25x - x^3 dx$$



Comment

Average value has a geometric interpretation that we will see on Wed.
[Average value....MEAN value....the MVT returns!!!]

Group Work

p.AP4 (comes after p 316)

Group 1: Problem 6

Group 2: 2002AB2

Group 3: Problem 7

Group 4: Problem 2

Group 5: Problem 3

- Send 1 person to back table to get paper, markers

- Do the math together on the big paper even if it is messy.