

Heart and Soul of Calculus Fundamental Theorems of Calculus 5.3

Lesson 297 | Calculus AB | Fundamental theorem of calculus

<https://www.youtube.com/watch?v=mCtfxE0yLCM>

Original practice aligned to the saved video title.

Name: _____ Date: _____ Show your reasoning.

01 Let $F(x) = \int_8^{x^2} (10t^2 + 5) dt$. Find $F'(x)$.

02 Let $F(x) = \int_5^{x^2} (7t^2 + 7) dt$. Find $F'(x)$.

03 Let $F(x) = \int_4^{x^2} (9t^2 + 6) dt$. Find $F'(x)$.

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04

Let $F(x) = \int_{4-x^2}^{x^2} (11t^2 + 6) dt$. Find $F'(x)$.

05

Let $F(x) = \int_{13-x^2}^{x^2} (12t^2 + 4) dt$. Find $F'(x)$.

06

Let $F(x) = \int_{3-x^2}^{x^2} (5t^2 + 7) dt$. Find $F'(x)$.

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01

Let $F(x) = \int \text{from } 8 \text{ to } x^2 \text{ of } (10t^2 + 5) \, dt$. Find $F'(x)$.

FTC with chain rule: evaluate the integrand at x^2 and multiply by $(x^2)' = 2x$.
 $F'(x) = (10x^4 + 5)2x = 20x^5 + 10x$.

02

Let $F(x) = \int \text{from } 5 \text{ to } x^2 \text{ of } (7t^2 + 7) \, dt$. Find $F'(x)$.

FTC with chain rule: evaluate the integrand at x^2 and multiply by $(x^2)' = 2x$.
 $F'(x) = (7x^4 + 7)2x = 14x^5 + 14x$.

03

Let $F(x) = \int \text{from } 4 \text{ to } x^2 \text{ of } (9t^2 + 6) \, dt$. Find $F'(x)$.

FTC with chain rule: evaluate the integrand at x^2 and multiply by $(x^2)' = 2x$.
 $F'(x) = (9x^4 + 6)2x = 18x^5 + 12x$.

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04

Let $F(x) = \int \text{from } 4 \text{ to } x^2 \text{ of } (11t^2 + 6) \, dt$. Find $F'(x)$.

FTC with chain rule: evaluate the integrand at x^2 and multiply by $(x^2)' = 2x$.
 $F'(x) = (11x^4 + 6)2x = 22x^5 + 12x$.

05

Let $F(x) = \int \text{from } 13 \text{ to } x^2 \text{ of } (12t^2 + 4) \, dt$. Find $F'(x)$.

FTC with chain rule: evaluate the integrand at x^2 and multiply by $(x^2)' = 2x$.
 $F'(x) = (12x^4 + 4)2x = 24x^5 + 8x$.

06

Let $F(x) = \int \text{from } 3 \text{ to } x^2 \text{ of } (5t^2 + 7) \, dt$. Find $F'(x)$.

FTC with chain rule: evaluate the integrand at x^2 and multiply by $(x^2)' = 2x$.
 $F'(x) = (5x^4 + 7)2x = 10x^5 + 14x$.