

Watch. Practice. Understand. | Lesson 297

Heart and Soul of Calculus Fundamental Theorems of Calculus 5.3

Watch the matching video: <https://www.youtube.com/watch?v=mCtfxE0yLCM>

Practice focus: Fundamental theorem of calculus

Original extra practice matched to the listed lesson topic.

Name: _____ Date: _____ Show your reasoning and check units.

01 If $F(x)$ is the integral of t^2+1 from 0 to x , find $F'(x)$.

02 If $G(x)$ is the integral of $\sin t$ from 1 to x^2 , find $G'(x)$.

03 Evaluate the integral of $|x|$ from -2 to 3.

04 If $H(x)$ is the integral of e^t from x to 2, find $H'(x)$.

Worked answers | Lesson 297

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01 If $F(x)$ is the integral of t^2+1 from 0 to x , find $F'(x)$.

FTC Part I: $F'(x)=x^2+1$.

02 If $G(x)$ is the integral of $\sin t$ from 1 to x^2 , find $G'(x)$.

FTC and chain rule: $G'(x)=\sin(x^2)\cdot 2x$.

03 Evaluate the integral of $|x|$ from -2 to 3.

Split at 0: integral of $-x$ from -2 to 0 is 2; integral of x from 0 to 3 is $9/2$. Total $13/2$.

04 If $H(x)$ is the integral of e^t from x to 2, find $H'(x)$.

Reverse the limits: $H'(x)=-e^x$.