

Calculus Integration by Using U-Substitution

Lesson 302 | Calculus AB | Integration by substitution

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

Original practice aligned to the saved video title.

Name: _____ Date: _____ Show your reasoning.

01

Find an antiderivative of $256 \cdot x^3 + 448 \cdot x$.

02

Find an antiderivative of $126 \cdot x \cdot (9 \cdot x^2 + 5)^6$.

03

Find an antiderivative of $576 \cdot x^3 + 432 \cdot x$.

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04

Find an antiderivative of $155520 \cdot x \cdot (2 \cdot x^2 + 1)^4$.

05

Find an antiderivative of $104 \cdot x \cdot (13 \cdot x^2 + 2)^3$.

06

Find an antiderivative of $182 \cdot x \cdot (13 \cdot x^2 + 7)^6$.

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01 Find an antiderivative of $256 \cdot x^3 + 448 \cdot x$.

Substitute $u=8x^2+14$, so $du=16x \, dx$; integrate the resulting power of u . An antiderivative is $4 \cdot (4 \cdot x^2 + 7)^2 + C$. Differentiate to check.

02 Find an antiderivative of $126 \cdot x \cdot (9 \cdot x^2 + 5)^6$.

Substitute $u=9x^2+5$, so $du=18x \, dx$; integrate the resulting power of u . An antiderivative is $(9 \cdot x^2 + 5)^7 + C$. Differentiate to check.

03 Find an antiderivative of $576 \cdot x^3 + 432 \cdot x$.

Substitute $u=12x^2+9$, so $du=24x \, dx$; integrate the resulting power of u . An antiderivative is $9 \cdot (4 \cdot x^2 + 3)^2 + C$. Differentiate to check.

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04

Find an antiderivative of $155520 \cdot x \cdot (2 \cdot x^2 + 1)^4$.

Substitute $u=12x^2+6$, so $du=24x \, dx$; integrate the resulting power of u . An antiderivative is $7776 \cdot (2 \cdot x^2 + 1)^5 + C$. Differentiate to check.

05

Find an antiderivative of $104 \cdot x \cdot (13 \cdot x^2 + 2)^3$.

Substitute $u=13x^2+2$, so $du=26x \, dx$; integrate the resulting power of u . An antiderivative is $(13 \cdot x^2 + 2)^4 + C$. Differentiate to check.

06

Find an antiderivative of $182 \cdot x \cdot (13 \cdot x^2 + 7)^6$.

Substitute $u=13x^2+7$, so $du=26x \, dx$; integrate the resulting power of u . An antiderivative is $(13 \cdot x^2 + 7)^7 + C$. Differentiate to check.