

4.5 Integration Techniques: Substitution

Integration by substitution can simplify a more difficult integrand and reducing some of the “guess and check” work.

Example 1 Find the derivative of $2(3x^2 - 7)^5$, and then find the anti-derivative of your answer.

Example 2 Find the indefinite integral $\int 2x^2(5x^3 + 8)^{-4} dx$

Example 3 Evaluate $\int \frac{20}{3x+5} dx$

Example 4 Evaluate $\int_1^3 3x \sqrt{5x^2 - 1} dx$

Example 5 Evaluate $\int_4^8 \frac{6x-9}{x^2-3x-1} dx$

Example 6 Evaluate $\int 2x\sqrt{x+1} dx$

Example 7 Find the indefinite integral $\int (1-x)e^{3x^2-6x+2} dx$.