

1. Use Part 1 of the Fundamental Theorem of Calculus to find the derivative of each integral expression.

a. $\int_{x^3}^5 \frac{\cos(t)}{t^2+2} dt$

b. $\int_{\sin(x)}^{\cos(x)} t^2 dt$

c. $\int_{x^3}^{x^5} \cos(5t) dt$

2. Use Part 2 of the Fundamental Theorem of Calculus to evaluate each integral.

a. $\int_{\frac{\pi}{6}}^{\frac{5\pi}{6}} \csc^2(\theta) d\theta$

b. $\int_{\frac{1}{3}}^5 \left(4 + \frac{1}{x}\right) dx$

c. $\int_1^2 (4x^{-5} - 5x^4) dx$

d. $\int_4^9 \frac{t-3}{\sqrt{t}} dt$

e. $\int_0^4 \frac{1-\sqrt{u}}{\sqrt{u}} du$

3. Find each indefinite integral.

a. $\int x \cos(2x^2) dx$

b. $\int \frac{9r^2 dr}{\sqrt{1-r^3}}$

c. $\int \frac{dx}{\sin^2(3x)}$

d. $\int \frac{\sin(2t+1)}{\cos^2(2t+1)} dt$

e. $\int \sqrt{\tan(x)} \sec^2(x) dx$

f. $\int \frac{dx}{\cot(3x)}$

g. $\int \sec^4(x) dx$

h. $\int \frac{dx}{x \ln(x)}$

4. Evaluate each definite integral.

a. $\int_0^{\pi/4} \tan^2(x) \sec^2(x) dx$

b. $\int_{-1}^3 \frac{x dx}{x^2+1}$

c. $\int_0^1 \sqrt{t^5 + 2t}(5t^4 + 2) dt$

d. $\int_0^2 \frac{e^x dx}{3+e^x}$

e. $\int_1^4 \frac{dx}{\sqrt{x}(\sqrt{x}+1)^3}$