

W02 Regular

Due date: Sunday 1/25, 11:59pm

01 ★

🔗 All odd power product

Compute the integral:

$$\int \cos^7 x \, dx$$

✍ Tangent and secant mixed parity

Compute the integral:

$$\int \tan^3 x \sec^2 x \, dx$$

- (a) Using $du = \sec^2 x \, dx$.
- (b) Using $du = \sec x \tan x \, dx$.

✍ Power product with negative power

Compute the integral:

$$\int \sin 7x \sec^5 7x \, dx$$

 Trig sub

Compute the integral:

$$\int \frac{dx}{x^3 \sqrt{x^2 - 4}}$$

✍ Trig sub

Compute the integral:

$$\int \frac{dx}{\sqrt{x^2 + 4x + 13}}$$

Hint: complete the square and then substitute.

 Trig sub

Compute the integral:

$$\int \frac{x^2}{(x^2 + 1)^{3/2}} dx$$

🔗 **Double sub:** u -sub then trig sub

Compute the definite integral:

$$\int_0^{\pi/2} \frac{\cos x}{\sqrt{1 + \sin^2 x}} dx$$

✍ Trig sub for electric charge

A charged wire lies on the x -axis running from x_1 to x_2 . The electric field at the point $p = (0, h)$ is given by:

$$E = \int_{x_1}^{x_2} \frac{k\lambda h}{(x^2 + h^2)^{3/2}} dx$$

Find the numerical value of E assuming $\lambda = 6.0 \times 10^{-4}$ and $k = 8.99 \times 10^9$ and $h = 3$ and $(x_1, x_2) = (-15, 15)$.