Fundamental Theorem of Calculus

- Use Part 1 of the Fundamental Theorem of Calculus to find the derivative of the function.

$$y = \int_0^{x^4} \cos^2 \theta \, d\theta$$

- Find the derivative of the function.

$$g(x) = \int_{2x}^{3x} \frac{u^2 - 1}{u^2 + 1} \, du$$

Net Change Theorem

- Verify by differentiation that the formula is correct.

$$\int \cos^2 x \, dx = \frac{1}{2}x + \frac{1}{4}\sin 2x + C$$

- Evaluate the integral.

$$\int_1^2 \left(x + \frac{1}{x} \right)^2 dx$$

- The velocity function (in meters per second) is given for a particle moving along a line. Find (a) the displacement, (b) the distance traveled by the particle during the given time interval, and (c) the acceleration at 3 seconds.
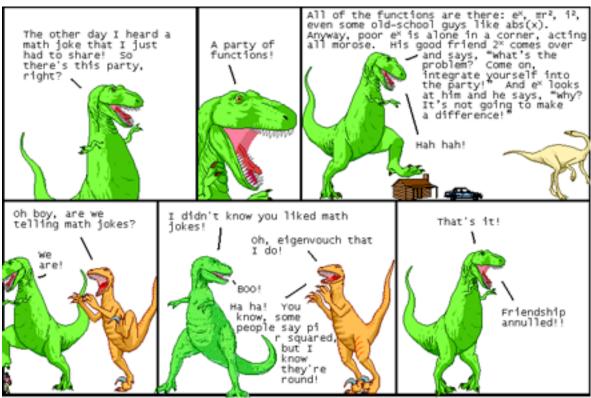
$$v(t) = 3t - 5, \ 0 \le t \le 3$$

Substitution Rule

- Evaluate the indefinite integral.

  1. $\displaystyle\int \sqrt{\cot x}\, \csc^2 x \; dx$

  2. $\displaystyle\int x(2x + 5)^8 \; dx$

- If f is continuous and $\displaystyle\int_0^4 f(x)\; dx = 10$, find $\displaystyle\int_0^2 f(2x)\; dx$.