Table for Exam 2, Math 126, Fall 2025

$$\sin^2(x) + \cos^2(x) = 1 \qquad \tan^2(x) + 1 = \sec^2(x)$$

$$\sin(2x) = 2\sin(x)\cos(x) \qquad \cos(2x) = \cos^2(x) - \sin^2(x)$$

$$\sin^2(x) = \frac{1}{2}(1 - \cos(2x)) \qquad \cos^2(x) = \frac{1}{2}(1 + \cos(2x))$$

Given:	Guess:
$a^2 - u^2$	$u = a \cdot \sin(\theta)$
$u^2 + a^2$	$u = a \cdot \tan(\theta)$
$u^2 - a^2$	$u = a \cdot \sec(\theta)$

$$L = \int_a^b \sqrt{1 + (f'(x))^2}\, dx$$

$$SA = \int_a^b 2\pi f(x)\sqrt{1 + (f'(x))^2}\, dx$$

- $\displaystyle\int \frac{dx}{a^2 + x^2} = \frac{1}{a}\tan^{-1}\left(\frac{x}{a}\right) + C$
- $\displaystyle\int \frac{dx}{ax + b} = \frac{1}{a}\ln|ax + b| + C$
- $\displaystyle\int \tan(u)\, du = \ln|\sec(u)| + C$
- $\displaystyle\int \sec(u)\, du = \ln|\sec(u) + \tan(u)| + C$
- $\displaystyle\int \cot(u)\, du = \ln|\sin(u)| + C$
- $\displaystyle\int \csc(u)\, du = \ln|\csc(u) - \cot(u)| + C$
- $\displaystyle\int \tan^n(u)\, du = \frac{1}{n-1}\tan^{n-1}(u) - \int \tan^{n-2}(u)\, du$
- $\displaystyle\int \sec^n(u)\, du = \frac{1}{n-1}\sec^{n-2}(u)\tan(u) + \frac{n-2}{n-1}\int \sec^{n-2}(u)\, du$

Disk: $\pi r^2 \cdot \text{thickness}$ Washer: $\pi(R^2 - r^2) \cdot \text{thickness}$ Shells: $2\pi rh \cdot \text{thickness}$