OPTIMIZATION PROBLEMS:

1. WHAT VALUE ARE YOU TRYING TO MAXIMIZE OR MINIMIZE?

2. WRITE DOWN EVERYTHING YOU ARE GIVEN (DRAW A PICTURE)

3. WRITE A FORMULA FOR QUANTITY TO BE MAXIMIZED OR MINIMIZED. (THIS FORMULA WILL TYPICALLY RELATE THE VARIABLES YOU ARE GIVEN IN 2)

4. WRITE (3) ↑ AS A FUNCTION IN ONE VARIABLE

5. WHAT IS THE DOMAIN OF THE FUNCTION IN STEP 4?

6. FIND THE MAX/MIN (FIND CRITICAL POINTS AND EVALUATE f AT THE ENDPOINTS)

ANTIDERIVATIVES:

A FUNCTION F IS AN ANTIDERIVATIVE OF THE FUNCTION f IF $F'(x) = f(x)$ FOR ALL x IN THE DOMAIN OF f.

FUNCTION	ANTIDERIVATIVE
k ← CONSTANT	$kx + C$
x^n	$\frac{x^{(n+1)}}{n+1} + C$, $n \neq -1$
$\frac{1}{x}$	$\ln(x) + C$
e^x	$e^x + C$
$\cos(x)$	$\sin(x) + C$
$\sin(x)$	$-\cos(x) + C$
$\sec^2(x)$	$\tan(x) + C$
$\csc(x)\cot(x)$	$-\csc(x) + C$
$\sec(x)\tan(x)$	$\sec(x) + C$
$\frac{1}{\sqrt{1-x^2}}$	$\sin^{-1}(x) + C$ (OR $\arcsin(x) + C$)
$\frac{1}{1+x^2}$	$\tan^{-1}(x) + C$ (OR $\arctan(x) + C$)
$\frac{1}{x\sqrt{x^2-1}}$	$\sec^{-1}(x) + C$ (OR $\operatorname{arcsec}(x) + C$)