

7. [10 points] Maize and Blue Jewelry Company is trying to decide on a design for their signature aMaize-ing bracelet. There are two possible designs: type W and type J . The company has done research and the two bracelet designs are equally pleasing to customers. The design for both rings starts with the function $C(x) = \cos\left(\frac{\pi}{2}x\right)$ where all units are in millimeters. Let R be the region enclosed by the graph of $C(x)$ and the graph of $-C(x)$ for $-1 \leq x \leq 1$.
- a. [5 points] The type W bracelet is in the shape of the solid formed by rotating R around the line $x = 50$. Write an integral that gives the volume of the type W bracelet. Include **units**.

Solution: The volume of the type W bracelet, in mm^3 , using the shell method, is

$$\int_{-1}^1 2\pi(50 - x) \cdot 2C(x) dx.$$

- b. [5 points] The type J bracelet is in the shape of the solid formed by rotating R around the line $y = -50$. Write an integral that gives the volume of the type J bracelet. Include **units**.

Solution: The volume of the type J bracelet, in mm^3 , using the washer method, is

$$\int_{-1}^1 \pi(50 + C(x))^2 - \pi(50 - C(x))^2 dx.$$