

“We seem to understand the value of oil, timber, minerals and housing, but not the value of unspoiled beauty, wildlife, solitude and spiritual renewal.”

CALVIN (BILL WATERSON)

1. Define a subset Q of the xy plane as $Q = \{(x, y) | 0 \leq y \leq 1 - x^2, -1 \leq x \leq 1\}$.

- (a) Find $\text{area}(Q)$
- (b) Find $\bar{x} \times \text{area}(Q)$
- (c) Find $\bar{y} \times \text{area}(Q)$
- (d) Find $\text{vol}_{x\text{-axis}}(Q)$
- (e) Find $\text{vol}_{y\text{-axis}}(Q)$

2. Express the region Q from question 1 in the form

$$Q = \{(x, y) | f(y) \leq x \leq g(y), a \leq y \leq b\}. \quad (1)$$

Using this representation.

- (a) Find $\text{area}(Q)$
- (b) Find $\bar{y} \times \text{area}(Q)$
- (c) Find $\bar{x} \times \text{area}(Q)$
- (d) Find $\text{vol}_{y\text{-axis}}(Q)$
- (e) Find $\text{vol}_{x\text{-axis}}(Q)$