Quiz 4

Honor Code: On my honor, I have neither given nor received any aid during this examination.
Instruction: You are not allowed to use a calculator during this examination. You need to show all necessary steps to get credit. This document is **double-sided**.

Name: _____

Problem 1

Recall the signed area of the region bounded by $f(x)$ and x-axis from a to b is given by

$$A = \lim_{n\to\infty} \sum_{i=1}^{n} f(x_i)\Delta_x,$$

where $f(x_i)$ can be understood as the height of summing rectangles, and Δ_x can be understood as the base.

Fill the blanks. Suppose we want to evaluate the signed area of the region bounded by $f(x) = \sqrt{\sin(x)}$ from 0 to π, we should use:

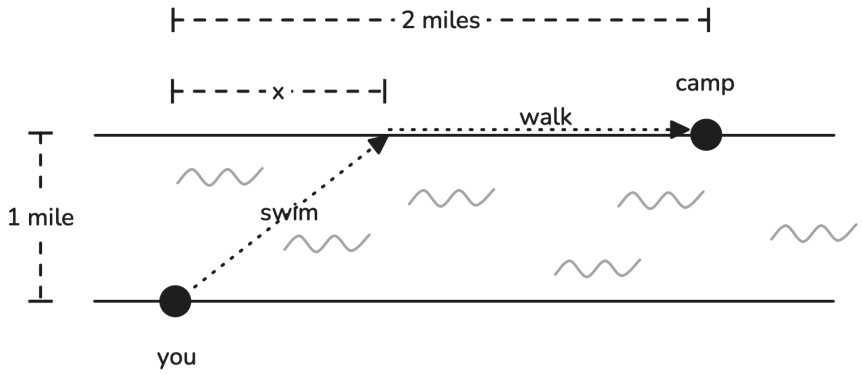
$f(x_i) =$ _____ (use right-endpoint method),

$\Delta_x =$ _____, thus

$A =$ _____.

Your answers should not directly contain the letters f and x. **Do not** evaluate the expression.

Problem 2



You are standing at the edge of a river which is 1 mile wide and wish to return to your campground on the opposite side of the river. You can swim at 2 mph and walk at 3 mph.
You must first swim across the river, diagonally, to any point on the opposite bank. From there walk to the campground, which is 2 miles from the point directly across the river from where you start your swim. What route will take the **least amount of time**? That is, with the variable provided on the graph, **find** x.
Hint: $y = \text{Time} = \text{Time}_{\text{swim}} + \text{Time}_{\text{walk}} = \frac{\text{Distance}_{\text{swim}}}{\text{Speed}_{\text{swim}}} + \frac{\text{Distance}_{\text{walk}}}{\text{Speed}_{\text{walk}}} = ...$