

3. [12 points] Oakley gets exercise every day in one of two ways: either by walking outside, or following instructions from an exercise app.
- $f(d)$ is the amount of time, in minutes, it takes Oakley to walk d miles.
 - $f(d)$ is invertible.
 - $W(t)$ is Oakley's heart rate, in beats per minutes, t minutes after they start walking.
 - $A(t)$ is Oakley's heart rate, in beats per minutes, t minutes after they start using the exercise app.
- a. [8 points] For each of the following, give a practical interpretation of the given expression, or explain why the expression does not make sense in the context of the problem.
- $f^{-1}(5)$
 - $W(f(1.5)) = 95$
 - $W(40) < A(20)$

Solution:

- $f^{-1}(5)$ is the distance in miles that Oakley can walk in 5 minutes.
 - Oakley's heart rate after walking 1.5 miles is 95 beats per minute.
 - Oakley's heart rate after walking for 40 minutes is less than their heart rate after using the exercise app for 20 minutes.
- b. [4 points] Find an expression for Oakley's average speed, in miles per **hour**, when Oakley has walked a total of d miles. Your answer may involve f , W , and/or A .

Solution: To walk d miles takes $f(d)$ minutes, or $f(d)/60$ hours. Since average speed is distance traveled over time, the average speed is

$$\frac{d}{f(d)/60} = \frac{60d}{f(d)}.$$