8. [10 points] Scientists are continuing their study of water temperature at a certain location in Lake Michigan using their underwater drone.

- Let $W(p)$ be the temperature, in degrees Celsius ($^{\circ}$C), of the water at a depth of $p$ feet.
- Let $T(p)$ be the time, in minutes, that it takes for the drone to descend to a depth of $p$ feet.

Assume that both of these functions are invertible and differentiable.

a. [2 points] Write a single equation representing the following statement in terms of the functions $W$, $T$, and/or their inverses:

It takes the drone 3 minutes to reach water with a temperature of 5.7$^{\circ}$C.

Answer:

b. [3 points] Complete the following sentence to give a practical interpretation of the equation $W'(50) = -0.2$.

Compared to the water at a depth of 50 feet, the water at a depth of 53 feet...

c. [3 points] Use a complete sentence to give a practical interpretation of the equation

$$\int_{50}^{65} T'(p) \, dp = 1.$$ 

d. [2 points] Which of the following expressions gives the average temperature, in $^{\circ}$C, of the water outside of the drone during the first 5 minutes of its descent? Circle the one correct answer.

i. $\frac{1}{5} \int_{0}^{5} W(p) \, dp$

ii. $\frac{1}{5} \int_{0}^{5} W(T^{-1}(t)) \, dt$

iii. $\frac{1}{5} \int_{0}^{5} W'(T(t)) \cdot T'(t) \, dt$

iv. $\frac{W(T^{-1}(5)) - W(T^{-1}(0))}{5}$

v. $\frac{W(T(5)) + W(T(0))}{2}$

vi. $\frac{T(W^{-1}(5)) - T(W^{-1}(0))}{5}$