HW  Average Value
Find the average value of the function on the given interval:

1. \( f(t) = t e^{-t^2}, \quad [0, 5] \)
2. \( h(x) = \cos^2 x \sin x, \quad [0, \pi] \)
3. a) Find the average value of the function on the given interval.
   b) Find \( c \) such that \( f(c) \) is the average value.
   c) Sketch the graph of \( f \) and a rectangle whose area is the same as the area under the graph of \( f \).
   \( f(x) = (x-3)^2, \quad [2, 5] \)
4. If \( f \) is continuous and \( \int f(x) \, dx = 8 \), show that \( f \) takes on the value \( 4 \) at least once on the interval \( [1, 3] \).

5. In a certain city, the temperature (in °F) \( t \) hours after 9 AM was modeled by the function
   \( T(t) = 50 + 14 \sin \frac{\pi t}{12} \)
Find the average temperature during the period from 9 AM to 9 PM.

6. Prove the Mean Value for Integrals by applying the Mean Value Theorem for derivatives to the function \( F(x) = \int_a^x f(t) \, dt. \)