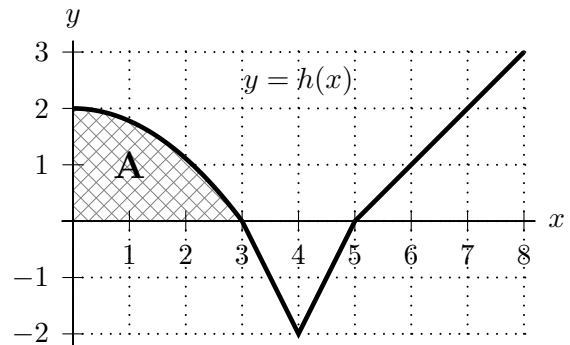**1**. [13 points]

The graph of a function $h(x)$ is shown on the right. The area of the shaded region A is 4, and $h(x)$ is piecewise linear for $3 \leq x \leq 6$.

Compute each of the following. If there is not enough information to compute a value exactly, write NOT ENOUGH INFO.

a. [2 points] Find $\displaystyle\int_0^3 (h(x) + 2) \, dx$.

Answer: $\displaystyle\int_0^3 (h(x) + 2) \, dx = $ _____

b. [2 points] Find the average value of $h(x)$ on the interval $[0, 4]$.

Answer: _____

c. [3 points] Let $J(x) = \sin(\pi h(x))$. Find $J'(3.5)$.

Answer: $J'(3.5) = $ _____

d. [3 points] Let $H(x)$ be an antiderivative of $h(x)$ with $H(4) = 5$. Find an equation for the tangent line to the graph of $H(x)$ at $x = 4$.

Answer: _____

e. [3 points] Let $g(x) = e^x$. Find $\displaystyle\int_6^7 \left(g(x)h'(x) + g'(x)h(x)\right) \, dx$.

Answer: $\displaystyle\int_6^7 \left(g(x)h'(x) + g'(x)h(x)\right) \, dx = $ _____