2. [8 points] Below is a portion of a graph of an even function $w(x)$. Note that $w(x)$ has a vertical asymptote at $x = -1$, has a horizontal asymptote at $y = -2.5$, and is linear on $[-5, -4]$.

Evaluate each of the given quantities. If the value does not represent a real number (including the case of limits that diverge to $\infty$ and $-\infty$), write DNE. You do not need to show work in this problem. Give your answers in exact form.

a. [1 point] $\lim_{p \to -4^+} w(p)$

Answer: 5

b. [1 point] $\lim_{x \to -8} w(x)$

Answer: DNE

c. [2 points] $\lim_{h \to 1} w(-2 + h)$

\[\text{Solution: } \text{For } h \text{ close to but not equal to } -1, \text{ the quantity } -2 + h \text{ is close to but not equal to } -3. \text{ So, as } h \to -1, \text{ we see from the graph that the value of } w(-2 + h) \text{ approaches } 3.\]

Answer: 3

d. [2 points] $\lim_{x \to \infty} w(x)$

\[\text{Solution: Since } w \text{ is an even function, the graph of } w \text{ is symmetric across the vertical axis, so there is a horizontal asymptote on the right at } y = -2.5. \text{ Alternatively, since } w \text{ is even, we know } w(x) = w(-x) \text{ for all } x \text{ in the domain of } w, \text{ so } \lim_{x \to \infty} w(x) = \lim_{x \to -\infty} w(-x) = -2.5.\]

Answer: -2.5

e. [2 points] $\lim_{h \to 0} \left( (3 - h)^2 + \frac{w(-4.5 + h) - w(-4.5)}{h} \right)$

\[\text{Solution: } \lim_{h \to 0} \left( (3 - h)^2 + \frac{w(-4.5 + h) - w(-4.5)}{h} \right) = \lim_{h \to 0} \left( (3 - h)^2 + w'(-4.5) \right) = (3 - 0)^2 + 5 = 14.\]

Answer: 14