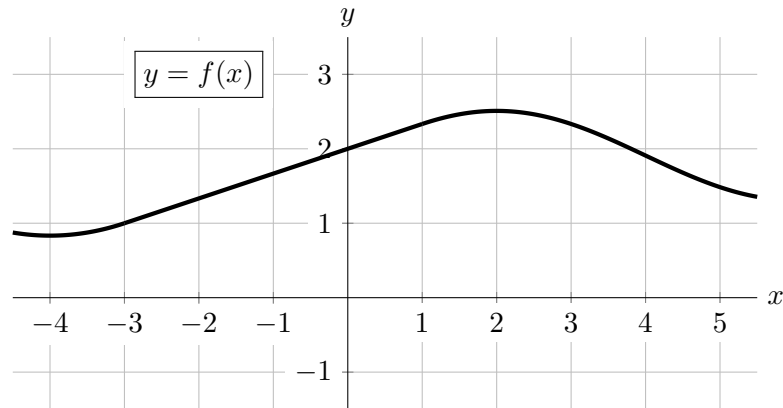**5.** [10 points] The graph of the function $f(x)$ is shown below.
Note that $f(x)$ is linear on the interval $(-3, 1)$.
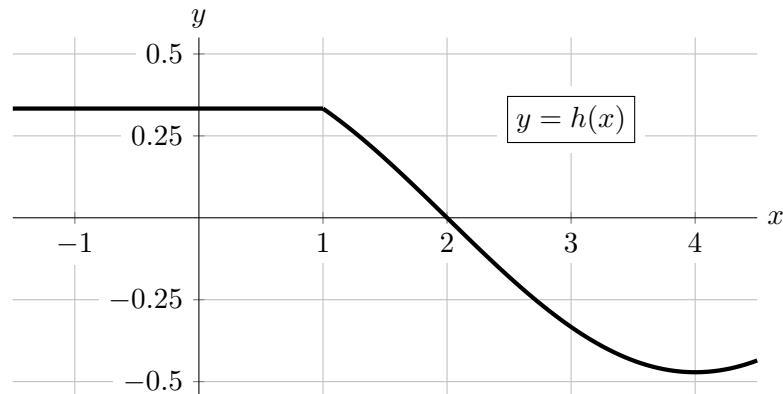

a. [6 points] The function $g(x)$ is given by the equation

$$g(x) = \begin{cases} e^{px} & x \leq 0 \\ Cf(x) & x > 0 \end{cases}$$

where C and p are constants and f is as above. Find one pair of **exact** values for C and p such that $g(x)$ is differentiable, or write NONE if there are none. Be sure your work is clear.

Part of the graph of the function $h(x)$ is shown below.

Note that $h(4) = -\dfrac{\sqrt{2}}{3}$.

b. [2 points] Complete the following sentence.

Because the function $h(x)$ satisfies the hypotheses of the mean value theorem on the interval $[2, 4]$, there must be some point c with $2 \leq c \leq 4$ such that...

c. [2 points] On which of the following intervals does $h(x)$ satisfy the hypotheses of the mean value theorem? List all correct answers, or write NONE.

$$[-1, 0] \qquad\qquad [0, 3] \qquad\qquad [1, 4]$$