6. [4 points] Shown below at left is a portion of the graph of a function \( m(x) \). Shown below at right is a portion of the graph of a function \( p(x) \), which can be obtained from \( m(x) \) through one or more graph transformations. Find a formula for \( p(x) \) in terms of \( m(x) \).

\[ y = m(x) \]

\[ y = p(x) \]

\text{Answer: } p(x) = -m \left( \frac{1}{2} x - 1 \right) = -m \left( \frac{1}{2} (x - 2) \right)

7. [9 points] For a constant \( c \), let

\[ K(x) = \frac{2^c x}{e^{x-c}}. \]

a. [5 points] Use the limit definition of the derivative to write an explicit expression for \( K'(3) \). Your answer may include the constant \( c \) but should not involve the letter \( K \). Do not attempt to evaluate or simplify the limit. Write your final answer in the answer box provided below.

\text{Answer: } K'(3) = \lim_{h \to 0} \frac{2^{c(3+h)} - 2^{c(3)}}{e^{(3+h)-c} - e^{3-c}}

b. [4 points] Find the value of \( c \) so that \( K(1) = 5 \). Give your answer in \textbf{exact form} and show all your work.

\text{Solution: } We want \( c \) such that

\[ \frac{2^c(1)}{e^{1-c}} = 5, \text{ or } 2^c = 5e^{1-c}. \]

Solving, we find that \( \ln(2^c) = \ln(5e^{1-c}) \)

\[ \ln(2^c) = \ln(5) + \ln(e^{1-c}) \]

\[ c \ln(2) = \ln(5) + 1 - c \]

\[ c \ln(2) + c = \ln(5) + 1 \]

\[ c(\ln(2) + 1) = \ln(5) + 1 \]

\[ c = \frac{\ln(5) + 1}{\ln(2) + 1}. \]

\text{Answer: } c = \frac{\ln(5) + 1}{\ln(2) + 1}