2. [10 points]
   a. [5 points] Let $f(x)$ be a function that satisfies all of the following statements:
      
      a) The domain of $f(x)$ is $[-4, 5)$.
      
      b) The graph of $y = f(x)$ has only one horizontal intercept at $x = 2$.
      
      c) The function $f(x)$ is decreasing for $-1 \leq x \leq 3$.
      
      d) The function $f(x)$ is concave down for $-4 \leq x \leq 0$ and concave up for $3 \leq x < 5$.
      Make sure the concavity of $f(x)$ is clear in your graph.
      
      e) The function $f(x)$ has constant rate of change for $0 \leq x \leq 3$.
      
      Draw a possible graph for $f(x)$. Make sure to label the important points on the graph to receive full credit.

   \[\text{Solution:}\]
b. [5 points] Let \( w = K(r) \), where \( K(r) = \log(7e^{2r} + 4) + 5 \). Find a formula for \( K^{-1}(w) \). Show all your work.

**Solution:**

\[
\begin{align*}
w &= \log(7e^{2r} + 4) + 5 \\
w - 5 &= \log(7e^{2r} + 4) \\
10^{w-5} &= 7e^{2r} + 4 \\
7e^{2r} &= 10^{w-5} - 4 \\
e^{2r} &= \frac{10^{w-5} - 4}{7} \\
2r &= \ln\left(\frac{10^{w-5} - 4}{7}\right) \\
K^{-1}(w) &= \frac{1}{2} \ln\left(\frac{10^{w-5} - 4}{7}\right)
\end{align*}
\]