1. [9 points]
   a. [3 points] Let $T$ be the temperature in °F at a distance $L$ feet away from a bonfire. It is known that for $1 \leq L \leq 3$, the temperature $T$ is inversely proportional to the cube root of the distance $L$ to the bonfire. Find a formula for $T$ in terms of $L$ if the temperature at 2 feet away from the bonfire is 125°F.

   **Solution:** We know that $T = \frac{k}{L^{\frac{1}{3}}}$. Since $T(2) = 125 = \frac{k}{2^{\frac{1}{3}}}$, then $k = 125 \cdot 2^{\frac{1}{3}}$. Hence $T = \frac{125 \cdot 2^{\frac{1}{3}}}{L^{\frac{1}{3}}}$.

   b. [6 points] The graph of a polynomial $f(x)$ of degree five is shown below.

   ![Graph of a polynomial function](image)

   **Solution:**
   i) Find the zeros of $f(x)$: $x = -2, 0$ and 3.
   
   ii) Find a formula for $f(x)$:

   Using the zeros and the graph, we can say that $f(x) = k(x + 2)^2(x - 3)^2$. Since $f(2) = -2$, then $-2 = k(4)^2(1)^2$. This yields $k = \frac{-1}{16}$. Hence 

   $f(x) = \frac{-1}{16}x(x + 2)^2(x - 3)^2$. 