6. [10 points]
   a. [5 points] The temperature $T$ (in degrees Fahrenheit) at a point next to a campfire is inversely proportional to the square of its distance $d$ (in meters) from the fire. If the temperature at a point 0.5 meters away from the fire is 500° F, what is the temperature (in degrees Fahrenheit) at 1.5 meters away from the fire? Show all your work to receive full credit.

   \[
   T = \frac{k}{d^2} \quad \text{so} \quad 500 = \frac{k}{0.5^2} \quad \text{and} \quad k = 500(0.5)^2 = 125.
   \]
   Thus the temperature at 1.5 meters is $T = \frac{125}{1.5^2} \approx 55.56°$ F

   b. [2 points] Let $H(x) = (x^3 + 1)^2$. Find two functions $K(x)$ and $J(x)$ such that $K(J(x)) = H(x)$. Your functions should satisfy $K(x) \neq x$ and $J(x) \neq x$.

   \[
   \text{Solution: } K(x) = x^2 \quad J(x) = x^3 + 1 \quad \text{or} \quad K(x) = (x + 1)^2 \quad J(x) = x^3
   \]

   c. [3 points] The shadow (the segment BC) made by a 150-foot-tall building has a length of 200 feet. Find the value, in radians, of the angle ABC.

   \[
   \text{Solution: } \text{Let } \theta = \text{angle ABC, then } \tan \theta = \frac{150}{200}. \text{ Hence } \tan^{-1}\left(\frac{150}{200}\right) \approx 0.643 \text{ radians.}
   \]