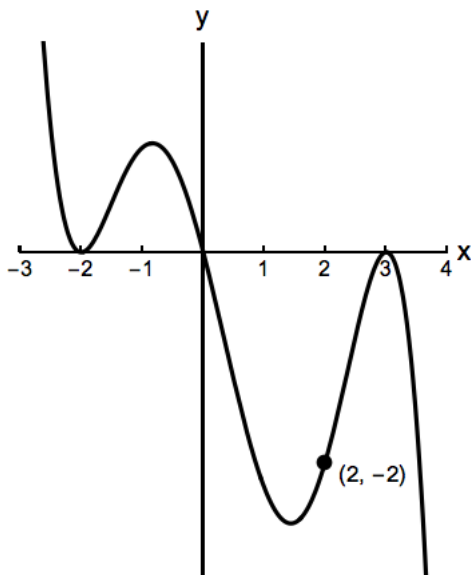


1. [9 points]

- a. [3 points] Let T be the temperature in $^{\circ}\text{F}$ 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 $k = 125 \sqrt[3]{2}$. Hence $T = \frac{125 \sqrt[3]{2}}{L^{\frac{1}{3}}}$.

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



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 $f(x) = kx(x+2)^2(x-3)^2$. Since $f(2) = -2$, then $-2 = k2(4)^2(1)^2$. This yields $k = -\frac{1}{16}$. Hence

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