

1. Find the absolute minimum and maximum values of $f(x) = x^{2/3}$ on the interval $[-1, 1]$.

2. Find the absolute minimum and maximum values of $f(x) = x^4 - 2x^2$ on the interval $[-2, 2]$.

3. Find the absolute maximum and minimum values of

$$f(x) = x^{7/3} - 7x^{1/3}$$

on the interval $[-1, 8]$.

4. Does $f(x) = \frac{x^2}{x^2+1}$ have a global maximum (i.e. an absolute maximum on the interval $(-\infty, \infty)$)? How about a global minimum?

5. You are to build a rectangular box with a square base and no top. You have a total of 12 cubic square feet of material with which to form the surface of the box.

(a) Denoting as x as the side length of the base of the box, write the volume of the box as a function of x .

(b) Find the interval of possible x -values (Hint: none of the dimensions of the box can be negative).

(c) Find the maximum volume of such a box by maximizing your function from (a) on the interval you found in (b).

6. A piece of wire 80 inches long is cut into at most two pieces. Each piece is shaped into a square. How should the wire be cut so that to minimize the area(s) of the square(s)? How should the wire be cut so that to maximize the area(s) of the square(s)?