Exercise 21

Sketch the graph of f by hand and use your sketch to find the absolute and local maximum and minimum values of f. (Use the graphs and transformations of Sections 1.2 and 1.3.)

$$f(x) = \sin x, \quad -\pi/2 \le x \le \pi/2$$

Solution

A graph of the function is shown below. Since the interval $-\pi/2 \le x \le \pi/2$ is closed at both ends, the function has an absolute maximum and an absolute minimum:

$$f\left(-\frac{\pi}{2}\right) = \sin\left(-\frac{\pi}{2}\right) = -1 \qquad \text{(absolute minimum)}$$

$$f\left(\frac{\pi}{2}\right) = \sin\left(\frac{\pi}{2}\right) = 1 \qquad \text{(absolute maximum)}.$$