Exercise 22

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.)

$$f(t) = \cos t, \quad -3\pi/2 \le t \le 3\pi/2$$

Solution

A graph of the function is shown below. The function has an absolute and local maximum and an absolute and local minimum:

$$f(0) = \cos 0 = 1 \qquad \text{(absolute and local maximum)}$$

$$f(-\pi) = \cos(-\pi) = -1 \qquad \text{(absolute and local minimum)}$$

$$f(\pi) = \cos \pi = -1 \qquad \text{(absolute and local minimum)}.$$

$t = 0$ and $t = -\pi$ and $t = \pi$ are within the interval $-3\pi/2 \le t \le 3\pi/2$, not at the endpoints, making them local.