PROBLEMA 8.3 $\quad f(x) = |x/\sqrt{2}| + \cos x$

$x \in [-\pi, \pi]$

- f es PAR: $f(x) = f(-x) \Rightarrow$ Basta estudiar f para $x \in [0, \pi]$

- f es CONTINUA: $f([-\pi, \pi]) = [m, M]$

  m: mínimo absoluto; M: máximo absoluto

- f es DERIVABLE $\forall x \neq 0$: $\cos x$ es derivable $\forall x$

  $|x|$ es derivable $\forall x \neq 0$

- Si $x \in (0, \pi]$: $f(x) = x/\sqrt{2} + \cos x$

  $f'(x) = 1/\sqrt{2} - \operatorname{sen} x$

- PUNTOS CRÍTICOS: $f'(x) = 0 \Leftrightarrow x = \pm \pi/4$, $x = \pm 3\pi/4$

$$f(\pm \pi/4) = \frac{1}{\sqrt{2}} + \frac{\pi}{4\sqrt{2}} > f\left(\pm \frac{3\pi}{4}\right) = -\frac{1}{\sqrt{2}} + \frac{3\pi}{4\sqrt{2}}$$

- PUNTOS $\nexists f'(x)$: $x = 0 \Rightarrow f(0) = 1$

$$f(\pm \pi/4) > f(0) > f\left(\pm \frac{3\pi}{4}\right).$$

- EXTREMOS del INTERVALO:

$$x = \pm \pi \Rightarrow f(\pm\pi) = -1 + \frac{\pi}{\sqrt{2}}$$

$$\Rightarrow \underbrace{f(\pm \pi/4)}_{\substack{\text{máximo absoluto} \\ M}} > f(0) > f(\pm \pi) > \underbrace{f(\pm 3\pi/4)}_{\substack{\text{mínimo absoluto} \\ m}}$$