On the set $[-\frac{1}{2}, 1]$, f is $\downarrow$ on $[-1, 0)$,

f is $\uparrow$ on $(0, 1]$ so global max is $f(1) = \sqrt{2}$

global min is $f(0) = 0$

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4) a) $\lim_{x \to 0+0} (\cos x)^{1/\sin x} = \lim_{x \to 0+0} \text{"}1^{\infty}\text{"}$

$(\cos x)^{1/\sin x} = e^{\frac{1}{\sin x} \cdot \ln\cos x} = e^{l} \quad \left(l = \frac{\ln(\cos x)}{\sin x}\right)$

$\lim_{x \to 0+0} \frac{\ln(\cos x)}{\sin x} = L'H \Rightarrow \lim_{x \to 0+0} \frac{\frac{1}{\cos} \cdot -\sin x}{\cos x} = -\frac{\sin x}{\cos^2 x} = -0$

$\Rightarrow \lim_{x \to 0+0} e^{0} = 1$

b) $\lim_{x \to 0-0} (x \cdot \ln(-x)) = \text{"}0 \cdot \infty\text{"}$

$= \lim_{x \to 0-0} \frac{\ln(-x)}{\frac{1}{x}} = L'H = \lim_{x \to 0-0} \frac{-\frac{1}{x}}{-\frac{1}{x^2}} = x = 0$