1. If $f(x) = \sin^2 x - a\cos x$ has exactly one

local ① minima in $(0, \pi)$, find 'a'.

② maximum → $(-2, 2)$ $\boxed{a = \phi}$

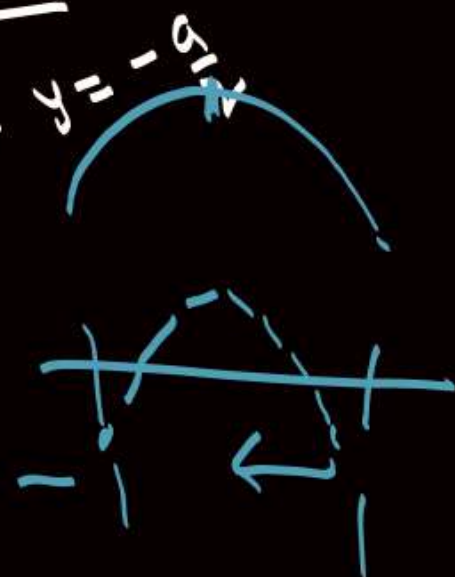$f'(x) = (2\cos x + a)\sin x$ $\underset{> 0}{\underbrace{}}$

$\boxed{-1 < -\dfrac{a}{2} < 1}$ $f'(x)$ $\dfrac{+ \quad -}{x_1}$

$\cos x = -\dfrac{a}{2}$

$-\dfrac{a}{2} \in (-1, 1)$

$a \in (-2, 2)$

$f(t) = \boxed{1 - t^2 - at}$

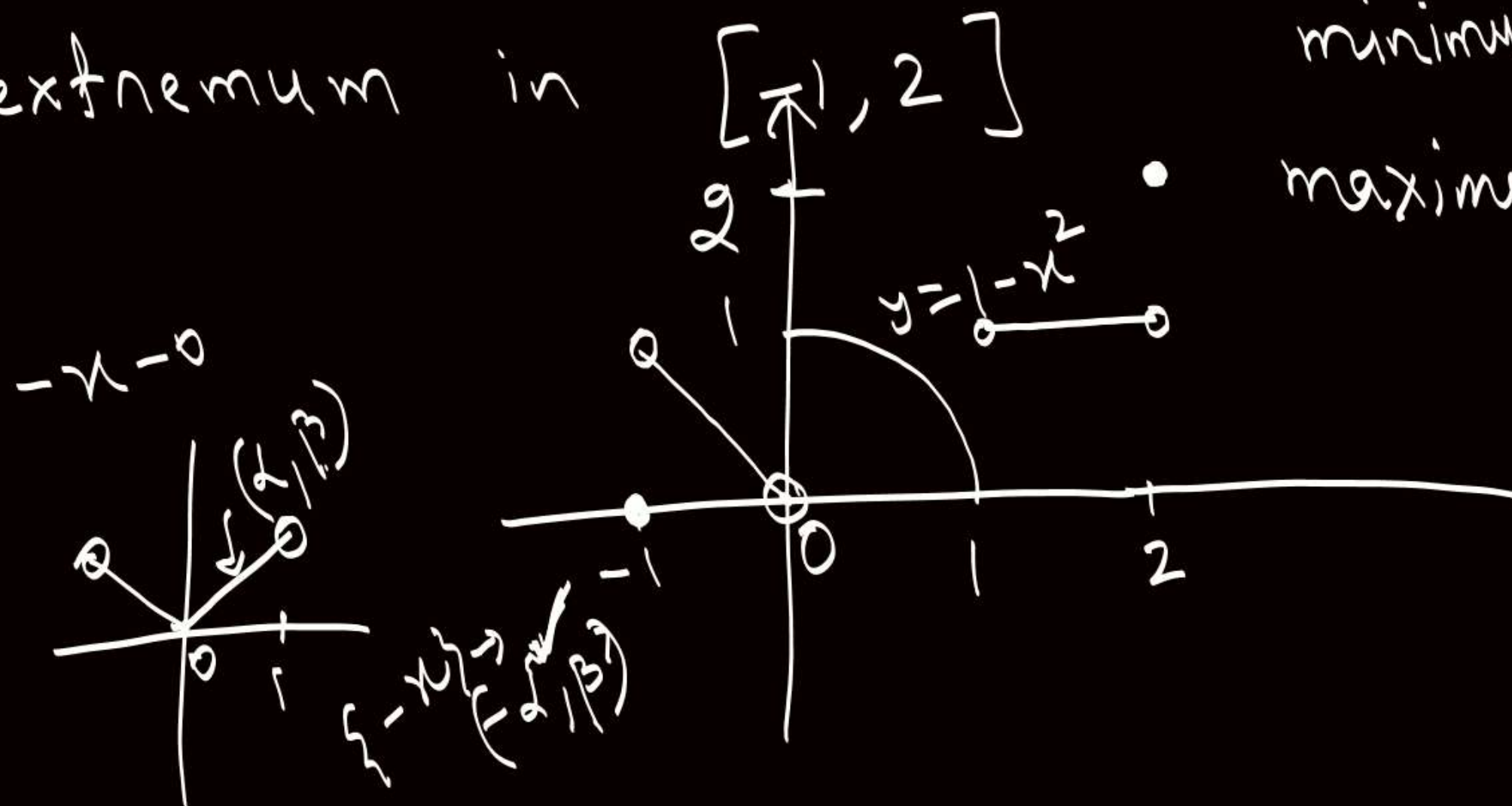$t \in (-1, 1)$

$\downarrow x_1$

maximum

$y = -\dfrac{a}{2}$
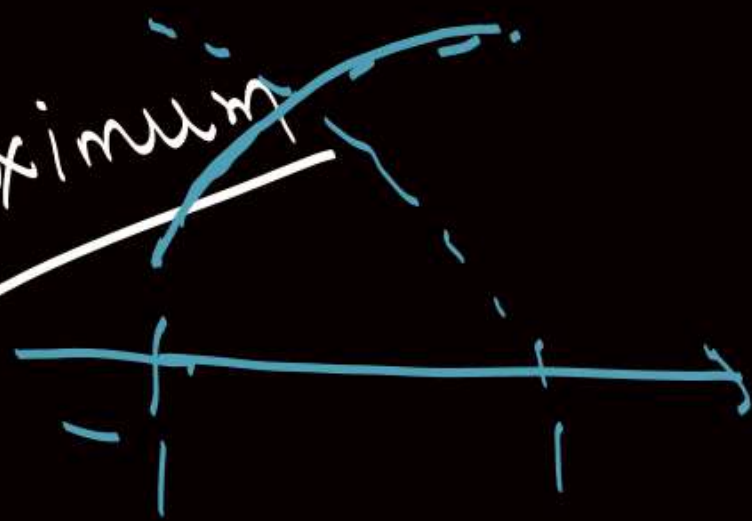
maximum

2. Discuss $f(x) = \begin{cases} \{-x\} & -1 \leq x < 0 \\ 1-x^2 & 0 \leq x \leq 1 \\ [x] & 1 < x \leq 2 \end{cases}$

$[\cdot] = G \cdot I \cdot F$

$\{\cdot\} = F P F$

for extremum in $[-1, 2]$

minimum $\rightarrow x = -1, 1$

maximum $\rightarrow x = 0, 2$
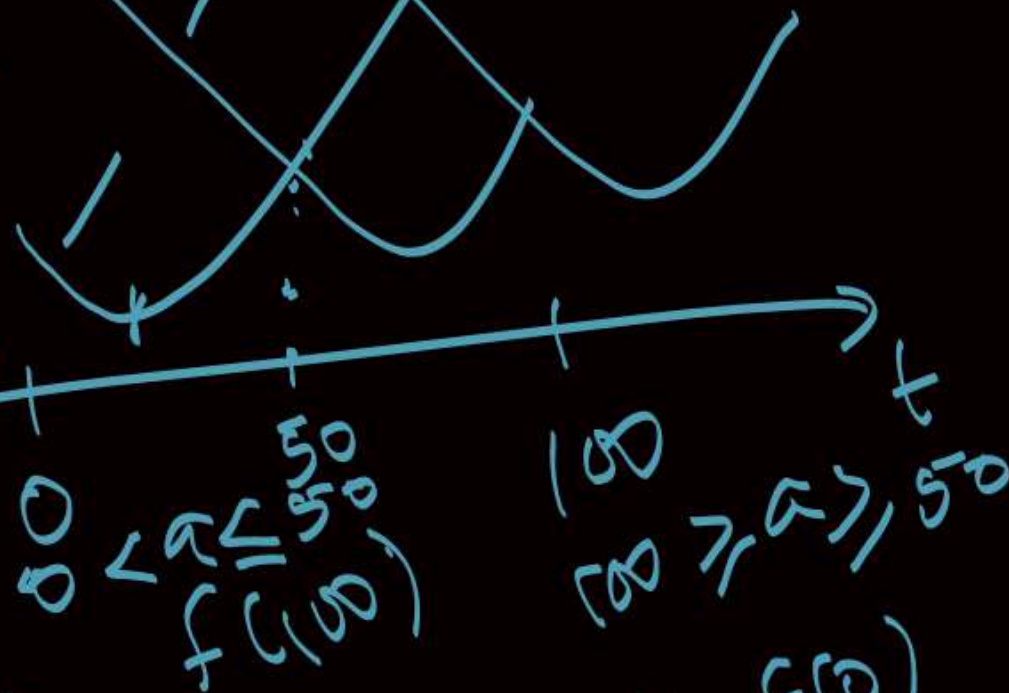
3: Find global maximum of

$$f(x) = x^4 - 2ax^2 + 3a - 6a^2 \quad \text{in} \quad [-7, 10]$$

PT

Ex-II

$$f(t) = t^2 - 2at + 3a - 6a^2 \qquad t \in [0, 100]$$

$a \leq 0$

$f_{max} = f(100)$

$0 < a \leq 50$
$f(100)$

$100 \geq a \geq 50$
$f(0)$

$a \geq 100$
$f(0)$

$g(a) = \max\left(f(x) \mid x \in [7, 10] \right) \quad f_{max} = \begin{cases} f(100) = 10^4 - 200a + 3a - 6a^2 & a \leq 50 \\ f(0) = 3a - 6a^2 & a \geq 50 \end{cases}$