

$$f(x) = \begin{cases} 3(x+1) + 11 \rightarrow 3x + 12 & x \geq 1 \\ f(x+1) - 1 \rightarrow f(x) + 1 & x < 1 \end{cases}$$

المسألة

$$f(1-x) = \begin{cases} 3(1-x) + 11 \rightarrow 3x + 12 \rightarrow -3x + 12 & x \leq 0 \\ f(1-x) + 11 \rightarrow f(x) - 1 \rightarrow -f(x) - 1 & x > 0 \end{cases}$$

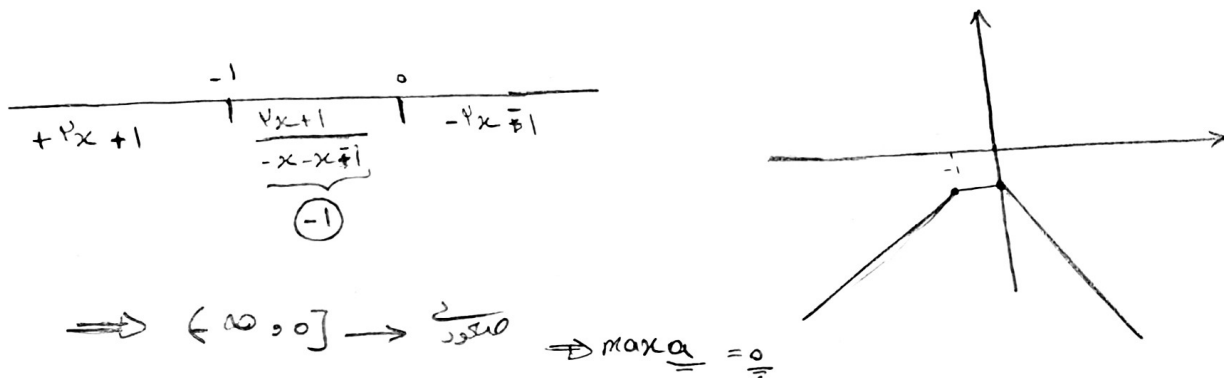
$$f(x+1) = \begin{cases} 3(x-1) + 11 \rightarrow 3x + 8 & x \geq 1 \\ f(x-1) + 11 \rightarrow f(x) + 1 & x < 1 \end{cases}$$

$$f(1-x) \geq f(x+1)$$

$$3 - x \leq x + 1$$

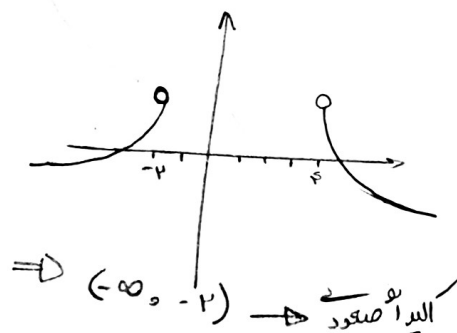
$$2 \leq 2x \rightarrow x \geq 1$$

$$\Rightarrow f(x) < 2^x \Rightarrow (x^3 + x)^x < x^x \Rightarrow x^3 + x < x \Rightarrow x^3 < 0 \Rightarrow x < 0$$



$$\Rightarrow (-\infty, 0] \rightarrow \text{محدود} \Rightarrow \max a = 0$$

$$(x+1)(x-1) \Rightarrow \begin{matrix} -1 & 1 \\ + & - \\ \hline & 0 \end{matrix}$$



$$\Rightarrow (-\infty, -1) \rightarrow \text{الحد الأدنى محدود}$$

$$\text{الف) } a^2 - 3 > 0 \Rightarrow a^2 > 3 \Rightarrow a > \sqrt{3} \text{ or } a < -\sqrt{3} \Rightarrow a \in (-\infty, -\sqrt{3}) \cup (\sqrt{3}, +\infty)$$

$$\text{ب) } a^2 - 3 \geq 0 \Rightarrow a^2 \geq 3 \Rightarrow a \geq \sqrt{3} \text{ or } a \leq -\sqrt{3} \Rightarrow a \in (-\infty, -\sqrt{3}] \cup [\sqrt{3}, +\infty)$$

$(x+p)^p - 1 \xrightarrow{c}$
 $y = -1$
 $|f(x)|$
 $(x+p)^p - 1 = 0 \Rightarrow x+p=1 \Rightarrow x=-p$

$\sqrt{x} = t \Rightarrow t^p + t - p = 0$
 $t = 1$
 $t = -p$
 $\sqrt{x} = t$

$\Rightarrow f(x) \leq \sqrt{x} \Rightarrow x + \sqrt{x} - p \leq \sqrt{x} \Rightarrow x - p \leq 0 \Rightarrow x \leq p, x \geq 0$

$\Rightarrow x \in p, 0 \rightarrow$

$\sqrt[p]{9 \cos^p - 1} - \sqrt[p]{1 - 9 \cos^p}$
 $\cos \leq 1$
 $\frac{1}{p} - p = -\frac{p}{p}$
 $p^p - p^{-p} = p - \frac{1}{p} = \frac{p^2 - 1}{p}$
 $\Rightarrow R_f = \left[-\frac{p}{p}, \frac{10}{p} \right] \Rightarrow \frac{10}{p} - \left(-\frac{p}{p} \right) = \frac{p+10}{p}$

$g \circ f(x) = g(f(x)) \Rightarrow \frac{p^p x - [x+p] - p^{-p} x + [x+p]}{p}$