

۱۶، ۱۷

$f(x, t) = \begin{cases} x+1 & x > 1 \\ x-1 & x < 1 \end{cases} \xrightarrow{x=t, t \rightarrow x=t+1} \begin{cases} t-2 > 1 \rightarrow t > 3 \rightarrow f(t-2) = t-1 \\ t-2 < 1 \rightarrow t < 3 \rightarrow f(t-2) = t-3 \end{cases}$

$\Rightarrow f(t) = \begin{cases} t+1 & t > 3 \\ t-3 & t < 3 \end{cases} \rightarrow f(x) = \begin{cases} x+1 & x > 3 \\ x-3 & x < 3 \end{cases}$

$f(3-x) \rightarrow \begin{cases} 3-x > 3 \rightarrow x < 0 \rightarrow f(3-x) = 4-x \\ 3-x < 3 \rightarrow x > 0 \rightarrow f(3-x) = 2-x \end{cases}$

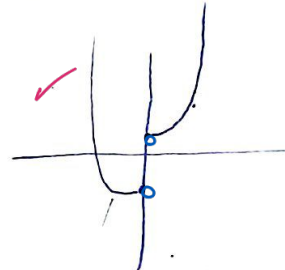
$f(x+1) \rightarrow \begin{cases} x+1 < 3 \rightarrow x < 2 \rightarrow f(x+1) = x \\ x+1 > 3 \rightarrow x > 2 \rightarrow f(x+1) = x+4 \end{cases}$

$\sqrt{f(3-x)} - f(x+1) \rightarrow f(3-x) - f(x+1) > 0$   
 $x > 2 \rightarrow 3-x - x-4 = -1-2x > 0 \rightarrow x < -\frac{1}{2}$   
 $0 < x < 2 \rightarrow 3-x - (x+4) = -1-2x > 0 \rightarrow x < -\frac{1}{2}$   
 $x < 0 \rightarrow 2-x - (x+4) = -2-2x > 0 \rightarrow x < -1$   
 $\Rightarrow (-\infty, -1) \cup (-\frac{1}{2}, 0] \rightarrow \boxed{(-\infty, -1) \cup (-\frac{1}{2}, 0]}$

$f(x) = (x^r + a)^r$   
 $f'(x) = r(x^r + a)^{r-1} \cdot r x^{r-1}$   
 $f''(x) = r(r-1)(x^r + a)^{r-2} \cdot r x^{r-2}$   
 $f''(x) < f''(x') \rightarrow (x^r + a)^{r-2} < (x'^r + a)^{r-2} \rightarrow (x^r + a)^r < (x'^r + a)^r \rightarrow x^r < x'^r \rightarrow x^r < 0$   
 $\Rightarrow \boxed{x < 0}$  ✓

$y = |x| (x^r + 1)$   
 $\rightarrow x > 0 \rightarrow y = x(x^r + 1) \rightarrow y = x^{r+1} + x$   
 $\rightarrow x < 0 \rightarrow y = -x(x^r + 1) \rightarrow y = -x^{r+1} - x$

صفر در دامنه تابع نمی باشد

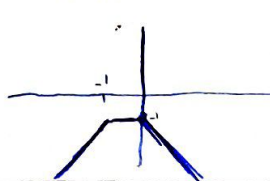


غیر یکنوا

$f(x) = \frac{x^2+1}{|x|-|x+1|}$

$x > 0 \rightarrow \frac{x^2+1}{x-1} = -x-1$   
 $-1 < x < 0 \rightarrow \frac{x^2+1}{-x-x-1} = \frac{x^2+1}{-2x-1} = \frac{x^2+1}{-1(x+1)} = -1$   
 $x < -1 \rightarrow \frac{x^2+1}{-x+x+1} = \frac{x^2+1}{1} = x^2+1$

$\boxed{0, 0}$

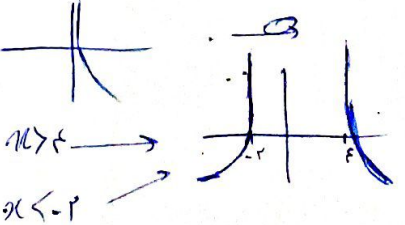


ناحه از  $(-\infty, 0]$   
 صعودی است

$y = \log_{\frac{1}{2}}(x^2-2x-1) \rightarrow x^2-2x-1 > 0 \rightarrow (x-4)(x+2) > 0 \rightarrow x < -2 \text{ or } x > 4$

$y = \log_{\frac{1}{2}} x \rightarrow 0 < x < 1 \rightarrow$

$y = \log_{\frac{1}{2}}(x^2-2x-1) \rightarrow x > 4 \rightarrow$   
 $x < -2 \rightarrow$



ناحه از  $(-\infty, -2)$  آهسته صعودی است

