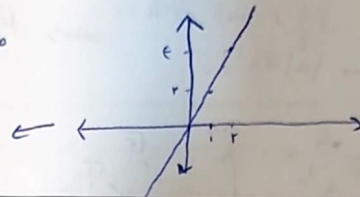


الف) $y^3 - y = 2x^2 \rightarrow \begin{cases} y_1^3 - y_1 = 2x_1^2 \\ y_2^3 - y_2 = 2x_2^2 \end{cases} \xrightarrow{f(x_1+x_2)} y_1^3 - y_1 = y_2^3 - y_2 \Rightarrow (y_1^3 - y_2^3) - (y_1 - y_2) = 0$
 $(y_1 - y_2)(y_1^2 + y_1 y_2 + y_2^2) - (y_1 - y_2) = 0 \Rightarrow (y_1 - y_2)(y_1^2 + y_1 y_2 + y_2^2 - 1) = 0$ تابع نیست
 ب) $x = \cos y \Rightarrow y = 90^\circ, 270^\circ$
 ج) $\sqrt{x-4} + |y-2| = 0 \Rightarrow x=4, y=2$ تابع نیست

الف) $|x| \Rightarrow f(x) = 1 \rightarrow$  $f(x) = 1$

ب) $|x| \Rightarrow f(x) = ax + b = 2x + b \Rightarrow 2x + b = 2 \Rightarrow b = 0$

$f(x) = 2x$



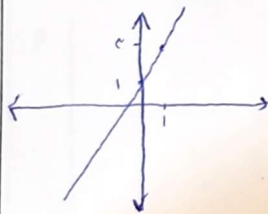
الف) $f(x) = x \Rightarrow 1x + 0 \Rightarrow a=1, b=0 \Rightarrow \frac{2 \times 0 + 1}{0} = 1$

ب) $|x| \Rightarrow \frac{-b}{a} = 2 \Rightarrow -b = 2a, f(x) = x^2 + ax + b \Rightarrow -a = 2 \Rightarrow a = -2$
 $a=1, b=a, c=b$

$-\frac{b^2 - 4ac}{4a} = -\frac{a^2 - 4b}{4} = 1 \Rightarrow \frac{a^2 - 4b}{4} = -1 \Rightarrow a^2 - 4b = -4 \Rightarrow 20 = 4b \Rightarrow b = 5 \Rightarrow -2 + \frac{2+5}{1} = 5$

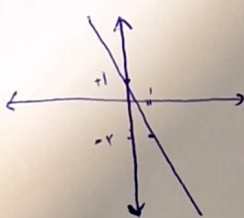
الف) $y = 2x + 1$

$|1|, |1|$

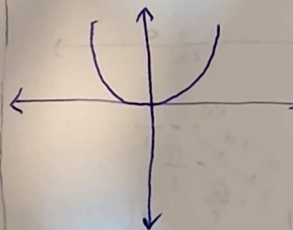


ب) $y = -2x + 1$

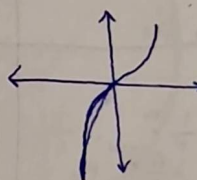
$|1|, |1|$



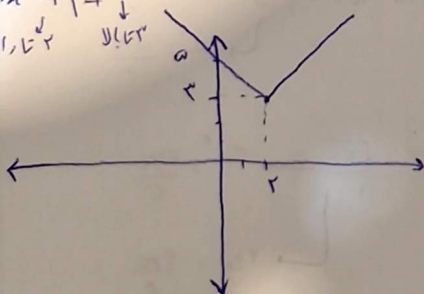
ج) $y = x^2$



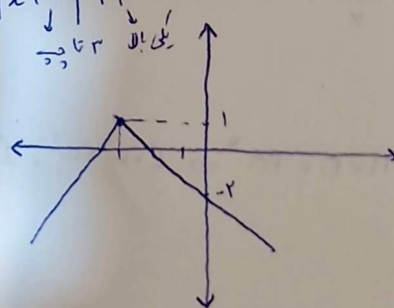
د) $y = x^3$



$y = |x-2| + 1$
 $\leftarrow 1, 2, 1 \rightarrow$



$y = -|x+3| + 1$
 $\leftarrow 3, 1, -1 \rightarrow$



الف) $y = \frac{x+1}{x^2-2x} \rightarrow x(x-2) \Rightarrow D_f = \mathbb{R} - \{0, 2\}$

ب) $y = \frac{x+1}{x^2-2x+1} \rightarrow \Delta = b^2 - 4ac = (-2)^2 - 4(1)(1) = -4 \rightarrow$ ناقدره $D_f = \mathbb{R}$

ج) $y = \frac{x+1}{x^2+x+1} \rightarrow \Delta = b^2 - 4ac = (1)^2 - 4(1)(1) = -3 \rightarrow$ ناقدره $D_f = \mathbb{R}$

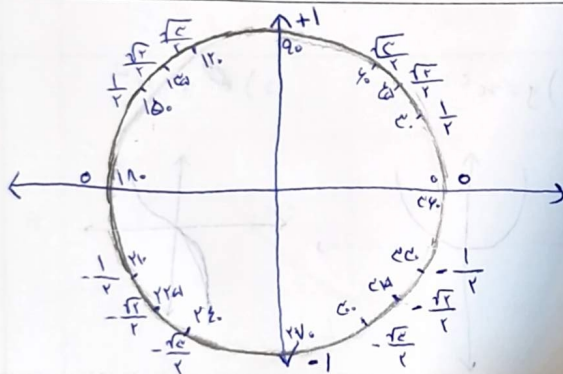
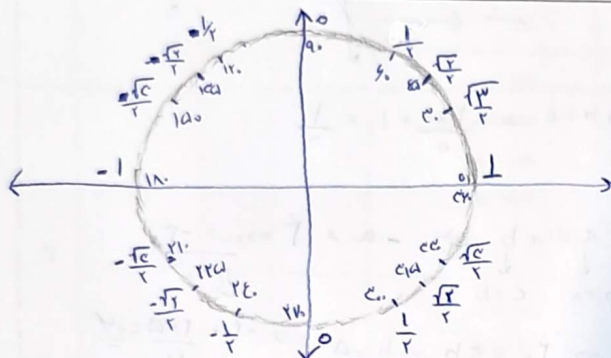
د) $y = \frac{x+1}{x^2-2x^2} \rightarrow x^2(x^2-2) = x^2(x+\sqrt{2})(x-\sqrt{2}) \Rightarrow D_f = \mathbb{R} - \{-\sqrt{2}, 0, \sqrt{2}\}$

الف) $y = \sqrt{4-x} + \sqrt{x-2} \Rightarrow x \leq 4, x \geq 2 \Rightarrow 2 \leq x \leq 4 \Rightarrow D_f = [2, 4]$

ب) $y = \frac{x+1}{x^2+1} \Rightarrow D_f = \mathbb{R}$

ج) $y = \frac{\sqrt{x-2}}{x-1} \rightarrow x \geq 2, x \neq 1 \Rightarrow D_f = [2, +\infty) - \{1\}$

د) $y = \frac{x+1}{|x|+x^2} \rightarrow |x|+x^2 = 0 \Rightarrow x=0 \Rightarrow D_f = \mathbb{R} - \{0\}$



الف) $\frac{12\pi}{4} = 3\pi = 3 \times 180^\circ \Rightarrow \cos 180^\circ = -\frac{1}{2} \Rightarrow \sin x = +\frac{1}{2} \rightarrow \begin{cases} 30^\circ = \frac{\pi}{6} \\ 150^\circ = \frac{5\pi}{6} \end{cases}$

ب) $\frac{11\pi}{4} = 11 \times 30^\circ = 330^\circ \Rightarrow \cos 330^\circ = \frac{\sqrt{3}}{2} \Rightarrow \sin x = -\frac{\sqrt{3}}{2} \rightarrow \begin{cases} 210^\circ = \frac{7\pi}{6} \\ 330^\circ = \frac{11\pi}{6} \end{cases}$