

الف) $\square \rightarrow \begin{cases} 1 \rightarrow 2-1=1 \\ 0 \rightarrow 0-1=-1 \\ -\frac{b}{2a}=0 \end{cases}$

$\Rightarrow R_f = [-1, 1]$ یا رسم شکل روی طرالی تیره یا رسم در بازه $x \in [0, 1] \rightarrow [-1, 1]$

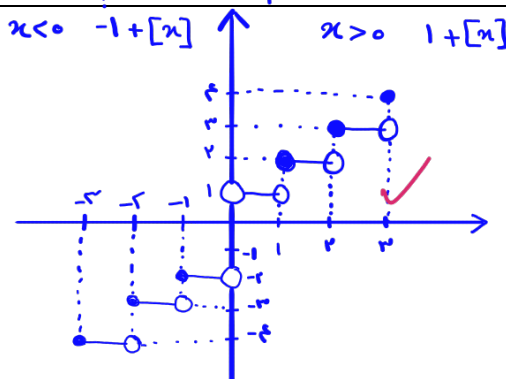
ب) $\square \rightarrow \begin{cases} 1 \rightarrow 2-4=-1 \\ -1 \rightarrow -2-4=-6 \end{cases}$

$R_g = [-6, -1]$

یا $3 \times [-1, 1] \rightarrow [-3, 3]$

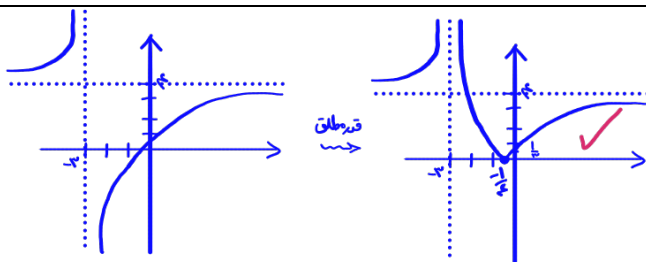
$y = \frac{x}{|x|} + [x]$

$x \neq 0$



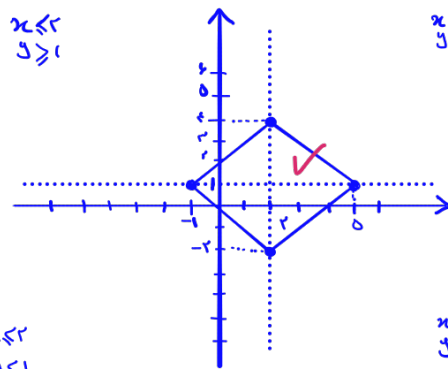
$y = \frac{x+1}{x+3}$

$\begin{cases} 3 = -3 \\ 1 = \frac{4}{1} = 4 \\ 0 = \frac{1}{3} \\ \frac{1}{3} = 0 \end{cases}$



$|x-2| + |y-1| = 3$

$\begin{cases} -x+2+y-1=3 \\ y=x+2 \\ \begin{vmatrix} 2 & -1 \\ 1 & 1 \end{vmatrix} \end{cases}$



$\begin{vmatrix} 2 & -1 \\ -2 & 1 \end{vmatrix} \rightarrow y = -x$

$\begin{cases} x \geq 2 \\ y \geq 1 \end{cases} \rightarrow \begin{cases} y-1+x-2=3 \\ y=-x+6 \\ \begin{vmatrix} 1 & 1 \\ 1 & 1 \end{vmatrix} \end{cases}$

$\begin{cases} x \geq 2 \\ y \leq 1 \end{cases} \rightarrow \begin{cases} x-2-y+1=3 \\ y=x-4 \\ \begin{vmatrix} 1 & 1 \\ 1 & -1 \end{vmatrix} \end{cases}$

الف) $t^x + 2t \rightarrow \square \rightarrow \begin{cases} \sqrt{x} \rightarrow 2+\sqrt{x} = \frac{4}{\sqrt{x}} \\ \sqrt{x} \approx \sqrt{t} \\ +\infty \rightarrow \infty \\ \frac{x}{t} = -1 \end{cases}$

$R_f = [\frac{4}{\sqrt{x}}, +\infty)$

ب) $y = -\sin^2 x + \sqrt{2} \sin x + 3 \rightarrow \begin{cases} 1 \rightarrow -1+2+3=4 \\ -1 \rightarrow -1-2+3=0 \\ \frac{x}{t} = 1 \end{cases}$

$R_f = [0, 4]$

$$D_f = \{1, 2, 3, 4, 5, 6, 7, 8, 9\} \rightarrow \left(-\frac{1}{r}x\right) + 1 + \left(-\frac{1}{r}x\right) + 1 + \dots \rightarrow \frac{-1}{r} \left(1 + \dots + 1\right) + \cancel{1} \left(\cancel{9}\right) = -10 + 9 = \cancel{1} \quad \text{2}$$

$$\{x \mid x < 1, x \in \mathbb{N}\}$$

$$\frac{nxn+1}{r} = \frac{1x1}{r} = \cancel{1} \quad \text{6}$$

$$[r, \infty) \rightarrow r = \frac{2}{\dots} \rightarrow a = 0 \quad \text{2}$$

$$f(r) = \sqrt{rb+c} = 1 \quad \forall b+c=0$$

$$\forall b+c=1 \rightarrow b+0=1 \quad b=1 \quad c=-r \quad \text{7}$$

$$g = \sqrt{x^r + c} \rightarrow R_g = \sqrt{[r, +\infty)} = [1, +\infty)$$

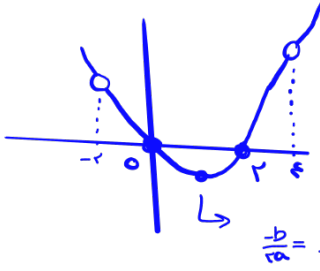
$$\frac{-b}{ra} = 0 \quad \frac{-b}{ra} = r$$

$$f(x) = \frac{x(x-r)(x+r)}{x+r} \quad D = \mathbb{R} - \{a, b\}$$

$$R = [c, +\infty) - \{1\}$$

$$x^r - rx \neq 1$$

$$x^r - rx - 1 \neq 0$$

$$(x-r)(x+r) \neq 0 \rightarrow x \neq \begin{matrix} a \\ r \end{matrix}, \begin{matrix} b \\ -r \end{matrix}$$


$$\frac{-b}{ra} = \frac{r}{r} = 1 \rightarrow \boxed{1=c}$$

$$f\left(\frac{a+b}{rc}\right) = f\left(\frac{r}{-r}\right) = 1+r = \cancel{1} \quad \text{8}$$

$$g \rightarrow \sqrt[r]{(x+k)^r} = \sqrt[r]{x^r + rkx^{r-1} + \dots + k^r} \rightarrow \sqrt[r]{(x-r)^r} = x-r \xrightarrow{r \rightarrow \infty} \begin{matrix} -r \\ -1 \end{matrix} \parallel \begin{matrix} 1r \\ 1 \end{matrix} \quad \text{2}$$

$$K^r = -1$$

$$K = -r$$

$$(x-r)^r = x^r - rx^{r-1} + \dots - 1$$

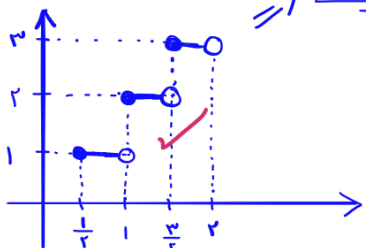
$$a = -r$$

$$b = 1r$$

$$D = [-r, 1r] \quad R_f = [\cancel{1}, 0] \quad \text{9}$$

$$y = \begin{bmatrix} x \end{bmatrix} + \begin{bmatrix} x + \frac{1}{r} \end{bmatrix}$$

$$\begin{matrix} \swarrow & \searrow \\ [\frac{1}{r}, 1) & [1, 2) \\ \textcircled{0} & \textcircled{1} \end{matrix} \quad \dots \quad \begin{matrix} \swarrow & \searrow & \searrow \\ [\frac{1}{r}, 1) & [1, \frac{r}{r}) & [\frac{r}{r}, 2) \\ \textcircled{1} & \textcircled{1} & \textcircled{2} \end{matrix}$$

$$+ = \begin{matrix} 1 & 2 & 3 \end{matrix}$$


$$\Rightarrow \frac{b \cdot \frac{1}{r}}{r} \quad \text{2}$$