

۲۰ افزودنی:

۱)

الف) $y = \frac{|x|+1}{|x|-1} \rightarrow y(|x|-1) = |x|+1 \rightarrow |x|(y-1) = y+1 \rightarrow |x| = \frac{y+1}{y-1}$

(۲)

$\frac{|y+1|}{y-1} \geq 0 \rightarrow \frac{1}{1-\frac{1}{y}} \rightarrow R_f = (-\infty, -1] \cup (1, +\infty)$

ب) $y = \frac{x^2+1}{|x|} \rightarrow y(|x|+1) = |x|+1 \rightarrow R_f = [2, +\infty)$

۲) $y = \frac{x^2+2x-2}{x+2}$

$yx + 2y - x^2 - 2x + 2 = 0 \rightarrow x^2 + (2-y)x - 2y - 2 = 0$

(۲)

$a = \frac{-b \pm \sqrt{\Delta}}{2a} \rightarrow 0 \geq 0 \rightarrow (2-y)^2 - 4(-2y-2) \geq 0 \rightarrow 4 + y^2 - 4y + 1 + 8y + 8 \geq 0$

$y^2 + 4y + 13 \geq 0 \rightarrow (y+2)(y+9) \geq 0 \rightarrow \frac{y-2}{y+9} \rightarrow R_f = (-\infty, -9] \cup (-2, +\infty)$

۳)

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

$\Delta = 1-4 = -3 < 0 \rightarrow D_f = \mathbb{R}$

(۲)

$y \neq 1 \rightarrow a = \frac{-(1-y) \pm \sqrt{\Delta}}{2(y-1)}$

$\Delta \geq 0 \rightarrow (1-y)^2 - 4(y-1)(y-\frac{1}{y}) \geq 0 \rightarrow \frac{y-1}{y} \rightarrow R_f = [0, 1]$

۴)

الف) $y = \sqrt{x^2+2x-1}$

$\frac{h}{f(a)} = \frac{f}{-f} \rightarrow 2$

$\rightarrow R_f = \sqrt{(-\infty, 2]} = [-2, 2]$

(۲)

ب) $y = \sqrt{2x^2-12x}$

$\frac{h}{f(a)} = \frac{1}{f} \rightarrow 2$

$R_f = \sqrt{[-1, +\infty)} = [1, +\infty)$

۵)

الف) $y = f(x^2-x+1)$

$R_f = f(\mathbb{R}) = (-\infty, +\infty)$

(۲)

ب) $y = \log(\frac{x^2+1}{x})$

$\rightarrow R_f = f(\mathbb{R}) = [1, +\infty)$

$\rightarrow R_f = [1, +\infty)$

4)

a) $y = |x-1| - |x-1|$

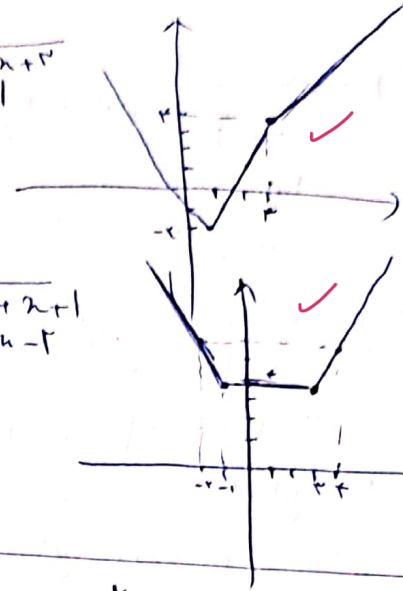
$x-1 > 1$ $x > 2$	$x-1 < 1$ $x < 2$	$x-1 < 1$ $x < 2$
$x-1-1$ $x-2$	$x-1-1$ $x-2$	$x-1-1$ $x-2$

$y = [-2, +\infty)$

b) $y = |x-1| + |x+1|$

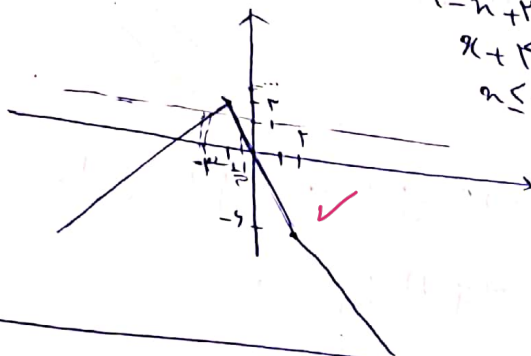
$x-1 > 1$ $x > 2$	$x-1 < 1$ $x < 2$	$x-1 < 1$ $x < 2$
$x-1+1$ x	$x-1+1$ x	$x-1+1$ x

$y = [2, +\infty)$



(2)

v) $|x-1| - |x+1| \leq 1$

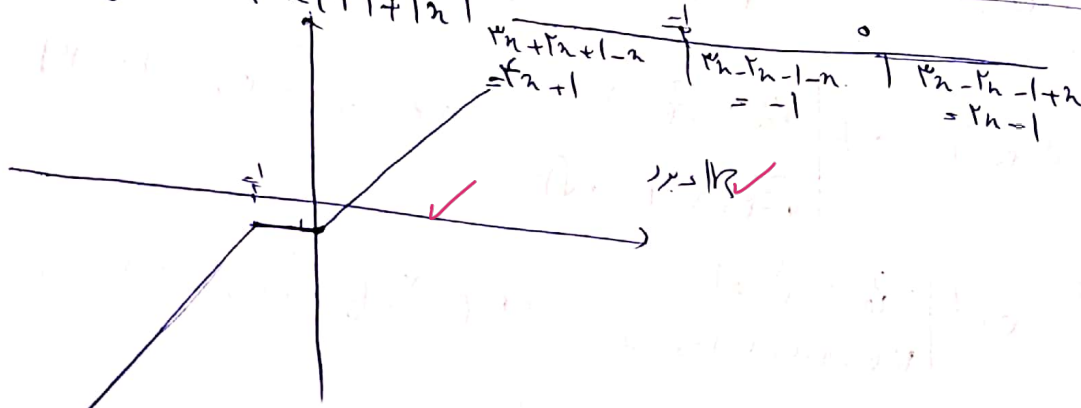


$x-1 > 1$ $x > 2$	$x-1 < 1$ $x < 2$	$x-1 < 1$ $x < 2$
$x-1-1$ $x-2$	$x-1-1$ $x-2$	$x-1-1$ $x-2$

$x \in (-\infty, -1] \cup [1, +\infty)$

(2)

1) $y = x - |x+1| + |x|$



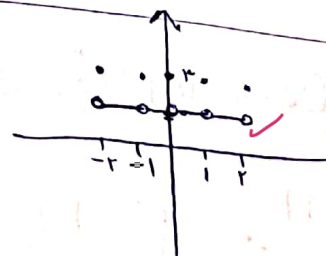
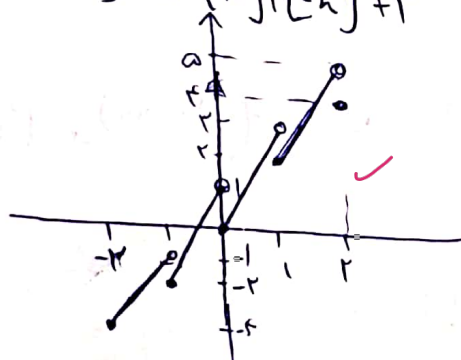
(2)

9)

a) $y = [x] + [x-1] = [x] + [-x] + 1$

$-1 < x \leq 0$ and $x \in \mathbb{Z}$

b) $y = x - [x]$



$y = \{x\}$

$y \in [-1, 1)$

(2)

10) الف)

$$y_s \sin^2 \alpha - \sin \alpha + 1$$

$$\begin{array}{c} \begin{array}{c} 1 \\ \downarrow \\ -1 \end{array} \quad \begin{array}{c} 1 \\ \downarrow \\ +1 \end{array} \quad \begin{array}{c} 1 \\ \downarrow \\ +1 \end{array} \quad \begin{array}{c} 1 \\ \downarrow \\ +1 \end{array} \quad \begin{array}{c} 1 \\ \downarrow \\ +1 \end{array} \\ \frac{-p}{pa+p} \quad \frac{1}{p} = \frac{1}{p} + 1 + \frac{s}{p} \end{array}$$

$$\rightarrow x_s \left[\frac{p}{p}, p \right]$$

(2)

ب)

$$y_s \sin^2 \alpha + \sin \alpha + 1$$

$$\begin{array}{c} \begin{array}{c} 1 \\ \downarrow \\ -1 \end{array} \quad \begin{array}{c} 1 \\ \downarrow \\ +1 \end{array} \quad \begin{array}{c} 1 \\ \downarrow \\ +1 \end{array} \quad \begin{array}{c} 1 \\ \downarrow \\ +1 \end{array} \quad \begin{array}{c} 1 \\ \downarrow \\ +1 \end{array} \\ \frac{-p}{pa+p} \quad \frac{1}{p} = \frac{1}{p} + 1 + \frac{s}{p} \end{array}$$

$$x_s \left[\frac{p}{p}, p \right]$$