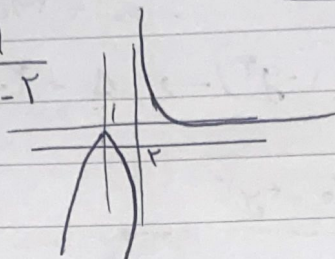


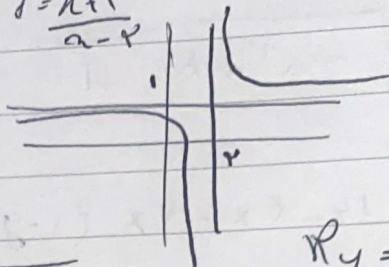
در مسائل

$$y = \frac{|n|+1}{|n|-r}$$

$$y = \frac{|n|+1}{|n|-r}$$



$$y = \frac{n+1}{n-r}$$



$$R_y = \mathbb{R} - \{1\}$$

$$y = \frac{n^r+1}{|n|}$$

$$\rightarrow n > 0$$

$$\frac{n^r+1}{n} = n + \frac{1}{n} \rightarrow n + \frac{1}{n} \geq r$$

$$n < 0 \rightarrow \frac{n^r+1}{-n} = -n + \frac{1}{-n} \rightarrow -n + \frac{1}{-n} \leq -r$$

$$n + \frac{1}{n} \geq r \rightarrow \mathbb{R}^+ [r, +\infty)$$

$$y = \frac{n^r + rn - r}{n+r} \rightarrow yn + ry = n^r + rn - r \rightarrow n^r + r(r-y) - r - ry$$

$$\Delta = (r-y)^2 - 4(-r-ry) = y^2 - ry + r^2 + 4r + 4ry = y^2 + 3ry + r^2 + 4r =$$

$$(y+r)(y+r) \quad n = \frac{y - r \pm \sqrt{(y+r)(y+r)}}{r} = \frac{-r}{r} \pm \frac{-r}{r}$$

$$R = (-\infty, -r] \cup [-r, +\infty)$$

$$y = \frac{n^r - n + \frac{1}{n}}{n^r - n + 1}$$

$$D_y \rightarrow n^r - n + 1 \neq 0$$

$$\Delta \geq 0$$

$$\rightarrow D = \mathbb{R}$$

$$R_y = yn^r - yny = n^r - n + \frac{1}{n} \rightarrow (1-y) + 2(y-1) + \frac{1}{n} - y =$$

$$\Delta = (y-1)^2 - 4\left(\frac{1}{n} - y\right)(1-y) = y^2 - ry - ry^2 + 4y + 1 =$$

$$-ry^2 + ry$$

$$R_y = [0, 1]$$

$$n = \frac{1-y \pm \sqrt{ry(-y+1)}}{r-ry}$$

$$r-ry$$

$$y \neq 1$$

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$$y = \sqrt{-n^2 + 4n - 1}$$

$$y^2 = -n^2 + 4n - 1$$

$$-n^2 + 4n - 1 - y^2 = 0$$

$$\Delta = 16 - 4 \times (-1) \times (-1 - y^2) \rightarrow \Delta = 12 - 4y^2$$

$$n = \frac{-4 \pm \sqrt{12 - 4y^2}}{-2}$$

$$\frac{-\sqrt{3} \pm \sqrt{3}}{-2}$$

$$y = \sqrt{4n^2 - 4n}$$

$$y^2 = 4n^2 - 4n$$

$$4n^2 - 4n - y^2 = 0$$

$$\Delta = 16 - 4 \times (-1) \times (-y^2) = 16 - 4y^2 = 4(4 - y^2)$$

$$n = \frac{1 \pm \sqrt{4 - y^2}}{2}$$

$$\frac{1 \pm \sqrt{4 - y^2}}{2}$$

$$R_y = (-\infty, 2] \cup [2, \infty)$$

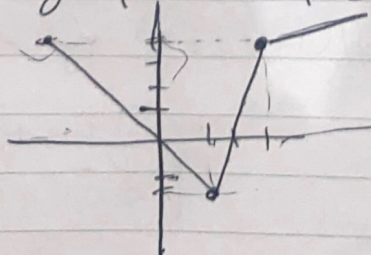
$$y = \log \frac{n^2 - n + 1}{n}$$

$$R_y = (-\infty, \infty)$$

$$y = \log \frac{n^2 + 1}{n} \rightarrow \frac{n^2 + 1}{n} > 0 \quad n > 0$$

$$n + \frac{1}{n} \geq 2 \quad y = \log \frac{n^2 + 1}{n} \rightarrow R_y = [1, \infty)$$

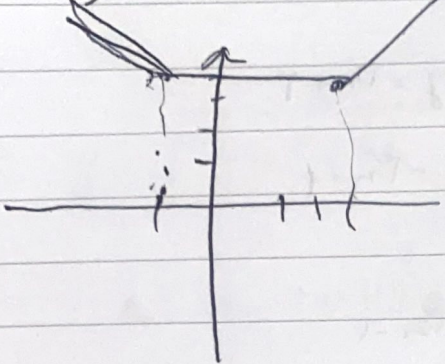
$$f(x) = y = |x - 1| - |x - 2|$$



$x - 1 \geq 0$	$x - 2 \geq 0$	$x - 1 < 0$
$x \geq 1$	$x \geq 2$	$x < 1$
$x - 1 = x - 1$	$x - 2 = x - 2$	$x - 1 = -(x - 1)$
$x - 1 = x - 1$	$x - 2 = x - 2$	$x - 1 = -x + 1$
$x - 1 = x - 1$	$x - 2 = x - 2$	$x - 1 = -x + 1$

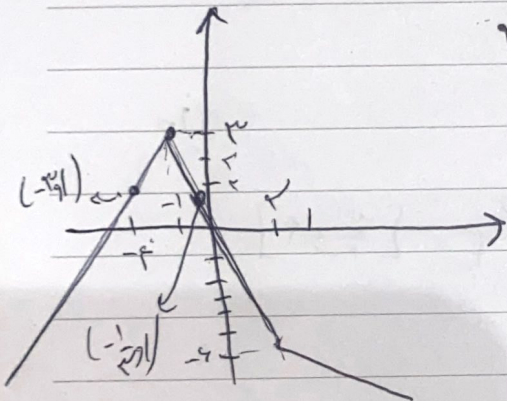
مسائل

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



$x < -1$	$-1 \leq x < 2$	$x \geq 2$
$y = -x + 1$	$y = 3$	$y = x + 3$

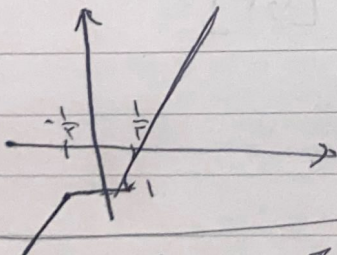
$R_f = [1, +\infty)$



$x < -1$	$-1 \leq x < 2$	$x \geq 2$
$y = -x - 1$	$y = -3$	$y = x - 3$

$R_f = \mathbb{R} - [-1, \frac{1}{2}]$

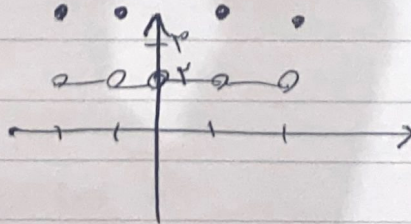
$y = |x-2| - |x+1| + |x|$



$x < -1$	$-1 \leq x < 0$	$0 \leq x < 2$	$x \geq 2$
$y = -x + 1$	$y = x + 1$	$y = x + 1$	$y = x - 1$

$R_f = \mathbb{R}$

2) $y = [x] + [x-2] = [x] + [-x] + 2$



$$1) y = \cos x - [x]$$

$$-2 \leq x < -1 \rightarrow [x] = -2 \rightarrow y = \cos x + 2$$

$$-1 \leq x < 0 \rightarrow [x] = -1 \rightarrow y = \cos x + 1$$

$$0 \leq x < 1 \rightarrow [x] = 0 \rightarrow y = \cos x$$

$$1 \leq x < 2 \rightarrow [x] = 1 \rightarrow y = \cos x - 1$$

$$x = 2 \rightarrow y = -1$$

$$R_f = [-1, 2]$$

$$2) y = \sin x - \sin x + 1$$

(10)

$$\sin x = 1 \rightarrow 1 - 1 + 1 = 1$$

$$\sin x = -1 \rightarrow -1 - (-1) + 1 = 1$$

$$\sin x = \frac{1}{2} \rightarrow \frac{1}{2} - \frac{1}{2} + 1 = 1$$

$$R_f = [1, 1]$$

$$3) y = \sin^2 x + \sin^2 x + 1$$

$$\sin^2 x = 0 \rightarrow 0 + 0 + 1 = 1$$

$$\sin^2 x = 1 \rightarrow 1 + 1 + 1 = 3$$

$$\sin^2 x \neq -\frac{1}{2}$$

$$R_f = [1, 3]$$