

$$y = \frac{m^2 + n^2}{m-1} \rightarrow ym - y = m^2 + n^2 \rightarrow 0 = m^2 + (1-y)m + y \rightarrow m = \frac{y-1 \pm \sqrt{\Delta}}{2}$$

$$\Delta \geq 0 \rightarrow y^2 + 1 - 2y - 4y - 4 \geq 0 \rightarrow y^2 - 6y - 3 \geq 0 \rightarrow (y-3)(y+1) \geq 0$$

$$R_D = (\infty, -1] \cup [3, +\infty)$$

$$1) y = \frac{m^2 - 5m + 1}{m+1} \rightarrow y(m+1) = m^2 - 5m + 1 \rightarrow m^2 - (y+5)m + (y-1) = 0$$

$$R_D = [1, +\infty)$$

$$2) y = \sqrt{m^2 - 5m + 1} \rightarrow y^2 = m^2 - 5m + 1 \rightarrow m^2 - (y^2 + 5)m + (y^2 - 1) = 0$$

$$R_D = [0, +\infty)$$

$$3) y = \frac{m+1}{m-5} \rightarrow y(m-5) = m+1 \rightarrow ym - 5y = m+1 \rightarrow ym - m = 5y + 1 \rightarrow m(y-1) = 5y+1$$

$$R_D = \mathbb{R} \setminus \left\{ \frac{1}{5} \right\}$$

$$4) y = \frac{m^2 + 1}{\sqrt{m^2 + 1}} \rightarrow y = \sqrt{m^2 + 1} \rightarrow y^2 = m^2 + 1 \rightarrow m^2 - (y^2 - 1) = 0$$

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

$$5) y = \frac{m^2 + 1}{m^2 - 1} \rightarrow y(m^2 - 1) = m^2 + 1 \rightarrow ym^2 - y = m^2 + 1 \rightarrow ym^2 - m^2 = y + 1 \rightarrow m^2(y-1) = y+1$$

$$R_D = (\infty, -1] \cup (1, +\infty)$$

$$6) y = \frac{m^2 + 1}{m^2 - 1} \rightarrow y = \frac{m^2 + 1}{m^2 - 1} \rightarrow y(m^2 - 1) = m^2 + 1 \rightarrow ym^2 - y = m^2 + 1 \rightarrow ym^2 - m^2 = y + 1 \rightarrow m^2(y-1) = y+1$$

$$R_D = \left(\frac{1}{y-1}, +\infty \right)$$

$$7) y = \frac{2 \sin m - 1}{\sin m + 1} \rightarrow y(\sin m + 1) = 2 \sin m - 1 \rightarrow y \sin m + y = 2 \sin m - 1 \rightarrow y \sin m - 2 \sin m = -y - 1 \rightarrow \sin m(y-2) = -y-1$$

$$R_D = \left[-\frac{1}{2}, \frac{1}{2} \right]$$

$$8) y = \frac{2 \sin m - 1}{\sin m + 1} \rightarrow y = \frac{2 \sin m - 1}{\sin m + 1} \rightarrow y(\sin m + 1) = 2 \sin m - 1 \rightarrow y \sin m + y = 2 \sin m - 1 \rightarrow y \sin m - 2 \sin m = -y - 1 \rightarrow \sin m(y-2) = -y-1$$

$$R_D = \left[-\frac{1}{2}, \frac{1}{2} \right]$$

الف) $y = |2m-2| - |m-2|$

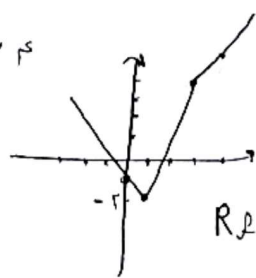
نقطه کزای

$m = 0 \rightarrow -1$

$m = 1 \rightarrow -1$

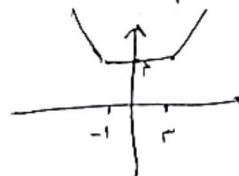
$m = 2 \rightarrow 0$

$m = 3 \rightarrow 1$



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

ب) $y = |m-2| + |m+1|$ شکل د



$R_d = [3, +\infty)$

✓

$|m-2| - |2m+2| \leq 1$

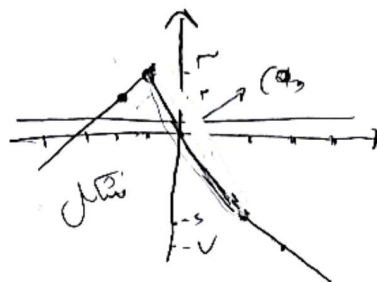
نقطه کزای $m = -1, 2, 3$

$m = -1 \rightarrow 2$

$m = 2 \rightarrow 3$

$m = 3 \rightarrow 6$

$m = 4 \rightarrow 7$



m	-1	2
$m+2$	$-m$	$-m-2$
$m-2$	$-m-2$	$-m$
$m \leq -1$	$m > \frac{1}{2}$	$m > 0$

$R_d = \mathbb{R} - (-2, -\frac{1}{2})$

✓

$f(m) = \frac{m^2 - m + 1}{m^2 - m + 1} \rightarrow y = m^2 - ym + y = m^2 - m + \frac{1}{2} \rightarrow m^2(1-y) + (1+y)m + \frac{1}{2} - y \neq 0$

$m = \frac{-y \pm \sqrt{y^2 - 4(1-y)(\frac{1}{2}-y)}}{2(1-y)} \rightarrow 1-y^2 + 2y + y^2 - 2y + 1 = 0 \rightarrow 2y^2 - 4y + 2 = 0 \rightarrow y = 1$

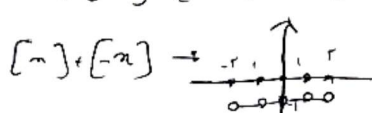
$m^2 - m + 1 = 0 \rightarrow \Delta < 0$

$R_d = \mathbb{R}$

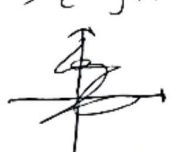
$R_d = (-\infty, 1] \cup [1, +\infty)$

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الف) $[m] + [2-m] = [m] + [-m] + 2$



$[m] + [-m] + 2$

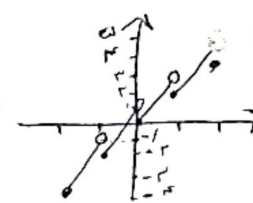


$y = [m]$

$R_d = \{y \mid y \in \mathbb{Z}\}$

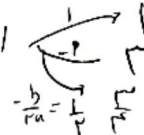
$R_d = \{2, 3\}$

$\begin{cases} -1 \leq m < 1 & [m] = -1 \\ -1 \leq m < 0 & [m] = -1 \\ 0 \leq m < 1 & [m] = 0 \\ 1 \leq m < 2 & [m] = 1 \end{cases}$



$R_d = [-1, 1)$

الف) $y = \sin^2 m - \sin m + 1$ $[\frac{1}{4}, 2] = R_d$



ب) $\sin^2 m + \sin^2 m + 1 = y$ $[\frac{1}{4}, 2] = R_d$



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