

۱۸۷۸

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

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

$$R_f = (-\infty, -1] \cup [3, +\infty) \quad \checkmark \quad \left(\frac{-1 \pm \sqrt{1+12}}{2} \right)$$

دسته ۱

۱) $y = \frac{m^2 - 5m + 1}{m+1} \rightarrow y(m+1) = m^2 - 5m + 1 \rightarrow m^2 - (y+5)m + 1 = 0$
 $\Delta = 25 - 4(y+1) \geq 0 \rightarrow 21 - 4y \geq 0 \rightarrow y \leq \frac{21}{4}$
 $R_f = (-\infty, \frac{21}{4}]$

۲) $y = \sqrt{m^2 - 5m + 1} \rightarrow y^2 = m^2 - 5m + 1 \rightarrow m^2 - 5m + 1 - y^2 = 0$
 $\Delta = 25 - 4(1 - y^2) \geq 0 \rightarrow 21 + 4y^2 \geq 0$
 $R_f = \mathbb{R}$

۳) $y = \frac{m^2 - 5m + 1}{m+1} \rightarrow y(m+1) = m^2 - 5m + 1 \rightarrow m^2 - (y+5)m + 1 = 0$
 $\Delta = 25 - 4(y+1) \geq 0 \rightarrow 21 - 4y \geq 0 \rightarrow y \leq \frac{21}{4}$
 $R_f = (-\infty, \frac{21}{4}]$

۴) $y = \frac{m^2 + 1}{m-1} \rightarrow y(m-1) = m^2 + 1 \rightarrow m^2 - ym + 1 = 0$
 $\Delta = y^2 - 4 \geq 0 \rightarrow y \leq -2 \text{ or } y \geq 2$
 $R_f = (-\infty, -2] \cup [2, +\infty)$

۵) $y = \frac{m^2 + 1}{m-1} \rightarrow y(m-1) = m^2 + 1 \rightarrow m^2 - ym + 1 = 0$
 $\Delta = y^2 - 4 \geq 0 \rightarrow y \leq -2 \text{ or } y \geq 2$
 $R_f = (-\infty, -2] \cup [2, +\infty)$

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

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۹) $y = \frac{m^2 + 1}{m-1} \rightarrow y(m-1) = m^2 + 1 \rightarrow m^2 - ym + 1 = 0$
 $\Delta = y^2 - 4 \geq 0 \rightarrow y \leq -2 \text{ or } y \geq 2$
 $R_f = (-\infty, -2] \cup [2, +\infty)$

الف) $y = |2m-2| - |m-2|$

نقطه کزای

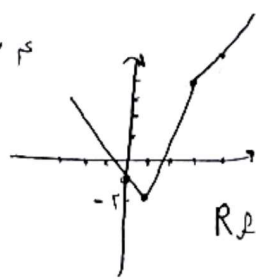
$m = 0 \rightarrow -1$

$m = 1 \rightarrow -1$

$m = 2 \rightarrow 0$

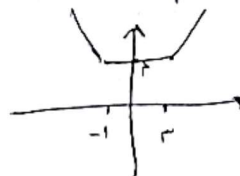
$m = 3 \rightarrow 1$

$m = 4 \rightarrow 2$



$R_d = [-1, +\infty)$

ب) $y = |m-2| + |m+1|$ شکل د



$R_d = [1, +\infty)$

2
✓

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

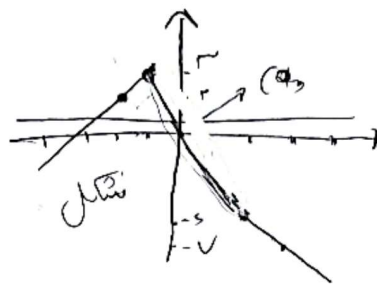
نقطه کزای $-1, 2, 3$

$m = -1 \rightarrow 2$

$m = 0 \rightarrow 3$

$m = 2 \rightarrow -6$

$m = 3 \rightarrow -7$



$m < -1$	$-2m$	$-m-2$
$-1 \leq m < 0$	$-m-1$	$-m-2$
$0 \leq m < 2$	$-m-1$	$-m-2$
$m \geq 2$	$-m-1$	$-m-2$

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

2
✓

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

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

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

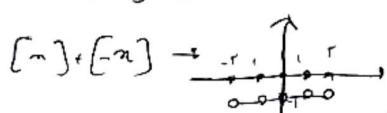
$x = y-1 \pm \sqrt{(y-1)^2 - 4(y-\frac{1}{y})(y-1)} \rightarrow 0 \leq y < 1$

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

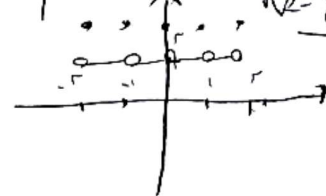
$R_d = \mathbb{R}$

1, 2, 3

الف) $[m] + [2-m] = [n] + [-n] + 3$

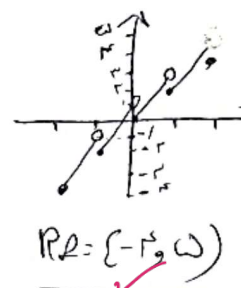


$[m] + [-m] + 3$



$y = [m]$

$-1 \leq m < 0$	$m-2$
$0 \leq m < 1$	$m-1$
$1 \leq m < 2$	m
$2 \leq m < 3$	$m+1$



$R_d = [-1, \infty)$

2
9

الف) $y = \sin^2 m - \sin^2 n + 1$

$[\frac{1}{2}, 3] = R_d$

$\sin^2 m + \sin^2 n + 1 = y$

$R_d = [1, 3]$

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