

الف) $y = n^3 - 2n^2 + 3n$

$$y = (n-1)^2 + 1$$

$$n = \sqrt{y-1} + 1$$

$$R_f = \mathbb{R} \checkmark$$

ب) $y = \frac{1}{n^2 - 2n}$

$$y = \frac{1}{(n-1)^2 - 1}$$

$$\frac{-1}{+1-1+}$$

$$n = \sqrt{1 + \frac{1}{y}} + 1$$

$$R_f: (-\infty, 0) \cup (0, +\infty) \setminus (-\infty, -1] \cup (0, +\infty)$$

(۱,۵)

الف) $y = n^2 - 4n + 6$

$$\left| \frac{y}{4} = 2 \right| R_f: [4, +\infty) \checkmark$$

ب) $y = -n^2 + 4n + 3$

$$\left| \frac{y}{12} = 3 \right| R_f: (-\infty, 12] \checkmark$$

(۲)

ج) $y = \sqrt{n^2 - 4n - 3}$

$$\left| \frac{y}{-4} = 2 \right| R_f: \sqrt{(-4, +\infty)} = [0, +\infty) \checkmark$$

د) $y = \sqrt{-n^2 + 4n}$

$$\left| \frac{y}{9} = 3 \right| R_f: \sqrt{(-\infty, 9]} = [0, 3] \checkmark$$

الف) $y = n^2 - 6n^2 + 3n + 1$

$$R_f: \mathbb{R} \checkmark$$

ب) $y = n^4 - 4n^2 + 3n + 2$

$$R_f: \mathbb{R} \checkmark$$

(۲)

ج) $y = \sqrt{n^4 - 4n^2 + 6n + 1}$

$$R_f: [0, +\infty) \checkmark$$

د) $y = (n^2 - 4n^2 + 3n + 1)^2$

$$R_f: [0, +\infty) \checkmark$$

الف) $y = \frac{2n+1}{n-2}$

$$R_f: \mathbb{R} - \{2\} \checkmark$$

ب) $y = \frac{2n+1}{n+1}$

$$R_f: \mathbb{R} - \{2\} \checkmark$$

(۲)

الف) $y = \sqrt{\frac{2n+1}{n+1}}$

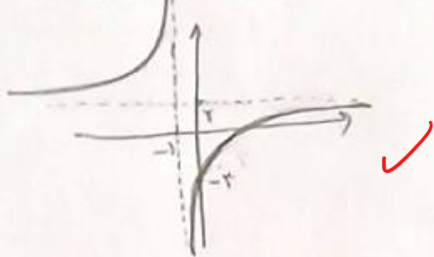
$$R_f: \sqrt{\mathbb{R} - \{2\}} = [0, +\infty) - \{\sqrt{2}\} \checkmark$$

ب) $y = \sqrt{\frac{2n+1}{2-n}}$

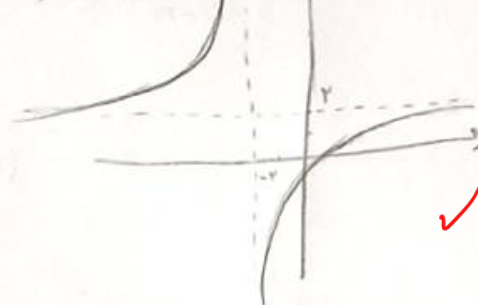
$$R_f: \sqrt{\mathbb{R} - \{2\}} = [0, +\infty) \checkmark$$

(۲)

الف) $y = \frac{r^n - n}{n+1}$ $n=0 \rightarrow y = -r$



ب) $y = \frac{r^n - 1}{n+1}$ $n=0 \rightarrow y = -\frac{1}{r}$



(2)

الف) $y = \sin n + \frac{1}{\sin n}$

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

ب) $\frac{n^4+1}{n^2} = n^2 + \frac{1}{n^2}$

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

(2)

ج) $y = \frac{\sqrt{n^2+1}}{\sqrt{n}} = \sqrt{n} + \frac{1}{\sqrt{n}}$

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

د) $y = \sqrt{n} + \frac{1}{\sqrt{n}}$

$R_f = [2, +\infty)$ ✓

الف) $y = n^r + \frac{1}{n^r+r}$

$n^r+r + \frac{1}{n^r+r} \cdot r \xrightarrow{n=0} r + \frac{1}{r} - r = \frac{1}{r}$

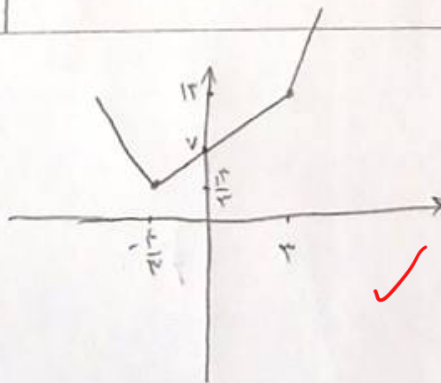
$R_f: [\frac{1}{r}, +\infty)$ ✓

ب) $\frac{n^r+2}{\sqrt{n^r+r}} = \frac{\sqrt{n^r+r}}{\sqrt{n^r+r}} + \frac{1}{\sqrt{n^r+r}}$
 $\min = 2$

$R_f: [\frac{2}{r}, +\infty)$ $\min = 2 + \frac{1}{r} = \frac{2}{r}$

(2)

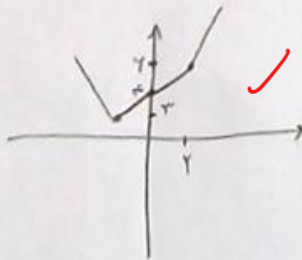
$y = |n-r| + |rn+r|$
 $\frac{-r}{r} \quad r$
 $-f_n-1 \quad |rn+r| \quad f_n+1$



(2)

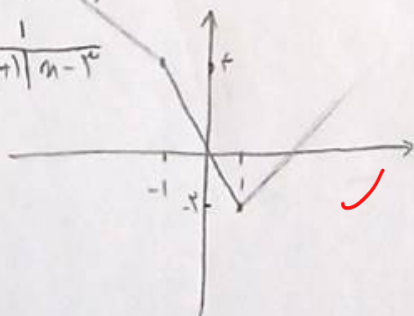
الف) $y = |n-r| + |rn+r|$

$\frac{-1}{-rn} \quad \frac{r}{rn} \quad \frac{1}{rn}$



$y = |rn-r| + |n+1|$

$\frac{-1}{r-n} \quad \frac{1}{-rn+1} \quad \frac{1}{n-r}$



(2)