

$$x^r + r m + 1 + q x^r + 1 - q m \Rightarrow 1 + x^r - r m + r + m x^r + n n + m n = f(m)$$

$$\Rightarrow x^r(1 + m) + x(n - r) + m n = f(m)$$

تابع ثابت:  $1 + m = 0 \sim m = -1$ ,  $n - r = 0 \sim n = r$

$$g(m) = \{(r, -1), (r, r+1), (\frac{r+r}{-1}, -1), (-q, r+k)\} \quad r+1 = -1 \Rightarrow r = -1$$

$$r+k = -1 \sim -1+k = -1 \sim k=0 \Rightarrow m+n+p+k = -1 + r -1 + 1 = -1$$

الف)  $\sqrt{\frac{x-r}{x^2 - r x^r - 1}} \sim x^r - r x^r - 1 = 0$   
 $(x-r)(x+r) = 0$   
 $x^r = r \Rightarrow x = \pm r$   
 $x^r = -r$  غلط  

|      |    |   |
|------|----|---|
|      | -r | r |
| صورت | -  | + |
| مخرج | +  | - |
| ج    | -  | + |

 $D_f = (-r, +\infty)$

ب)  $r \neq r[-m] \Rightarrow r \neq [-m] \Rightarrow r \leq -m < r \Rightarrow -r \geq m > -r$

$$D_f = (-r, -r]$$

الف)  $I: x(x^r - 1) \geq 0 \Rightarrow \begin{cases} x=0 \\ x^r - 1 = 0 \Rightarrow x = \pm 1 \end{cases}$   
 II:  $|x| + x > 0 \Rightarrow \begin{cases} x > 0 \\ x < 0 \end{cases} \Rightarrow (0, +\infty)$   

|         |    |   |   |
|---------|----|---|---|
|         | -1 | 0 | 1 |
| (x)     | -  | 0 | + |
| (x^r-1) | +  | 0 | - |
| ج       | -  | + | - |

 $I \cap II: [1, +\infty)$

ب)  $|x-r| - x^r \geq 0 \Rightarrow \begin{cases} x-r \geq x^r \Rightarrow ① \quad 0 \geq x^r - x + r \\ x-r \leq -x^r \Rightarrow ② \quad x^r + x - r \leq 0 \end{cases}$

①:  $\Delta < 0 \quad x = \frac{1 \pm \sqrt{1-4+r}}{2} \Rightarrow$  ریشه ندارد  
 ②:  $(x+r)(x-1) = 0 \Rightarrow \frac{-r}{+r-r+1} = -1 \Rightarrow [-1, 1]$

$$D_f = [-r, 1) - \{-1\} \quad |x| \neq 1 \Rightarrow x \neq \pm 1$$

①:  $|x-r| - 1 \neq k \quad |x-r| \geq 1 \Rightarrow x \geq r, x \leq 1$   
 ②:  $1 - |x-r| \neq k \quad |x-r| < 1 \Rightarrow 1 < x < r$

$$D_f = \mathbb{R} - \{\text{ریشه مخرج}\}$$

$\Rightarrow ①: |x-r| \neq k+1 \Rightarrow \begin{cases} x-r \neq k+1 \Rightarrow x \neq k+r \quad x \geq r \Rightarrow [r, +\infty) \\ r-x \neq k+1 \Rightarrow x \neq 1-k \quad x \leq r \Rightarrow (-\infty, 1] \end{cases}$   
 $D_{f①} = (-\infty, 1] \cup [r, +\infty)$   
 ②:  $|x-r| \neq 1-k \Rightarrow \begin{cases} x-r \neq 1-k \Rightarrow x \neq 1-k \quad x \geq r \Rightarrow [r, 1) \\ r-x \neq 1-k \Rightarrow x \neq 1+k \quad x < r \Rightarrow (1, r) \end{cases}$   
 $D_{f②} = (1, r)$   
 $\Rightarrow \boxed{k=1}$

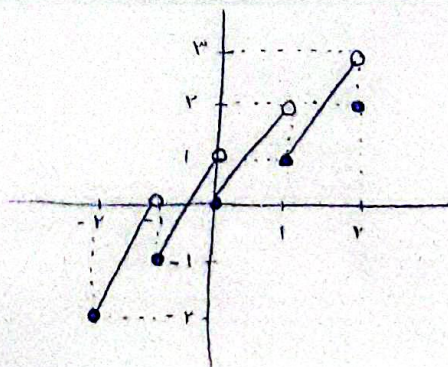
$$r m + r \quad -r \leq m < -1$$

$$r m + 1 \quad -1 \leq m < 0$$

$$r m \quad 0 \leq m < 1$$

$$r m - 1 \quad 1 \leq m < r$$

$$r m - r = r \quad m = r$$





$$\frac{x^r - rx + r}{x+a} = x-b \Rightarrow x^r - bx + ax - ab = x^r - rx + r \Rightarrow \begin{cases} a-b = -r \\ -ab = r \end{cases}$$

$$a = b-r \Rightarrow ab = -r \Rightarrow (b-r)b = -r$$

$$\Rightarrow b^r - rb + r = 0 \Rightarrow (b-1)(b-r) = 0 \Rightarrow \begin{cases} b=1 \\ b=r \end{cases} \Rightarrow a = b-r \Rightarrow \begin{cases} a = -r \\ a = -1 \end{cases}$$

$$\begin{cases} -r-1 = -r \\ -1-1 = -r \\ -r-r = -r \\ -1-r = -r \end{cases}$$

$$\mu_{\text{مقدار } a-b} = \{-r, -r, -r\}$$

$$f(x) = \begin{cases} \frac{(x^r-1)(x+r)}{(x^r-1)} = x+r \\ \frac{ax+r}{x+b} \end{cases}$$

$$x+r = x + \frac{r}{r} \Rightarrow C=r$$

$$x=1: \frac{a+r}{1+b} = r \Rightarrow r+rb = a+r \Rightarrow a = rb+1$$

$$x=-1: \frac{-a+r}{b-1} = -1 \Rightarrow b-1 = -a+r \xrightarrow{\text{ساده‌سازی}} b-1 = -rb-1+r$$

$$\Rightarrow rb = r \Rightarrow b = \frac{1}{r} \quad b+C = \frac{a}{r}$$

$$D_f = rx - ra \geq 0 \Rightarrow x \geq \frac{ra}{r} \quad D_g = b - rx \geq 0 \Rightarrow x \leq \frac{b}{r}$$

$$r f - g = \{(1, k)\} \Rightarrow D_f \cap D_g = \{1\} \quad \frac{ra}{r} = \frac{b}{r}$$

$$f(1) = \sqrt{r-ra} + k-1 \quad g(1) = \sqrt{b-r} = \sqrt{ra-r} \Rightarrow a = \frac{r}{r} > b = r$$

$$r f - g(1) = k \Rightarrow rk - r = k \Rightarrow k = r \Rightarrow ra - \frac{b}{r} - k = r - r - r = -r$$

$$D_g \Rightarrow rx \geq -r \Rightarrow x \geq -1 \quad D_f = m - x \geq 0$$

$$D_{f \times g} = [-1, r] \quad \text{است } f, g \text{ در این بازه}$$

$$\Rightarrow D_f = (-\infty, r] \Rightarrow r \geq x \Rightarrow m = r$$

$$(-\infty, x_0] \leftarrow \text{تابع } f \text{ در این بازه است پس } f \text{ در این بازه } (x_0, +\infty) \leftarrow$$

$$\sqrt{\frac{r-x}{r}} + n - \sqrt{\frac{rx+r}{r}} = 4\sqrt{r}$$

$$\Rightarrow n = 4\sqrt{r} + \sqrt{\frac{rx+r}{r}} - \sqrt{\frac{r-x}{r}} \Rightarrow n = 4\sqrt{r} - r \Rightarrow m+n = r + 4\sqrt{r} - r = 4\sqrt{r}$$

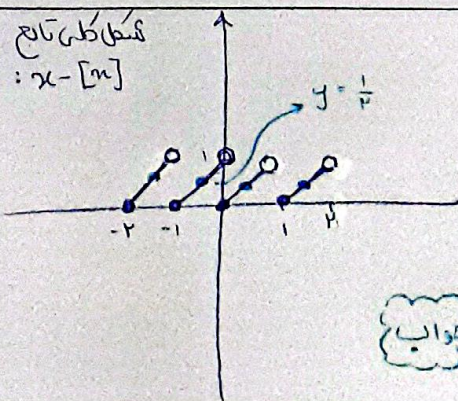
$$-r \leq x < -1 \quad \sim \quad x+r = \frac{1}{r}$$

$$-1 \leq x < 0 \quad \sim \quad x+1 = \frac{1}{r}$$

$$0 \leq x < 1 \quad \sim \quad x = \frac{1}{r}$$

$$1 \leq x < r \quad \sim \quad x-1 = \frac{1}{r}$$

$$x=r \quad \sim \quad \text{مورد خاص}$$



ک جواب