

$$f(n) = (n+1)^2 + (n-1)^2 + mn^2 + n^2 + mn$$

$$\rightarrow f(n) = n^2 + 1 + 2n + n^2 + 1 - 2n + mn^2 + n^2 + mn$$

$$\rightarrow f(n) = (1+m)n^2 + (n-2)n + mn + 2 \rightarrow 1+m=0 \rightarrow \boxed{m=-1}$$

$$\rightarrow n-2=0 \rightarrow \boxed{n=2}$$

$$f(n) = 2 + (-1)(2) = \boxed{-2}$$

$$g(n) = \left\{ \underbrace{(1, m)}_{(1, -1)} \underbrace{(n, p+1)}_{(1, p+1)} \underbrace{(p+2, -1)}_{(-9, -1)} \underbrace{(-9, p+K)}_{p+K=-1} \right\}$$

$$p+K=-1 \rightarrow -11+K=-1 \rightarrow \boxed{K=10}$$

$$p+1=-1 \rightarrow \boxed{p=-2}$$

$$m+n+p+K = -1 + 1 + (-2) + 10 = \boxed{8} \text{ جواب}$$

الف) $f(n) = \sqrt{\frac{n-2}{n^2-2n-8}}$

$$\frac{n-2}{n^2-2n-8} \geq 0 \rightarrow \frac{-2}{-2} \quad \frac{2}{-2} \rightarrow D_f = (-2, +\infty) - \{2\}$$

$$\downarrow \begin{matrix} (n^2-2)(n^2+2) \\ \swarrow \searrow \\ -2 \quad + \end{matrix} \rightarrow \boxed{n \neq -2}$$

ب) $f(n) = \frac{2n^2+1}{2-2[-n]} \rightarrow 2-2[-n] \neq 0 \rightarrow 2[-n] \neq 2 \rightarrow [-n] \neq 1$

$-3 < n \leq -2 \leftarrow n \text{ خارج دامنه تابع}$

$$\rightarrow D_f = \mathbb{R} - (-3, -2]$$

الف) $f(n) = \frac{\sqrt{n(n^2-1)}}{\sqrt{|n|+n}}$

$$n(n^2-1) \geq 0 \rightarrow \begin{matrix} -1 & 0 & 1 \\ | & | & | \\ + & - & + \end{matrix} \rightarrow [-1, 0] \cup [1, +\infty) \text{ I}$$

$$|n|+n > 0 \rightarrow (0, +\infty) \text{ II}$$

$$\text{I} \cap \text{II} \Rightarrow D_f = [1, +\infty)$$

ب) $f(n) = \frac{\sqrt{|n-2|-n^2}}{|n|-1}$

$$|n|-1 \neq 0 \rightarrow |n| \neq 1 \rightarrow \boxed{n \neq \pm 1} \text{ I}$$

$$f(n) = \frac{n^r - rn + r}{n+a} + b \rightarrow \text{جواب}$$

— 4 —

$$\frac{n^r - rn + r + nb + ab}{n+a} = n \rightarrow \frac{n^r + (b-r)n + r + ab}{n+a} = n$$

$$\cancel{n^r} + (b-r)n + r + ab = \cancel{n^r} + an$$

$$\begin{cases} b-r = a \rightarrow b = a+r \\ r+ab = 0 \rightarrow r+a(a+r) = 0 \rightarrow a^2 + ra + r = 0 \rightarrow a = -1 \text{ or } -r \end{cases}$$

if $a = -1 \rightarrow b = r \rightarrow a-b = \boxed{-r}$

if $a = -r \rightarrow b = 1 \rightarrow a-b = \boxed{-r}$

$$f(n) = \begin{cases} \frac{n^r + rn^r - n - r}{n^r - 1} & n \neq \pm 1 \\ \frac{an+r}{n+b} & n = \pm 1 \end{cases}$$

— 5 —

$$g(n) = n + c \rightarrow \boxed{g(n) = n+r}$$

$$n=r \rightarrow \frac{r^r + r(r) - r - r}{r} = \frac{1r}{r} = r \rightarrow r = r+c \Rightarrow \boxed{c=r}$$

$$\left. \begin{aligned} n=1 \rightarrow f(n) &= \frac{a+r}{1+b} \\ \hookrightarrow g(n) &= r \end{aligned} \right\} \frac{a+r}{1+b} = r \rightarrow a+r = r+rb \rightarrow \boxed{a-rb=1}$$

$$\left. \begin{aligned} n=-1 \rightarrow f(n) &= \frac{r-a}{b-1} \\ \hookrightarrow g(n) &= 1 \end{aligned} \right\} \frac{r-a}{b-1} = 1 \rightarrow r-a = b-1 \rightarrow \boxed{a+b=r}$$

$$\begin{cases} a-rb=1 \\ a+b=r \end{cases} \rightarrow \begin{cases} a-rb=1 \\ -a-b=-r \end{cases} \rightarrow -rb = -r \rightarrow \boxed{b = \frac{1}{r}}$$

$$b+c = \frac{1}{r} + r = \boxed{\frac{a}{r}}$$

نکته: چون نقطه یک نقطه در دایره آن مرکز است ← پس معادلت زیر را در نظر بگیرید.

$$\left. \begin{aligned} f(x) &= \sqrt{x-3a} + k - 1 \\ g(x) &= \sqrt{b-x} + 3k \end{aligned} \right\} \begin{aligned} x-3a &= -(b-x) \\ x-3a &= x-b \end{aligned}$$

$b-x=0 \leftarrow$ این است $\leftarrow$ $\boxed{b=3a}$

$\boxed{b=3}$ $\boxed{a=\frac{3}{3}}$

$$2k-2+3k=k \rightarrow 4k=2 \rightarrow \boxed{k=\frac{1}{2}}$$

$$3a - \frac{b}{3} - k = 3\left(\frac{3}{3}\right) - \frac{3}{3} - \frac{1}{2} = 3 - \frac{5}{2} = \left(\frac{1}{2}\right) \quad \text{جواب}$$

$$f(x) = \sqrt{m-x} + x \quad D_{f \times g} = [-1, v]$$

$$g(x) = \sqrt{2x+2} \rightarrow D_g \rightarrow 2x+2 \geq 0 \rightarrow \boxed{x \geq -1}$$

$$D_f \rightarrow m-x \geq 0 \rightarrow x \leq m \rightarrow x \leq v \rightarrow \boxed{m=v} \rightarrow f(x) = \sqrt{v-x} + x$$

$D_{f \times g} = [-1, v]$ ←

$$\left. \begin{aligned} f-g(2) \Rightarrow f(2) &= \sqrt{v-2} + 2 = 2+x \\ g(2) &= \sqrt{2(2)+2} = \sqrt{6} = 2\sqrt{2} \end{aligned} \right\} \begin{aligned} 2+x+2\sqrt{2} &= 4\sqrt{2} \\ \boxed{x} &= 2\sqrt{2}-2 \end{aligned}$$

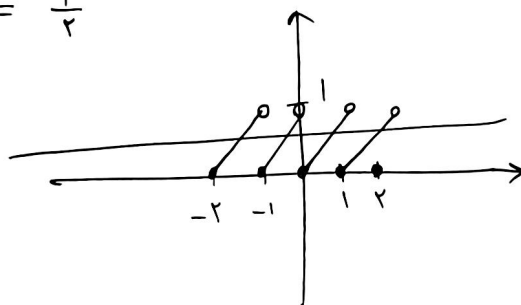
$$m+x = v + 2\sqrt{2} - 2 = \boxed{2\sqrt{2} + 5} \quad \text{جواب}$$

$$y = \left(\frac{1}{x}\right)^2 (x - [x]) = \frac{1}{x}$$

۱۰ - در بازه $[-2, 2]$

$$\rightarrow y = x - [x] = \frac{1}{x}$$

$$0 \leq x - [x] < 1$$



معادله $y = \frac{1}{x}$ دارد. جواب