

$$f(x) = (x+1)^p + (x-1)^q + mx^r + nx + mn$$

سؤال ①

$$g(x) = \{ (f, m), (n, p+1), (p+r, -1), (-q, p+k) \}$$

$$m + n + p + k = ?$$

$$f(x) = x^r + 1 + 2x + 9x^r + 1 - 4x + mx^r + nx + mn$$

$$x^r(1+9+m) + x(2-4+n) + 2 + mn \xrightarrow{\text{ضرایب}} \begin{cases} 1+m=0 \Rightarrow m=-1 \\ n-2=0 \Rightarrow n=2 \end{cases}$$

$$\Rightarrow f(x) = 2 + (-1) = -1$$

$$g(x) = \{ (f, -1), (f, p+1), (p+r, -1), (-q, p+k) \}$$

$$p+1 = -1 \Rightarrow p = -2, \quad p+k = -1 \Rightarrow -2+k = -1 \Rightarrow k = 1$$

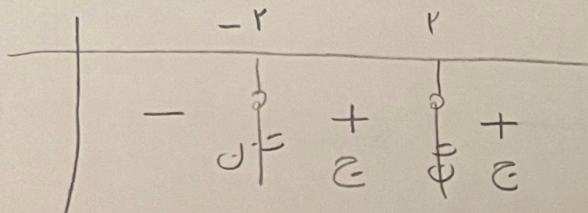
$$m+n+p+k = (-1) + (2) + (-2) + (1) = 0$$

الف) $y = \sqrt{\frac{x-2}{x^2-2x-8}}$

$$\frac{x-2}{x^2-2x-8} \geq 0$$

$$x-2=0 \Rightarrow x=2$$

سؤال ②



$$x^2-2x-8=0 \Rightarrow x^2=t$$

$$t^2-2t-8=0$$

$$(t-4)(t+2)=0 \Rightarrow \begin{cases} t=4 \\ t=-2 \end{cases}$$

$$x^2=4 \Rightarrow x=\pm 2$$

$$x^2=-2 \times \text{مستبعد}$$

$$D_f = (-2, +\infty) - \{2\}$$

$$ب) y = \frac{2x^2+1}{x-2[-x]}$$

$$x-2[-x] \neq 0 \Rightarrow x \neq -x \Rightarrow x \neq 0$$

$$\Rightarrow x < -2 \text{ or } x > 2$$

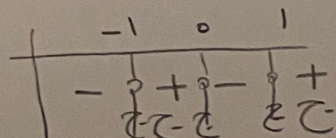
$$\Rightarrow x < -2 \text{ or } x > 2 \Rightarrow D_f = \mathbb{R} - (-2, 2)$$

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

$$\text{① } x(x^2-1) \geq 0 \Rightarrow \begin{cases} x=0 \\ x=1 \\ x=-1 \end{cases}$$

سؤال ③

$$\text{② } |x|+x \geq 0 \Rightarrow \begin{cases} x+x=2x & x > 0 \\ 0 & x < 0 \end{cases}$$



$$[-1, 0] \cup [1, +\infty) \text{ ①}$$

$$(0, +\infty) \text{ ②}$$

$$\text{①, ② } D_f = [1, +\infty)$$

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

$$(I) |x|-1 \neq 0 \Rightarrow |x| \neq 1 \Rightarrow x \neq \pm 1$$

سوال ۳ صحت ب

$$\sqrt{|x-2|-x^2} \sim |x-2|-x^2 \geq 0 \begin{cases} x-2-x^2 & x \geq 2 \\ -(x^2-x+2) \leq 0 & \Delta < 0 \end{cases}$$

جواب ندارد

$$x \neq \pm 1 (I)$$

$$[-2, 1] (II) \Rightarrow (I) \cap (II)$$

$$\begin{cases} -x+2-x^2 \leq 0 & x < 2 \\ -(x^2+x-2) = 0 \Rightarrow (x+2)(x-1) = 0 \\ x = -2 \quad x = 1 \end{cases}$$

$$D_f = [-2, 1] - \{1, -1\}$$

$$\begin{array}{c|cc} & -2 & 1 \\ \hline & + & - \\ & \downarrow & \downarrow \\ & 2 & 1 \end{array}$$

$$f(x) = \frac{1}{||x-2|-1|-k}$$

$$||x-2|-1|-k = 0 \Rightarrow ||x-2|-1| = k \Rightarrow$$

سوال ۴

$$|x-2|-1 = k \Rightarrow |x-2| = k+1$$

$$|x-2|-1 = -k \Rightarrow |x-2| = -k+1$$

$$|x-2| = k+1 \Rightarrow \begin{cases} x-2 = k+1 \rightarrow x = k+3 \rightarrow 4 \\ x-2 = -k-1 \rightarrow x = -k+1 \rightarrow 0 \end{cases}$$

در نقطه مخرج باید منفی شود
سین ۳ عدد صحیح دارد
دانه زوج زیبا
 $-k+3 = k+1 \Rightarrow k=1$

$$|x-2| = -k+1 \Rightarrow \begin{cases} x-2 = -k+1 \rightarrow x = -k+3 \rightarrow 4 \\ x-2 = k-1 \rightarrow x = k+1 \rightarrow 2 \end{cases}$$

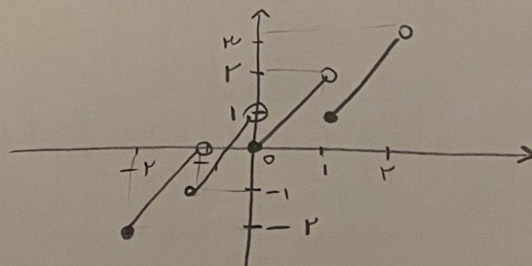
$$y = 2x - [x] \quad [-2, 2]$$

$$-2 \leq x < -1 \rightarrow 2x+2$$

$$-1 \leq x < 0 \rightarrow 2x+1$$

$$0 \leq x < 1 \rightarrow 2x$$

$$1 \leq x < 2 \rightarrow 2x-1$$



سوال ۵

$$f(x) = \frac{x^2 - 6x + 3}{x+a} + b \xrightarrow{\text{تقسیم}} \frac{x^2 - 6x + 3}{x+a} + b = x$$

سوال ۶

$$\frac{x^2 - 6x + 3 + bx + ba}{x+a} = x \Rightarrow \frac{x(x+a)}{x+a} = x^2 + (b-6)x + 3 + ba$$

$$\Rightarrow \begin{cases} b-6 = a \rightarrow b = a+6 \\ 3+ab = 0 \Rightarrow ab = -3 \end{cases} \Rightarrow \begin{cases} a(a+6) = -3 \Rightarrow a^2 + 6a + 3 = 0 \\ (a+3)(a+1) = 0 \\ a = -3 \text{ or } a = -1 \end{cases}$$

$$a-b = -6$$

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

$$g(x) = x + c$$

$$b + c = ?$$

سوال (۷)

$$\frac{x^r + rx^r - x - r}{x^r - 1} = x + c \rightarrow \cancel{x^r} + \cancel{rx^r} - \cancel{x} - r = \cancel{x^r} + \cancel{cx^r} - \cancel{c} - \cancel{x}$$

$$\Rightarrow \boxed{c = r}$$

$$g(x) = x + c \Rightarrow \boxed{g(x) = x + r}$$

$$\begin{cases} \frac{ax + r}{x + b} = f(x) & x = \pm 1 \\ x + r = g(x) \end{cases} \quad \begin{aligned} x = +1 &\Rightarrow r = \frac{a+r}{1+b} \Rightarrow rb - a = -1 \\ x = -1 &\Rightarrow 1 = \frac{-a+r}{b-1} \Rightarrow b+a = r \end{aligned}$$

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

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

$$rb = r \Rightarrow b = \frac{1}{r}$$

$$f(x) = \sqrt{rx - ra} + k - 1$$

$$rf - g = \{(1, k)\}$$

$$g(x) = \sqrt{b - \epsilon x} + rk$$

$$ra - \frac{b}{r} - k = ?$$

$$\begin{aligned} D \quad & \left. \begin{aligned} rx - ra \geq 0 &\Rightarrow x \geq \frac{r}{r} a \\ b - \epsilon x \geq 0 &\Rightarrow x \leq \frac{b}{r} \end{aligned} \right\} \Rightarrow D_{f \cap g} \xrightarrow{\text{مبتن}} \{(1, k)\} \\ & D_{f \cap g} = \{1\} \Rightarrow x = 1 \end{aligned}$$

$$\frac{r}{r} a = 1 \rightarrow \boxed{a = \frac{r}{r}}$$

$$\frac{b}{r} = 1 \Rightarrow \boxed{b = r}$$

$$rf - g = r\sqrt{rx - ra} + rk - 1 - \sqrt{\frac{r}{r}(x - rk)} = K$$

$$\Rightarrow rk - 1 - rk = K \Rightarrow \boxed{K = -1}$$

$$ra - \frac{b}{r} - k = \Rightarrow r\left(\frac{r}{r}\right) - \frac{r}{r} + 1 \Rightarrow ra - \frac{b}{r} - k = r$$

$$f(x) = \sqrt{m-x} + n \Rightarrow m-x \geq 0 \Rightarrow \boxed{x \leq m}$$

سوال ۹)

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

$$D_{f \times g} = [-1, 7] \rightarrow D_f \cap D_g = x \geq -1 \cap x \leq m \Rightarrow \boxed{m=7}$$

$$f - g(3) = 4\sqrt{2}$$

$$m+n=?$$

$$g(3) = \sqrt{2 \times 3 + 2} = \sqrt{8} \Rightarrow f = 4\sqrt{2} + \sqrt{8} = 8\sqrt{2}$$

$$\sqrt{m-x} + n - \sqrt{2x+2} = 4\sqrt{2} \Rightarrow \sqrt{m-3} + n = 8\sqrt{2} \Rightarrow$$

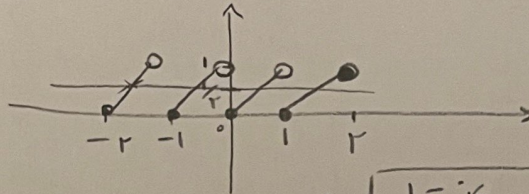
$$2+n = 8\sqrt{2} \Rightarrow \boxed{n = 8\sqrt{2} - 2}$$

$$m+n = 7 + 8\sqrt{2} - 2 = \boxed{5 + 8\sqrt{2}}$$

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

سوال ۱۰) در بازه $[-2, 2]$

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



در نقطه ۱
نمی تواند دارای ۴ جواب است در بازه در نظر