

نام و نام خانوادگی: پاسخنامه تشریحی تکلیف شماره ۲ کلاس: ۱۹، ۵ آقای مصطفی نویسی

$$f(x) = x^4 + px^3 + qx^2 + rx + mn \Rightarrow x^4 + mx^2 + 4x + nx + p + mn =$$

$$(1+m)x^4 + (-4+n)x^3 + pn = 0 \Rightarrow 1+m=0 \Rightarrow m=-1 \text{ و } -4+n=0 \Rightarrow n=4$$

$$g(x) = \left\{ \underbrace{(4, -1)}_{p+1=-1 \Rightarrow p=-1}, \underbrace{(p, -1)}_{-1=-1+K \Rightarrow K=0}, \underbrace{(4, p+1)}_{p+1=0 \Rightarrow p=-1}, \underbrace{(-9, p+K)}_{-1=-1+K \Rightarrow K=0} \right\} \quad m+n+p+K = -1+4-1+0 = 2 \checkmark$$

الف) $x^2 - 2x = 0 \Rightarrow x=2$ ریشه صفر $x^2 + t = t^2 - 2t - 1 = 0 \Rightarrow (t-4)(t+1) = 0 \Rightarrow \begin{cases} t=4 \Rightarrow x=2, -2 \\ t=-1 \Rightarrow x \end{cases}$

$$\frac{x^2}{x^4 - 2x^2 - 1} \geq 0 \quad \frac{x^2}{-x^2 + 1} \geq 0 \quad D_f = (-2, +\infty) \cup \{2\} \checkmark$$

ب) $4 - 2[-x] \neq 0 \Rightarrow 2[-x] \neq 4 \Rightarrow [-x] \neq 2 \Rightarrow 2 \leq -x \leq 3 \Rightarrow -3 \leq x \leq -2$

$$D_f = R - (-3, -2) \checkmark$$

الف) $x(x^2 - 1) \geq 0 \Rightarrow x(x-1)(x+1) \geq 0 \quad \frac{-1}{x+1} - \frac{1}{x-1} \quad [1, +\infty) \cup [-1, 0] \cup \{0\}$

ب) $|x+2| \geq 0 \Rightarrow x \geq -2$ همان

$|x+2| \geq 0 \Rightarrow x \geq -2$ همان $(0, +\infty) \cap [-1, +\infty) = [-1, +\infty) \checkmark$

ب) $|x-1| - x^2 \geq 0 \Rightarrow x^2 - |x-1| \leq 0 \Rightarrow \begin{cases} x \geq 1 \Rightarrow x^2 - x + 1 \leq 0 \Rightarrow (x-1/2)^2 + 3/4 \leq 0 \Rightarrow \text{خارج از حیطه حقیقی} \\ x < 1 \Rightarrow x^2 - 1 + x \leq 0 \Rightarrow (x+1)(x-1) \leq 0 \Rightarrow -1 \leq x < 1 \end{cases}$

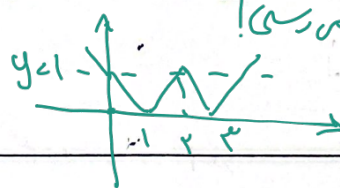
$x \geq 2 \Rightarrow x(x-1) \geq 0 \Rightarrow x \geq 1$ $|x-1| \neq 0 \Rightarrow x \neq 1$ $D_f = [-2, 1) \cup \{1\} \cup \{2\}$

$|x+1| - 1 = K \Rightarrow |x+1| = K+1 \Rightarrow \begin{cases} x+1 = K+1 \Rightarrow x=K \Rightarrow K \geq -1 \\ x+1 = -(K+1) \Rightarrow x = -K-2 \Rightarrow x \geq -1 \end{cases}$

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

$K+3 = -K+1 \Rightarrow 2K = -2 \Rightarrow K = -1$ غرضی

$K+1 = -K+3 \Rightarrow 2K = 2 \Rightarrow K = 1 \checkmark$



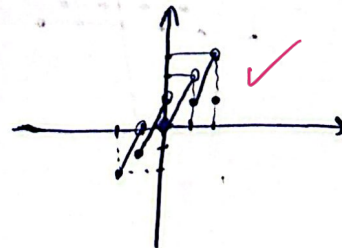
$-1 \leq x < 1 \Rightarrow y = 2x+2$

$-1 \leq x < 0 \Rightarrow y = 2x+1$

$0 \leq x < 1 \Rightarrow y = 2x$

$1 \leq x < 2 \Rightarrow y = 2x-1$

$x \geq 2 \Rightarrow y = 2x-2$



$$f(x) = \frac{x^2 - 5x + 3 + bx + ab}{x+a} = x \Rightarrow x^2 + (-5+b)x + ab = x^2 + ax$$

$$-5+b=a \Rightarrow a-b=-5 \quad \checkmark$$

$$\begin{cases} a=-1 \rightarrow x-3+b=x \rightarrow b=3 & a-b=-4 \\ a=-3 \rightarrow x-1+b=x \rightarrow b=1 & a-b=-2 \end{cases}$$

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$$f(x) = \frac{x^2 + 2x - 2}{x^2 - 1}; x \neq \pm 1 \Rightarrow f(x) = \frac{(x^2 - 1)(x+2)}{x^2 - 1} = x+2$$

$$g(x) = x+c \xrightarrow{f(x)=g(x)} \boxed{c=2}$$

$$x=1 \Rightarrow g(x)=3 \Rightarrow f(x)=3 = \frac{a+2}{1+b} \Rightarrow 3+b=a+2 \Rightarrow a-b=1$$

$$x=-1 \Rightarrow g(x)=1 \Rightarrow f(x)=1 = \frac{2-a}{b-1} \Rightarrow b-1=2-a \Rightarrow a+b=3 \Rightarrow \boxed{b=1} \Rightarrow \boxed{a=2}$$

$$D_f = [1, +\infty) \quad \{x-3a\}_+ = \{x\}_+^3 a \Rightarrow x \geq \frac{3a}{f} \Rightarrow \frac{3a}{f} = 1 \Rightarrow 3a=f \Rightarrow a=\frac{f}{3}$$

$$D_g = (-\infty, 1] \quad b - \{x\}_+ = \{x\}_+^3 b \Rightarrow x \leq \frac{b}{f} \Rightarrow \frac{b}{f} = 1 \Rightarrow b=f$$

$$2x\sqrt{f(1)-f} + 2K-2 = \sqrt{f-f(1)} - 3K = -K-2 = -2 \Rightarrow K=-1$$

$$f\left(\frac{f}{3}\right) = \frac{f}{3} - (-1) = \frac{f}{3} + 1 = 3 \quad \checkmark$$

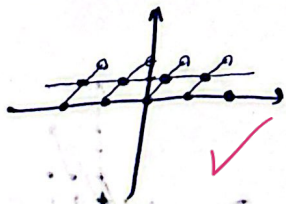
$$D_{f \cap g} = [-1, 2] \quad D_g \Rightarrow 2x+2 \geq 0 \Rightarrow x \geq -1$$

$$D_f \Rightarrow m-x \geq 0 \Rightarrow x \leq m \Rightarrow \boxed{m=2}$$

$$f(m) - g(m) = \sqrt{2-m} + n - \sqrt{1} = 2+n-\sqrt{1} = 2\sqrt{2} \Rightarrow 2+n = 1\sqrt{2} \Rightarrow n = 1\sqrt{2}-2$$

$$m+n = 1\sqrt{2} - 2 + 2 = 1\sqrt{2} \quad \checkmark$$

$$y = x - [x]$$



$$\text{für } x \Rightarrow -1 \leq x < 0$$