نام و نام خانوادگی ..... پاسخنامه تشریحی تکلیف شماره ..... کلاس .....

۱

الف)

$$\frac{x-1}{x}-\frac{x}{x-1}\geq 0 \rightarrow \frac{(x-1)^2-x^2}{x(x-1)}\geq 0 \rightarrow \frac{-2x+1}{x(x-1)}\geq 0$$

$$D=(-\infty,0)\cup\left[\frac{1}{2},1\right)$$

ب)

$$x+1\neq 0 \rightarrow x\neq -1 \quad x\neq 0 \quad x-1\neq 0 \rightarrow x\neq 1 \quad x+2\neq 0 \rightarrow x\neq -2$$

$$\frac{2}{x-1}+\frac{1}{x+2}\neq 0 \rightarrow \frac{2x+4+x-1}{(x-1)(x+2)}\neq 0 \rightarrow 3x+3\neq 0 \rightarrow x\neq -1$$

$$D=R-\{-2,-1,0,1\}$$

۲

الف)

$$\left(\frac{1}{2}x-9\right)\left(3x-x^3\right)\geq 0$$

$$\frac{1}{2}x-9=0 \rightarrow x=-2$$

$$3x-x^3=0 \rightarrow x=0,\pm\sqrt{3}$$

$$D=(-\infty,-2]\cup\left[0,\frac{9}{2}\right]\cup[2,+\infty)$$

ب)

$$\sqrt[3]{x-1}+\sqrt{y+1}=2 \xrightarrow{\text{به توان }2} y+1=\left(2-\sqrt[3]{x-1}\right)^2 \rightarrow y=\left(2-\sqrt[3]{x-1}\right)^2-1$$

$$x-1\geq 0 \rightarrow x\geq 1 \rightarrow D=[1,+\infty)$$

۳

$$x^2-x-2\geq 0 \rightarrow \Delta=9 \rightarrow x=\frac{1\pm 3}{2}\Rightarrow 2,-1$$

① $(-\infty,-1)\cup(2,+\infty)$

$$x^2-1\geq 0 \rightarrow \Delta=4 \rightarrow x=\pm 1$$

② $(-\infty,-1]\cup[1,+\infty)$

$$\sqrt{x^2-1}+1\neq 0 \rightarrow \sqrt{x^2-1}\neq -1$$

همیشه برقرار

$$① \cap ② \Rightarrow D=(-\infty,-1)\cup(2,+\infty)$$

۴

$$x=-2 \Rightarrow 4-2a-4=0 \rightarrow a=-\frac{1}{2}$$

$$-x^2-\frac{1}{2}x+3 \rightarrow \Delta=\frac{1}{4}-4(3)=\frac{49}{4} \rightarrow x=\frac{\frac{1}{2}\pm\frac{7}{2}}{-2}\rightarrow -2,\ \frac{3}{2}=b$$

$$a+b=\frac{3}{2}-\frac{1}{2}=\frac{2}{2}=1$$

۵

$$f(x)-x\geq 0 \qquad x\geq 1 \rightarrow f(x)-x=x^2-2x\geq 0 \rightarrow x(x-2)\geq 0 \rightarrow \frac{+\ 0\ -\ 2\ +}{}$$

$[1,+\infty)$ ①

$$x<1 \rightarrow f(x)-x=2x+3-x\geq 0 \rightarrow x+3\geq 0 \rightarrow x\geq -3 \rightarrow [-3,+\infty)$$ ②

$$① \cup ② = [-3,+\infty)$$

۶

$f(a) = (a+1)^2 = a+7$

$f(-2) = 2a - 4$

$\Rightarrow 12a + 12 = 2a - 4 + a \Rightarrow 10a = -16 \Rightarrow a = -1.6$

۷

$a = 2 \quad b = \sqrt{3} \quad f(a-b) = \sqrt{a-b} + \frac{1}{\sqrt{a-b}} + 2 \quad f(a+b) = \sqrt{a+b} + \frac{1}{\sqrt{a+b}} + 2$

$f(a+b) + f(a-b) = \sqrt{a-b} + 2 + \frac{1}{\sqrt{a-b}} + 2 + \sqrt{a+b} + \frac{1}{\sqrt{a+b}} + 2 = 2\left(\sqrt{a+b} + \sqrt{a-b}\right) + 6$

$\sqrt{a+b} = \sqrt{4} = 2 \qquad \sqrt{a-b} = 1$

$\rightarrow 2\left(\sqrt{2+\sqrt{2}} + \sqrt{2-\sqrt{2}}\right) + 6 \rightarrow 2(\sqrt{4}) + 6 = 10$

$\left(\sqrt{2+\sqrt{2}} + \sqrt{2-\sqrt{2}}\right)^2 = 2 + \sqrt{2} + 2 - \sqrt{2} + 2\left(\sqrt{4+\sqrt{2}}\sqrt{4-\sqrt{2}}\right) = 4$

۸

$2f(x) - 3f(-x) = 4x^2 - x \xrightarrow{\times 2} 4f(x) - 6f(-x) = 8x^2 - 2x$

$2f(-x) - 3f(x) = x + 4x^2 \xrightarrow{\times 3} -6f(-x) + 9f(x) = 3x + 12x^2$

$-5f(x) = 50x^2 \rightarrow f(x) = \frac{x + 20x^2}{-5}$

$f(x) = -4x^2 - \frac{1}{5}x$

۹

$x = -2 \rightarrow -3(-2)f(0) = 2(-2)^2 - m(-2) + 3m - 1 = 4f(0) = 14 + 2m + 3m - 1 = 5m + 13$

$\rightarrow f(0) = \frac{13 + 5m}{4} \qquad x = 0 \rightarrow 2f(0) = 3m - 1 \rightarrow f(0) = \frac{3m-1}{2}$

$\rightarrow \frac{13 + 5m}{4} = \frac{3m-1}{2} \rightarrow 30 + 10m = 12m - 4 \rightarrow 2m = 34 \rightarrow m = 17$

$f(0) = \frac{3(17) - 1}{2} = 25$

۱۰

$f(-1) + f(-1) = \frac{3 + 12 + 3}{-1} \rightarrow f(-1) = -9$

$x - 1 \geq 0 \rightarrow x \geq 1$

$\sqrt{x-1} = \sqrt{y+1} \rightarrow x \leq 17 \quad D_f = [1, 17]$

$\geq 0 \qquad +$