

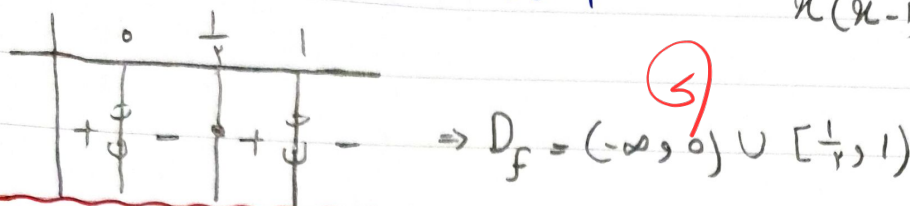
ملاحظة: $x < 0$

Date

No

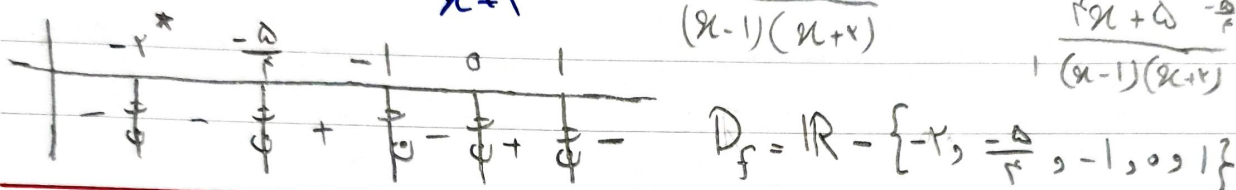
فاطمة مكي - ٢٠٢٠

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

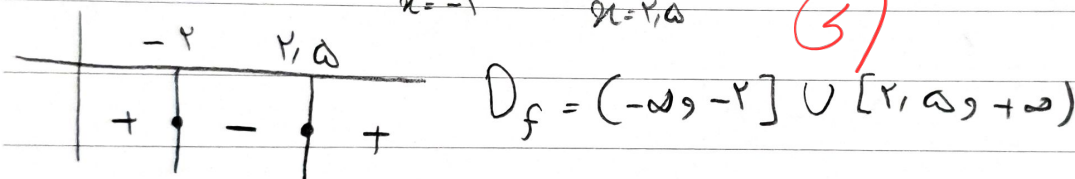


ب) $f(x) = \frac{1}{x+1} - \frac{2}{x} = \frac{x-2x-2}{x(x+1)} = \frac{-x-2}{x(x+1)}$

$\frac{2}{x-1} + \frac{1}{x+2} = \frac{2x+4+x-1}{(x-1)(x+2)} = \frac{3x+3}{(x-1)(x+2)}$



الف) $f(x) = \sqrt{((\frac{1}{x})^2 - 9)(14 - x^2)} \geq 0$ (2)



ب) $\sqrt{x-1} + \sqrt{y+1} = 3 \Rightarrow \sqrt{y+1} = 3 - \sqrt{x-1}$

① $x-1 \geq 0 \Rightarrow x \geq 1$

② $\sqrt{x-1} \leq 3 \Rightarrow x-1 \leq 9 \Rightarrow x \leq 10 \rightarrow D_f = [1, 10]$

$x^2 - x - 2 > 0 \Rightarrow (x-2)(x+1) > 0 \rightarrow \frac{-1}{+} \frac{2}{-} \rightarrow (-\infty, -1) \cup (2, \infty)$ (3)

$\sqrt{x^2-1} \Rightarrow x^2-1 \geq 0 \Rightarrow x^2 \geq 1 \Rightarrow \begin{matrix} x \geq 1 \\ x \leq -1 \end{matrix} \rightarrow (-\infty, -1] \cup [1, \infty)$

$D_f = (-\infty, -1) \cup (2, \infty)$

المسألة ٢٦

$$\sqrt{x^2 + ax - x^2} \Rightarrow D_f = [-r, b]$$

$a+b?$ (ف)

$$-(x^2 - ax - x^2) \geq 0 \Rightarrow x^2 - ax - x^2 \leq 0 \Rightarrow \begin{array}{c|cc} & \alpha & \beta \\ \hline & + & - \\ & | & | \\ & + & + \end{array} \Rightarrow \alpha = -r$$

$$\beta = b$$

$$\begin{array}{r} x^2 - ax - x^2 \\ -x^2 - rx \\ \hline (-r-a)x - x \end{array} \quad \begin{array}{l} x+r \\ x-r-a \Rightarrow x - \frac{r}{r} \Rightarrow \beta = \frac{r}{r} = b \end{array}$$

$$a+b = -\frac{1}{r} + \frac{r}{r} = 1$$

$$\begin{array}{r} (-r-a)x - x \\ + (r+a)x + r + ra \\ \hline 1 + ra \rightarrow 0 \Rightarrow a = -\frac{1}{r} \end{array}$$

$$f(x) \geq x \xrightarrow{x \geq 1} rx - r \geq x \Rightarrow x \geq 1 \text{ بيقول } \checkmark \quad (\omega \text{ م})$$

$$\boxed{x < 1} \rightarrow rx + r \geq x \Rightarrow x \geq -r \Rightarrow D_f = [-r, +\infty)$$

$$f(a) = \sqrt{a} + \sqrt{r} \rightarrow \sqrt{a} + \sqrt{r} = \sqrt{a-r} + a \Rightarrow 1 \cdot a = -1 \quad (\text{ف})$$

$$f(-r) = \sqrt{a} - \sqrt{r} \quad \boxed{a = -1 \wedge}$$

$$\frac{1}{r+\sqrt{r}} = r - \sqrt{r} \xrightarrow{a=r+\sqrt{r}} f(a) + f\left(\frac{1}{a}\right) = r \times \left(\sqrt{a} + \frac{1}{\sqrt{a}}\right) + r \quad (\checkmark)$$

$$r \left(\sqrt{r+\sqrt{r}} + \frac{1}{\sqrt{r+\sqrt{r}}} \right) + r = r\sqrt{r} + r \quad (\text{ف})$$

$$r f(x) - r f(-x) = rx^2 - x \quad \left. \begin{array}{l} f f(x) - r f(-x) = \sqrt{rx^2 - rx} \\ \wedge rx^2 - rx \end{array} \right\} \Rightarrow \text{ف}$$

$$r f(-x) - r f(x) = rx^2 + x \quad \left. \begin{array}{l} r f(-x) - r f(x) = \sqrt{rx^2 + rx} \\ \wedge rx^2 + rx \end{array} \right\} \Rightarrow \text{ف}$$

$$-\omega f(x) = r \cdot x^2 + x \Rightarrow f(x) = -\frac{rx^2}{\omega} - \frac{x}{\omega}$$

مربعاً ضداً

Date

No

$$(x+2)f(x) - 3xf(x+2) = x^2 - mx + 3m - 1$$

(9)
 $f(0)$?

$$x=0 \rightarrow 2f(0) = 3m - 1 \rightarrow f(0) = \frac{3m-1}{2}$$

$$x=-2 \rightarrow 9f(0) = 14 + 2m + 3m - 1 \rightarrow f(0) = \frac{5m+13}{9}$$

$$\hookrightarrow \frac{5m+13}{9} = \frac{3m-1}{2} \rightarrow 5m+13 = 9m-3 \Rightarrow 4m = 16 \rightarrow m = 4$$

$$f(0) = \frac{3(4)-1}{2} = \boxed{5}$$

$$f(x) + f\left(\frac{1}{x}\right) = \frac{3x^2 - 12x + 3}{x}$$

(1)
 $f(-1)$?

$$x=-1 \rightarrow f(-1) + f(-1) = \frac{3+12+3}{-1} = -18$$

$$2f(-1) = -18 \rightarrow f(-1) = \boxed{-9}$$