

به نام خدا

Date ۱۴.۴.۱۵, ۱۹ No

شماره تکلیف: !

نام و نام خانوادگی: خاضه متقی

$$(1) \quad A \times B - B^2 = \{(1,2), (1,3), (2,2), (2,3), (3,2), (3,3)\} - \{(2,2), (2,3), (3,2), (3,3)\}$$

$$\hookrightarrow A \times B - B^2 = \{(1,2), (1,3)\}$$

$$(2) \quad (الف) \quad m^2 = m + 2 \rightarrow m^2 - m - 2 = 0 \rightarrow (m+1)(m-2) \rightarrow m = 2 \text{ و } m = -1$$

تایم نمی شود $(2,4)$ و $(2,1)$ $\checkmark$

$$(ب) \quad m^2 = m + 2 \rightarrow m^2 - m - 2 = 0 \rightarrow m = 2 \rightarrow (2,4) \text{ و } (2,1) \rightarrow m = -1 \rightarrow (-1,3) \text{ و } (-1,4)$$

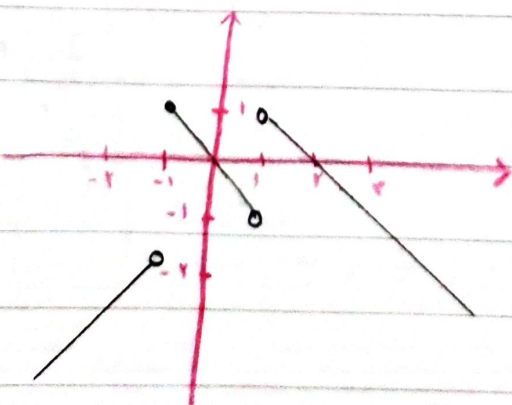
در ازای هیچ مقدار m تایم نیست.

$$(3) \quad \begin{cases} x=1 \rightarrow x^2 - 1 = ax + b \Rightarrow 1 - 1 = a + b \rightarrow a + b = 0 \\ x=2 \rightarrow ax + b = x^3 \Rightarrow 2a + b = 8 \end{cases} \rightarrow \begin{cases} a = 1 \\ b = -1 \end{cases}$$

$$\hookrightarrow a \times b = -1$$

$$(4) \quad x = k \rightarrow 2x - 3 = 5 - 3x \Rightarrow 2k + 3k = 5 + 3 \Rightarrow k = \frac{8}{5}$$

$$(5) \quad f(x) = \begin{cases} -x + 2 & x > 1 \\ -x & -1 \leq x < 1 \\ x - 1 & x < -1 \end{cases} \quad \begin{aligned} D_f &= \mathbb{R} - \{1\} \\ R_f &= (-\infty, 1] \end{aligned}$$



$$1 \rightarrow \begin{array}{c|cc} x & 1 & 3 \\ y & 1 & -1 \end{array}$$

$$2 \rightarrow \begin{array}{c|cc} x & -1 & 0 & 1 \\ y & 1 & 0 & -1 \end{array}$$

$$3 \rightarrow \begin{array}{c|cc} x & -1 & -2 \\ y & -2 & -3 \end{array}$$

(٦) الف) $2y^3 = -x^2 - 1 \xrightarrow{\text{تقارن ریاضی}} \begin{cases} 2y_1^3 = -x_1^2 - 1 \\ 2y_2^3 = -x_2^2 - 1 \end{cases} \xrightarrow{x_1 = x_2} 2y_1^3 = 2y_2^3 \Rightarrow y_1^3 = y_2^3$

$\hookrightarrow y_1 = y_2 \rightarrow \checkmark$ تابع هست

ب) $4y^2 - 12y + 9 = -(x^2 - 2x + 1) \rightarrow (2y - 3)^2 = -(x - 1)^2$

$\hookrightarrow (2y - 3)^2 + (x - 1)^2 = 0 \Rightarrow x = 1 \rightarrow \left(1, \frac{3}{2}\right) \rightarrow \checkmark$ تابع است

(٧) الف) $x \sin y = y \sin x \rightarrow \text{if } x = 0 \Rightarrow y = k\pi \Rightarrow \checkmark$ تابع نیست

ب) $\sqrt{\frac{x}{y}} + \sqrt{\frac{y}{x}} = 2 \xrightarrow{\text{بهم ضرب}} \frac{x}{y} + \frac{y}{x} + 2\sqrt{\frac{xy}{yx}} = 4$

$\hookrightarrow \frac{x^2 + y^2}{xy} = 4 \Rightarrow x^2 + y^2 - 4xy = 0 \rightarrow (x - y)^2 = 0$

$\hookrightarrow x = y \Rightarrow \checkmark$ تابع هست

(٨) الف) $y = \sqrt{\frac{x-1}{x-3}} + \sqrt{\frac{2-x}{x}} \Rightarrow \sqrt{\frac{x-1}{x-3}} + \sqrt{\frac{2-x}{x}} \Rightarrow (-\infty, 1] \cup (2, +\infty)$

$\sqrt{\frac{2-x}{x}} - \sqrt{\frac{x-1}{x-3}} \Rightarrow (0, 2] \xrightarrow{\text{Df}} D_f = [0, 1]$

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

$\hookrightarrow \sqrt{3} - \sqrt{x} \geq 0 \Rightarrow \sqrt{x} \leq \sqrt{3} \rightarrow 0 \leq x \leq 3$

$D_f = [0, 3]$

ن. ب. نام فردا

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(الف) $y = \frac{\sqrt{x^2 - 7x + 6}}{\sqrt{x^2 - 10x + 14}}$ $\xrightarrow{a+b+c=0} \begin{matrix} x=6 \\ x=1 \end{matrix} \rightarrow \begin{array}{c|cc|cc} & 1 & 6 & & \\ \hline & + & - & - & + \end{array}$ (9)

$\sqrt{x^2 - 10x + 14} \rightarrow \sqrt{-9x + 14} \Rightarrow -9x + 14 > 0 \Rightarrow x < \frac{14}{9}$

صورت $\rightarrow (-\infty, 1] \cup [6, +\infty)$
 مخرج $\rightarrow (-\infty, \frac{14}{9})$
 $\rightarrow D_f = (-\infty, 1]$

★ بر اساس مورد ب، ممکن است در مورد الف غلط تایید وجود داشته باشد:

(الف) $y = \frac{\sqrt{x^2 - 7x + 6}}{\sqrt{x^2 - 10x + 14}}$ $\xrightarrow{\text{مثل بالا}} (-\infty, 1] \cup [6, +\infty)$

$\rightarrow (x-2)(x-1) \Rightarrow \begin{matrix} x=2 \\ x=1 \end{matrix} \rightarrow \begin{array}{c|cc|cc} & 1 & 2 & & \\ \hline & + & - & - & + \end{array}$

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

(ب) $y = \frac{\sqrt{x^2 - 7x + 6}}{x^2 - 10x + 14} \rightarrow (x-6)(x-1) \Rightarrow x=6, x=1$
 $\rightarrow (x-2)(x-1) \Rightarrow x=2, x=1$

$\begin{array}{c|cc|cc|cc} & 1 & 2 & 6 & 1 & & \\ \hline & + & - & - & + & - & + \end{array} \Rightarrow D_f = (-\infty, 1] \cup (2, 6] \cup (1, +\infty)$

(الف) $y = \frac{\sqrt{2x^2 - 5x + 3}}{\sqrt{3x^2 - 7x + 4}}$ $\xrightarrow{a+b+c=0} \begin{matrix} x=\frac{3}{2} \\ x=1 \end{matrix} \rightarrow \begin{array}{c|cc|cc} & 1 & \frac{3}{2} & & \\ \hline & + & - & - & + \end{array}$ (1)

$\xrightarrow{a+b+c=0} \begin{matrix} x=\frac{4}{3} \\ x=1 \end{matrix} \rightarrow \begin{array}{c|cc|cc} & 1 & \frac{4}{3} & & \\ \hline & + & - & - & + \end{array}$

$\rightarrow D_f = (-\infty, 1] \cup [\frac{3}{2}, +\infty)$

(ب) $y = \frac{\sqrt{2x^2 - 5x + 3}}{3x^2 - 7x + 4} \rightarrow \begin{matrix} x=\frac{3}{2}, x=1 \\ x=\frac{4}{3}, x=1 \end{matrix}$

$\begin{array}{c|cc|cc|cc} & 1 & \frac{4}{3} & \frac{3}{2} & 1 & & \\ \hline & + & - & - & + & - & + \end{array}$

$\rightarrow D_f = (-\infty, \frac{4}{3}) \cup [\frac{3}{2}, +\infty) - \{1\}$