

(الف) $x^2 - 5x - 36 = (x+4)(x-9) \Rightarrow x < \frac{1}{4} = \frac{1}{4}$ (1) آزمون شفنی اردو یا زحم سہ

ب) $x^2 - 8x - 9 = (x+1)(x-9) \Rightarrow x < \frac{1}{8} = \frac{1}{8}$

ج) $x^2 - 9x - 12 = (x+2)(x-9) \Rightarrow x < \frac{2}{9} = \frac{2}{9}$

د) $x^2 - 10x - 24 = (x+3)(x-14) \Rightarrow x < \frac{3}{10} = \frac{3}{10}$

ه) $x^2 - 11x - 14 = (x+2)(x-14) \Rightarrow x < \frac{2}{11} = \frac{2}{11}$

و) $2x^2 + 5x + 3 = (x+2)(x+3) \Rightarrow x < \frac{2}{5} = \frac{2}{5}$

ز) $x^2 + 2x + 3 = 4 - 12 \Rightarrow$ ~~شماره ندارد~~

ح) $2x^2 + 3x - 2 = \frac{-3 \pm \sqrt{9 + 24}}{4} = \frac{-3 \pm \sqrt{33}}{4}$

3) $A = \{1, 2, 3\}, B = \{1, 2\}$
 $A \times B = \{(1,1), (1,2), (2,1), (2,2), (3,1), (3,2)\} \Rightarrow A \times B - B' = \{(1,1), (1,2)\}$
 $B' = \{(2,1), (2,2), (3,1), (3,2)\}$

4) الف) $m+2 = m^2 \Rightarrow m \rightarrow (2,1), (3,4) \times$

ب) $m+2 = m^2 \Rightarrow m \rightarrow (-1, 3) \times$ دقت! $(-1, 4) \times$

5) $a^2 = 3a - 2 \Rightarrow a^2 - 3a + 2 = (a-1)(a-2) \Rightarrow a = 1 \Rightarrow (1,1), (1,4) \times$
 $a = 2 \Rightarrow (2,1) \checkmark$

6) $x=1 \rightarrow 1-1=0=a+b \Rightarrow a=-b$
 $x=2 \Rightarrow 2a-a=1 \Rightarrow a=1 \Rightarrow b=-1 \Rightarrow a \times b = 1 \times -1 = -1$

7) $2k-2 = 4-2k \Rightarrow 4k=6 \Rightarrow k = \frac{3}{2}$

(1)

الف) $y(y^2-2) = (x-1)(x-3) \xrightarrow{x=1, x=3} y(y^2-2) = 0 \Rightarrow y < \frac{0}{\sqrt{2}} \Rightarrow$ تابع نیست $\times$

ب) $|x| + |y| = 3 \xrightarrow{x=1} 1 + |y| = 3 \Rightarrow y < -2 \Rightarrow$ تابع نیست $\times$

ج) $|y| = \sqrt{1-\cos x} \xrightarrow{x=\frac{\pi}{2}} \cos x = \frac{1}{2} \Rightarrow |y| = \frac{\sqrt{2}}{2} \Rightarrow y < \frac{\sqrt{2}}{2} \Rightarrow$ تابع نیست $\times$

د) $y' = -(x^2 + 2x + 1) \Rightarrow R_f = \emptyset \Rightarrow$ تابع است $\checkmark$

همواره منفی

(9)

الف) $\sqrt{y_1} = -(x_1^2 - 2x_1 + 2) \Rightarrow x_1 = x_2 \Rightarrow \sqrt{y_1} = \sqrt{y_2} \Rightarrow y_1 = y_2$ تابع است $\checkmark$

ب) $\begin{cases} y_1^3 + 2y_1 = 5x_1 \\ y_2^3 + 2y_2 = 5x_2 \end{cases} \xrightarrow{x_1=x_2} \begin{cases} y_1^3 + 2y_1 = y_2^3 + 2y_2 \\ y_1^3 - y_2^3 + 2(y_1 - y_2) = 0 \end{cases}$

$\Rightarrow (y_1 - y_2)(y_1^2 + y_1 y_2 + y_2^2 + 2) = 0$
 $\Rightarrow (y_1 - y_2)(y_1^2 + y_1 y_2 + y_2^2 + 2) = 0$
 $\frac{-y_2 \pm \sqrt{\Delta}}{2} \Rightarrow \Delta = y_2^2 - 4(y_2^2 + 2) \Rightarrow \Delta = -3y_2^2 - 8 < 0$ صفر نمی شود
 $\Rightarrow y_1 = y_2$ تابع است $\checkmark$

(10)

الف) $x \sin y = y \sin x \Rightarrow \frac{x}{\sin x} = \frac{y}{\sin y} \xrightarrow{x=\frac{\pi}{2}} \frac{\pi}{2} = \frac{y}{\sin y} \Rightarrow y < \frac{\pi}{2} \times$ تابع نیست $\times$

ب) $\sqrt{\frac{x}{y}} + \sqrt{\frac{y}{x}} = 2 \Rightarrow \frac{x}{y} + \frac{y}{x} + 2 = 4$
 $\Rightarrow x^2 + y^2 + 2xy = 4xy \Rightarrow x^2 + y^2 - 2xy = 0$
 $(x-y)^2 = 0 \Rightarrow y = x \Rightarrow$ تابع است $\checkmark$
 (موردی) $\Rightarrow$ یار = نه!

ب-۴) $(3, m^2)$ و $(3, m+2) \leadsto m^2 = m+2 \leadsto m^2 - m - 2 = 0$

$m=2 \rightarrow (2, 1)$ و $(2, 4)$ ✗

$m=-1 \rightarrow (-1, 4)$ و $(-1, 3)$ ✗ به ازای هیچ مقدار m عبارت آیزوت نیست!

ب-۱۰) $\sqrt{\frac{x}{y}} + \sqrt{\frac{y}{x}} = 2$

این عبارت تنها زمانی برقرار است که $1 = \sqrt{\frac{x}{y}}$ باشد پس

$\sqrt{\frac{x}{y}} = 1 \leadsto \frac{x}{y} = 1 \leadsto x = y$ و $(x, y \neq 0)$

