

$$\begin{aligned}
 5x^2 - 5x - 400 &= 0 \Rightarrow x^2 - 5x - 39 = 0 \Rightarrow (x-9)(x+4) = 0 \Rightarrow 9, -4 \Rightarrow \frac{9}{4}, -\frac{4}{9} \Rightarrow \left\{ \frac{9}{4}, -\frac{4}{9} \right\} \\
 3x^2 - 8x - 9 &= 0 \Rightarrow x^2 - 8x - 9 = 0 \Rightarrow (x-9)(x+1) = 0 \Rightarrow 9, -1 \Rightarrow \frac{9}{1}, -\frac{1}{9} \Rightarrow \left\{ 9, -\frac{1}{9} \right\} \\
 2x^2 - 8x - 12 &= 0 \Rightarrow x^2 - 8x - 12 = 0 \Rightarrow (x-6)(x+2) = 0 \Rightarrow 6, -2 \Rightarrow \frac{6}{2}, -\frac{2}{6} \Rightarrow \left\{ \frac{6}{2}, -\frac{2}{6} \right\} \\
 2x^2 - 5x - 12 &= 0 \Rightarrow x^2 - 5x - 24 = 0 \Rightarrow (x-8)(x+3) = 0 \Rightarrow 8, -3 \Rightarrow \frac{8}{3}, -\frac{3}{8} \Rightarrow \left\{ \frac{8}{3}, -\frac{3}{8} \right\}
 \end{aligned}$$

$$\begin{aligned}
 x^2 - 5x - 16 &= 0 \Rightarrow (x-7)(x+2) = 0 \Rightarrow \{7, -2\} \\
 2x^2 + 5x + 3 &= 0 \Rightarrow \Delta = 25 - 4(2)(3) = 1 \Rightarrow \frac{-5 \pm \sqrt{1}}{4} \Rightarrow \frac{-5 \pm 1}{4} \Rightarrow \frac{-4}{4}, \frac{-6}{4} \Rightarrow \left\{ -1, -\frac{3}{2} \right\} \\
 x^2 + 2x + 3 &= 0 \Rightarrow \Delta = 4 - 4(1)(3) = -8 \Rightarrow \text{ریشه ندارد} \\
 3x^2 + 3x - 2 &= 0 \Rightarrow \Delta = 9 - 4(-2)(3) = 33 \Rightarrow \frac{-3 \pm \sqrt{33}}{6} \Rightarrow \left\{ \frac{-3 + \sqrt{33}}{6}, \frac{-3 - \sqrt{33}}{6} \right\}
 \end{aligned}$$

$$\begin{aligned}
 A \times B &= \{(1,2)(1,3)(2,2)(2,3)(3,2)(3,3)\} \quad B^c = \{(2,2)(2,3)(3,2)(3,3)\} \\
 A \times B - B^c &= \{(1,2)(1,3)\}
 \end{aligned}$$

* هر 2 متغیر را از هم جدا کنیم با علامت + یا - *

$$\begin{aligned}
 \text{الف)} \quad f(x) &= \{(3, m^2)(2, 1)(m, 4)(-3, m)(-2, m)(3, m+2)\} \\
 m^2 &= m+2 \Rightarrow m^2 - m - 2 = 0 \xrightarrow[-1, -\frac{c}{a}]{a+c=b} (-1) * \\
 \text{ب)} \quad g(x) &= \{(3, m^2)(2, 1)(m, 4)(3, m+2)(-2, m)(-1, 3)\} \\
 m^2 &= m+2 \Rightarrow m^2 - m - 2 = 0 \xrightarrow[-1, -\frac{c}{a}]{a+c=b} -1, 2 * \\
 \text{مستند کردن کت جادو}
 \end{aligned}$$

$$\begin{aligned}
 f(x) &= \{(1, a^2)(1, 3a-2)(a^2, 3a+2)\} \\
 a^2 &= 3a-2 \Rightarrow a^2 - 3a + 2 = 0 \xrightarrow[1, \frac{c}{a}]{a+b+c=0} 2, 1 * \\
 \text{که اگر بخواهیم با } f(x) \text{ به ازای عدد 1 به ما دو مقدار دهد 1 و 2} \\
 \text{پس تابع ضعیف است}
 \end{aligned}$$

$$f(x) = \begin{cases} x^2 - 1 & x \leq 1 \\ ax + b & 1 \leq x \leq 2 \\ x^2 & x \geq 2 \end{cases} \rightarrow x=1 \rightarrow 1-1 = a+b \Rightarrow \underline{a+b=0}$$

$$\begin{aligned} 2(a+b=0) &\Rightarrow 2a+2b=0 \\ 2a+b=1 &\Rightarrow \underline{2a+b=1} \end{aligned} \Rightarrow \begin{aligned} 2a+2b=0 \\ 2a+b=1 \end{aligned} \Rightarrow \begin{aligned} a+b=0 \\ a+b=1 \end{aligned} \Rightarrow \begin{aligned} a &= 1 \\ b &= -1 \end{aligned} \Rightarrow \boxed{ab = -1}$$

$$f(x) = \begin{cases} 2x-3 & x \geq K \\ K-3x & x \leq K \end{cases} \xrightarrow{x=K} 2K-3 = K-3K \Rightarrow 2K-3 = -2K \Rightarrow 4K=3 \Rightarrow \Delta K = \frac{3}{4}$$

$$\boxed{K = \frac{3}{4}}$$

$$y^2 - 4y = x^2 - 2x + 3 \xrightarrow{x=1} y^2 - 4y = 0 \rightarrow y(y-4) = 0 \Rightarrow y = 0, 4 \quad \text{تابع نیست}$$

$$|x| + |y| = 3 \xrightarrow{x=0} |y| = 3 \Rightarrow y = 3, -3 \quad \text{تابع نیست}$$

$$|y| = \sqrt{1 - \cos x} \xrightarrow{x=0} |y| = 0 \Rightarrow y = 0 \quad \text{تابع نیست}$$

$$y^2 + x^2 + 2x + 1 = 0 \Rightarrow (x+1)^2 + y^2 = 0 \Rightarrow x = -1, y = 0 \quad \text{تابع نیست}$$

$$\sqrt[3]{y} + x^2 = 2x+2 \rightarrow \begin{cases} \sqrt[3]{y} = -x^2+2x+2 \\ \sqrt[3]{y} = -x^2+2x+2 \end{cases} \Rightarrow \sqrt[3]{y} = \sqrt[3]{y} \Rightarrow y = y \quad \text{تابع است}$$

$$\begin{aligned} y_1^2 + 2y_1 &= \Delta x \\ y_2^2 + 2y_2 &= \Delta x \end{aligned} \Rightarrow y_1^2 + 2y_1 = y_2^2 + 2y_2 \Rightarrow y_1^2 - y_2^2 + 2y_1 - 2y_2 = 0 \Rightarrow (y_1 - y_2)(y_1 + y_2 + 2) = 0 \Rightarrow y_1 = y_2 \quad \text{تابع است}$$

$$x \sin y = y \sin x \xrightarrow{x=0} 0 \sin y = y \sin 0 \rightarrow y = 0 \quad \text{تابع نیست}$$

$$\left(\sqrt{\frac{x}{y}} + \sqrt{\frac{y}{x}} = 2\right)^2 \Rightarrow \frac{x}{y} + \frac{y}{x} + 2\left(\sqrt{\frac{x}{y}}\right)\left(\sqrt{\frac{y}{x}}\right) = 4 \Rightarrow \frac{x}{y} + \frac{y}{x} + 2 = 4 \Rightarrow \frac{x}{y} + \frac{y}{x} = 2$$

$$\frac{x}{y} + \frac{y}{x} = 2 \Rightarrow \frac{x^2 + y^2}{xy} = 2 \Rightarrow x^2 + y^2 - 2xy = 0 \Rightarrow (x-y)^2 = 0 \Rightarrow x = y \quad \text{تابع است}$$