

۲. افزاینده خطی عالی نوشتار!

|                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                           |   |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|
| $\begin{aligned} & \text{الف) } 4x^2 - 5x - 4 = 0 \\ & x^2 - 5x - 1^4 = 0 \\ & (x-9)(x+4) = 0 \\ & \rightarrow x = \frac{9}{4} = \frac{1^4}{4} \\ & \rightarrow x = -\frac{4}{4} = -\frac{1^4}{4} \end{aligned}$ $x = \frac{1^4}{4}, x = -\frac{1^4}{4}$                                                                                                                                                  | $\begin{aligned} & \text{ب) } 1^4x^2 - 8x - 1^4 = 0 \\ & x^2 - 8x - 9 = 0 \\ & (x-9)(x+1) = 0 \\ & \rightarrow x = \frac{9}{1^4} = 1^4 \\ & \rightarrow x = -\frac{1}{1^4} \end{aligned}$ $x = 1^4, x = -\frac{1}{1^4}$                                                                                                                                                                                                  | $\begin{aligned} & \text{ج) } 4x^2 - 4x - 1^4 = 0 \\ & x^2 - 4x - 1^4 = 0 \\ & (x-4)(x+1) = 0 \\ & \rightarrow x = \frac{4}{1^4} = \frac{1^4}{1^4} \\ & \rightarrow x = -\frac{1}{1^4} = -\frac{1}{1^4} \end{aligned}$ $x = \frac{1^4}{1^4}, x = -\frac{1}{1^4}$                                                                                                                                                          | ۱ |
| $\begin{aligned} & \text{الف) } x^2 - 5x - 1^4 = 0 \\ & (x-7)(x+2) = 0 \\ & \rightarrow x = 7 \\ & \rightarrow x = -2 \end{aligned}$ $x = 7, x = -2$                                                                                                                                                                                                                                                      | $\begin{aligned} & \text{ب) } 1^4x^2 + 5x + 1^4 = 0 \\ & x^2 + 5x + 4 = 0 \\ & (x+2)(x+1) = 0 \\ & \rightarrow x = -\frac{2}{1^4} = -1 \\ & \rightarrow x = -\frac{1}{1^4} \end{aligned}$ $x = -1, x = -\frac{1}{1^4}$                                                                                                                                                                                                   | $\begin{aligned} & \text{ج) } x^2 + 4x + 1^4 = 0 \\ & \Delta = b^2 - 4ac = 16 - 4(1)(1) = 12 \\ & 1^4 - 4(1)(1) = -4 \\ & \Delta < 0 \rightarrow \text{ریشه ندارد!} \end{aligned}$ $x = \frac{-4 \pm \sqrt{12}}{2} = -2 \pm \sqrt{3}$                                                                                                                                                                                     | ۲ |
| $\begin{aligned} & A = \{1, 2, 3\} \rightarrow A \times B = \{(1, 2), (1, 3), (2, 2), (2, 3), (3, 2), (3, 3)\} \\ & B = \{2, 3\} \rightarrow B^c = \{(1, 2), (1, 3), (2, 2), (2, 3)\} \\ & \rightarrow A \times B - B^c = \{(1, 2), (1, 3)\} \\ & \rightarrow A \times B - B^c = \{(1, 2), (1, 3)\} \end{aligned}$                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                           | ۳ |
| $\begin{aligned} & \text{الف) } f(x) = \{(1, a^2), (1, 3a-2), (a^2, 3a+2)\} \\ & \rightarrow a^2 = 3a-2 \rightarrow a^2 - 3a + 2 = 0 \rightarrow (a-2)(a-1) = 0 \rightarrow a = 2 \text{ یا } a = 1 \\ & a = 1 \rightarrow f(x) = \{(1, 1), (1, 1), (1, 5)\} \rightarrow \text{تکرار نیست!} \\ & a = 2 \rightarrow f(x) = \{(1, 4), (1, 4), (4, 8)\} \rightarrow \text{تکرار هست!} \end{aligned}$ $a = 2$ | $\begin{aligned} & \text{ب) } g(x) = \{(3, m^2), (2, 1), (m, 4), (3, m+2), (-2, m), (-1, 3)\} \\ & m^2 = m+2 \rightarrow m^2 - m - 2 = 0 \rightarrow (m-2)(m+1) = 0 \\ & \rightarrow m = 2 \text{ یا } m = -1 \\ & m = 2 \rightarrow \{(3, 4), (2, 1), (2, 4), (3, 4), (-1, 2), (-1, 3)\} \\ & m = -1 \rightarrow \{(3, 1), (2, 1), (-1, 4), (3, 1), (-2, -1), (-1, 3)\} \\ & \rightarrow m = -1 \end{aligned}$ $m = -1$ | $\begin{aligned} & \text{ج) } 9(x) = \{(3, m^2), (2, 1), (-3, m), (-2, m), (3, m+2), (m, 4)\} \\ & m^2 = m+2 \rightarrow m^2 - m - 2 = 0 \rightarrow (m-2)(m+1) = 0 \\ & \rightarrow m = 2 \text{ یا } m = -1 \\ & m = 2 \rightarrow \{(3, 4), (2, 1), (-3, 2), (-2, 2), (3, 4), (2, 4)\} \\ & m = -1 \rightarrow \{(3, 1), (2, 1), (-3, -1), (-2, -1), (3, 1), (-1, 4)\} \\ & \rightarrow m = -1 \end{aligned}$ $m = -1$ | ۴ |
| $\begin{aligned} & f(x) = \{(1, a^2), (1, 3a-2), (a^2, 3a+2)\} \\ & \rightarrow a^2 = 3a-2 \rightarrow a^2 - 3a + 2 = 0 \rightarrow (a-2)(a-1) = 0 \rightarrow a = 2 \text{ یا } a = 1 \\ & a = 1 \rightarrow f(x) = \{(1, 1), (1, 1), (1, 5)\} \rightarrow \text{تکرار نیست!} \\ & a = 2 \rightarrow f(x) = \{(1, 4), (1, 4), (4, 8)\} \rightarrow \text{تکرار هست!} \end{aligned}$ $a = 2$              |                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                           | ۵ |

$$f(x) = \begin{cases} x^r - 1 & x \leq 1 \\ ax + b & 1 \leq x \leq r \\ x^r & x \geq r \end{cases}$$

$$x = 1 \rightarrow 1^r - 1 = a \cdot 1 + b \rightarrow 1 - 1 = a + b \rightarrow a + b = 0$$

$$x = r \rightarrow r^r = a \cdot r + b \rightarrow r^r - r = a + b = 0$$

$$\begin{aligned} r^r - r &= 0 \\ -a - b &= 0 \\ a &= 1 \end{aligned} \quad \begin{aligned} a + b &= 0 \rightarrow b = -1 \\ a \cdot b &= 1 \times (-1) = -1 \end{aligned}$$

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

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$$f(x) = \begin{cases} r^x - 1 & x \geq K \\ r - 1^x & x \leq K \end{cases}$$

$$\rightarrow x = K$$

$$r^K - 1 = r - 1^K$$

$$\Delta K = 1$$

$$\rightarrow K = \frac{1}{\Delta} \rightarrow K = \frac{1}{1} = 1$$

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$$a) y^r + x^r + r^x + 1 = 0$$

$$y^r = -x^r - r^x - 1$$

$$y^r = -(x^r + r^x + 1)$$

$$y^r = -(x+1)^r$$

$$\rightarrow y = 0 \rightarrow x+1 = 0 \rightarrow x = -1$$

$$\rightarrow x+1 = 0 \rightarrow x = -1$$

! پاسخ نیست

$$b) |y| = \sqrt{1 - \cos x}$$

$$|y| = \sqrt{1 - \cos 180^\circ}$$

$$|y| = \sqrt{1 - (-1)} = \sqrt{1+1} = \sqrt{2}$$

$$\rightarrow y = \pm \sqrt{2}$$

! پاسخ نیست

$$c) |x| + |y| = 1^r$$

$$x = 0 \rightarrow |y| = 1^r$$

$$\rightarrow y = \pm 1$$

! پاسخ نیست

$$d) y^r - 4y = x^r - r^x + 1^r$$

$$x = 1^r \rightarrow y(y^r - 4) = 9 - 1^r + 1^r$$

$$y(y^r - 4) = 0$$

$$\rightarrow y = 0$$

$$\rightarrow y = \pm \sqrt{4}$$

! پاسخ نیست

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$$b) y^r + r^y = \Delta x$$

$$\begin{cases} \Delta x_1 = y_1^r + r^{y_1} \\ \Delta x_2 = y_2^r + r^{y_2} \end{cases} \quad \begin{aligned} y_1^r + r^{y_1} &= y_2^r + r^{y_2} \\ y_1^r - y_2^r &= -r(y_1 - y_2) \end{aligned}$$

$$\rightarrow (y_1 - y_2)(y_1^r + y_1 y_2 + y_2^r) = -r(y_1 - y_2)$$

$$(y_1 - y_2)(y_1^r + y_1 y_2 + y_2^r + r) = 0 \rightarrow y_1 = y_2$$

$$x^r + y^r + y^r + r^x \rightarrow y^r - r^x + x^r + r^x = 0$$

$$y^r - r^x + y^r - 1 = -1^r y^r - 1 = -(1^r y^r + 1) \rightarrow \Delta < 0 \rightarrow \Delta < 0$$

! پاسخ نیست

$$d) \sqrt[3]{y} + x^r = r^x - 1^r$$

$$\begin{aligned} -x^r + r^x - 1^r &= \sqrt[3]{y_1} \quad x_1 = x_2 \quad \sqrt[3]{y_1} = \sqrt[3]{y_2} \\ -x^r + r^x - 1^r &= \sqrt[3]{y_2} \end{aligned}$$

$$\rightarrow \sqrt[3]{y_1} = \sqrt[3]{y_2} \rightarrow y_1 = y_2$$

! پاسخ نیست

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$$b) \sqrt{\frac{x}{y}} + \sqrt{\frac{y}{x}} = 2$$

$$a + \frac{1}{a} = 2 \rightarrow a = 1$$

$$\sqrt{\frac{x}{y}} = 1 \rightarrow \frac{x}{y} = 1 \rightarrow x = y$$

! پاسخ نیست

$$d) x \sin y = y \sin x$$

$$\rightarrow x = \{K\pi\} = \{\pi, 2\pi, \dots\}$$

$$\pi \times \sin y = y \times 0 \rightarrow \pi \cdot \sin y = 0$$

$$\rightarrow \sin y = 0 \rightarrow y = K\pi \rightarrow \{0, \pi, 2\pi, \dots\}$$

! پاسخ نیست

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$$(10-ج) \sqrt{\frac{x}{y}} + \sqrt{\frac{y}{x}} = 2$$

ہیں عبارت تنہا زمانی بہ قرار است کہ  $1 = \sqrt{\frac{x}{y}}$  بالحد پس

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

