

نام و نام خانوادگی: آریستو شیرازی پاسخنامه تشریحی تکلیف شماره ۱ کلاس یازدهم دبیرستان

۱

الف) $4x^2 - 5x - 4 = 0 \rightarrow x^2 - 5x - 4 = 0 \rightarrow (x-9)(x+4) = 0 \rightarrow x = 9$
 $\rightarrow x = \frac{9}{4} = \frac{9}{4}$
 ب) $3x^2 - 8x - 3 = 0 \rightarrow x^2 - 8x - 9 = 0 \xrightarrow{a+c=b} \frac{-1}{9} \rightarrow x = \frac{-1}{9}$
 $\rightarrow x = \frac{-1}{9}$
 ج) $2x^2 - 4x - 3 = 0 \rightarrow x^2 - 2x - 1.5 = 0 \rightarrow (x-4)(x+2) = 0 \rightarrow x = \frac{2}{3} = \frac{2}{3}$
 $\rightarrow x = \frac{2}{3} = \frac{2}{3}$
 د) $2x^2 - 5x - 12 = 0 \rightarrow x^2 - 5x - 6 = 0 \rightarrow (x-1)(x+3) = 0 \rightarrow x = \frac{4}{3} = \frac{4}{3}$
 $\rightarrow x = \frac{4}{3} = \frac{4}{3}$

۲

الف) $x^2 - 5x - 14 = 0 \rightarrow (x-7)(x+2) = 0 \rightarrow x = -2$
 $\rightarrow x = 7$
 ب) $2x^2 + 5x + 3 = 0 \rightarrow x^2 + 5x + 4 = 0 \rightarrow (x+3)(x+1) = 0 \rightarrow x = \frac{3}{2}$
 $\rightarrow x = \frac{3}{2} = -1$
 ج) $x^2 + 2x + 3 = 0 \xrightarrow{\Delta} x = \frac{-b \pm \sqrt{\Delta}}{2a} \rightarrow \Delta = b^2 - 4ac = 4 - 12 = -8 \rightarrow \Delta < 0$
 معادله جواب ندارد. (فاقد ریشه)
 د) $3x^2 + 3x - 2 = 0 \xrightarrow{\Delta} x = \frac{-3 \pm \sqrt{33}}{6} \rightarrow$ ریشه ها

۳

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

۴

الف) $f(n) = \{(3, m^2), (2, 1), (-3, m), (-2, m), (3, m+2), (m, 2)\}$
 $m^2 = m+2 \rightarrow m^2 - m - 2 = 0 \rightarrow (m-2)(m+1) = 0 \rightarrow m = -1$
 $\rightarrow m = 2$
 ب) $g(n) = \{(3, m^2), (2, 1), (m, 2), (3, m+2), (-2, m), (-1, 3)\}$
 $m^2 = m+2 \rightarrow m^2 - m - 2 = 0 \rightarrow m = -1$
 $\rightarrow m = 2$
 به ازای هیچ مقده تابع نیست

۵

$f(n) = \{(1, a^2), (1, 3a-2), (a^2, 3a+2)\}$
 $a^2 = 3a-2 \rightarrow a^2 - 3a + 2 = 0 \rightarrow (a-1)(a-2) = 0 \rightarrow a = 1$
 $\rightarrow a = 2$

$$f(n) = \begin{cases} n^2 - 1; n \leq 1 \\ an + b, 1 \leq n \leq r \\ n^r, n \geq r \end{cases}$$

if $n=1 \rightarrow n^2 - 1 = an + b \xrightarrow{n=1} (a+b=0)$
if $n=r \rightarrow an + b = n^r \xrightarrow{n=r} \begin{cases} ra + b = \Lambda \\ a = \Lambda \\ b = -\Lambda \\ a \times b = -\Lambda^2 \end{cases}$

$$f(n) = \begin{cases} 2n - 3, n \geq k \\ r - 3n, n \leq k \end{cases}$$

if $n=k \rightarrow 2n - 3 = r - 3n$

$\Delta n = 5 \rightarrow n = \frac{5}{5}$

الف) $y^3 - 4y = n^2 - 2n + 3 \xrightarrow{\text{if } n=1} y^3 - 4y = 0 \rightarrow y(y^2 - 4) = 0 \rightarrow y = \sqrt{4}$

ب) $|x| + |y| = 3 \xrightarrow{\text{if } n=0} |y| = 3 \rightarrow y = 3 \text{ or } y = -3$

ج) $|y| = \sqrt{1 - \cos n} \xrightarrow{\text{if } n = \frac{\pi}{2} \text{ or } \frac{3\pi}{2}} |y| = \sqrt{1 - (-1)} = \sqrt{2} \rightarrow y = \pm \sqrt{2}$

د) $y^2 + n^2 + 2n + 1 = 0 \rightarrow y^2 + (n+1)^2 = 0 \rightarrow y^2 = 0 \rightarrow y = 0$
 $(n+1)^2 = 0 \rightarrow n = -1$

الف) $\sqrt[3]{y} + n^2 = 2n - 2 \rightarrow \begin{cases} \sqrt[3]{y_1} = -n_1^2 + 2n_1 - 2 \\ \sqrt[3]{y_2} = -n_2^2 + 2n_2 - 2 \end{cases} \xrightarrow{n_1=n_2} \sqrt[3]{y_1} = \sqrt[3]{y_2} \rightarrow y_1 = y_2$

ب) $y^2 + 2y = \Delta n \rightarrow \begin{cases} y_1^2 + 2y_1 = \Delta n_1 \\ y_2^2 + 2y_2 = \Delta n_2 \end{cases} \xrightarrow{n_1=n_2} y_1^2 + 2y_1 = y_2^2 + 2y_2$
 $y_1^2 - y_2^2 + 2y_1 - 2y_2 = 0$
 $(y_1 - y_2)(y_1 + y_2 + 2) = 0$

الف) $x \sin y = y \sin x$
if $n=0 \rightarrow y \sin 0 = 0 \rightarrow y \in \mathbb{R}$

ب) $\sqrt{\frac{x}{y}} + \sqrt{\frac{y}{x}} = 2 \xrightarrow{(\frac{x}{y})^2} \frac{x}{y} + \frac{y}{x} + 2 = 2 \rightarrow \frac{x^2 + y^2}{xy} = 2$
 $x^2 + y^2 = 2xy \rightarrow x^2 + y^2 - 2xy = 0$

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