

نام و نام خانوادگی پاسخنامه تشریحی تکلیف شماره کلاس جزئیات

الف) $4x^2 - 5x - 7 = 0 \Rightarrow x^2 - 5x - 37 = 0 \rightarrow (x-9)(x+4) = 0 \rightarrow \begin{cases} x = \frac{9}{1} = 9 \\ x = \frac{-4}{1} = -4 \end{cases}$ ✓

ب) $3x^2 - 11x - 3 = 0 \Rightarrow x^2 - 11x - 9 = 0 \rightarrow (x-9)(x+1) = 0 \rightarrow \begin{cases} x = \frac{9}{1} = 9 \\ x = \frac{-1}{1} = -1 \end{cases}$ ✓

ج) $4x^2 - 4x - 3 = 0 \Rightarrow x^2 - 4x - 12 = 0 \rightarrow (x-6)(x+2) = 0 \rightarrow \begin{cases} x = \frac{6}{1} = 6 \\ x = \frac{-2}{1} = -2 \end{cases}$ ✓

د) $2x^2 - 5x - 12 = 0 \Rightarrow x^2 - 5x - 24 = 0 \rightarrow (x-8)(x+3) = 0 \rightarrow \begin{cases} x = \frac{8}{1} = 8 \\ x = \frac{-3}{1} = -3 \end{cases}$ ✓

الف) $x^2 - 5x - 11 = 0 \rightarrow (x-7)(x+2) = 0 \rightarrow \begin{cases} x = 7 \\ x = -2 \end{cases}$ ✓

ب) $2x^2 + 5x + 3 = 0 \rightarrow x^2 + 5x + 6 = 0 \rightarrow (x+2)(x+3) = 0 \rightarrow \begin{cases} x = \frac{-2}{1} = -2 \\ x = \frac{-3}{1} = -3 \end{cases}$ ✓

ج) $x^2 + 2x + 3 = 0 \rightarrow \Delta = b^2 - 4ac \Rightarrow 4 - (4 \times 3 \times 1) < 0 \rightarrow$ ~~شماره~~ $\frac{-2 \pm \sqrt{4 - 12}}{2} \Rightarrow \frac{-2 \pm \sqrt{-8}}{2}$ ✓

د) $10x^2 + 13x - 2 = 0 \rightarrow x = \frac{-b \pm \sqrt{\Delta}}{2a} \Rightarrow \frac{-13 \pm \sqrt{169 - (-2 \times 10 \times 1)}}{20} \rightarrow \begin{cases} \frac{-13 + \sqrt{189}}{20} \\ \frac{-13 - \sqrt{189}}{20} \end{cases}$ ✓

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

$B = \{2,3\} \Rightarrow \{(1,2), (1,3)\}$ ✓
 $A = \{1,2,3\}$

الف) $f(x) = \{(3, m^2), (2, 1), (-3, m), (-2, m), (3, m+2), (m, 4)\}$

$m^2 = m+2 \rightarrow m^2 - m - 2 = 0 \rightarrow (m-2)(m+1) = 0 \rightarrow \begin{cases} m = 2 \\ m = -1 \end{cases}$ ✓
 $m = 2$ تحقق $\rightarrow (2, 4) \neq (2, 1)$

ب) $g(x) = \{(3, m^2), (2, 1), (m, 4), (3, m+2), (-2, m), (-1, 3)\}$ ✓

$m^2 = m+2 \rightarrow m^2 - m - 2 = 0 \rightarrow (m-2)(m+1) = 0 \rightarrow \begin{cases} m = 2 \\ m = -1 \end{cases}$ ✓
 $m = -1$ تحقق $\rightarrow (-1, 4) \neq (-1, 3)$
 $m = 2$ تحقق $\rightarrow (2, 1) \neq (2, 4)$

$f(x) = \{(1, a^2), (1, 3a+2), (a^2, 3a+2)\}$

$a^2 = 3a+2 \rightarrow a^2 - 3a - 2 = 0$
 $(a-1)(a-2) = 0 \rightarrow a = 1 \rightarrow \{(1, 1), (1, 1), (1, 5)\} \times$ ✓
 $a = 2 \rightarrow \{(1, 4), (1, 4), (4, 8)\} \checkmark$

$$f(x) = \begin{cases} x^{r-1} & x \leq 1 \\ ax+b & 1 \leq x \leq r \\ x^r & x \geq r \end{cases} \quad \begin{cases} x=1 \\ x=r \end{cases} \quad \begin{aligned} 0 &= a+b \Rightarrow a=-b \\ ra+b &= 1 \\ r(-b)+b &= 1 \Rightarrow -rb+b=1 \Rightarrow -b=b+1 \Rightarrow -b=1 \Rightarrow b=-1 \Rightarrow a=1 \end{aligned}$$

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

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$$f(x) = \begin{cases} rx-r^2 & x > r \\ r-r^2x & x \leq r \end{cases} \rightarrow \begin{aligned} rx-r^2 &= r-r^2x \\ 0 &= 2r-r^2x \\ x &= \frac{2r-r^2}{r} \end{aligned}$$

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الف) $y^3 - 4y = x^2 - 4x + 4 \xrightarrow{x=1} y(y^2 - 4) = 0 \quad \begin{aligned} y=0 \\ y^2 - 4 = 0 \Rightarrow y^2 = 4 \Rightarrow y = \pm 2 \end{aligned}$

ب) $|x| + |y| = 3 \xrightarrow{x=0} |y| = 3 \Rightarrow y = \pm 3$

ج) $|y| = \sqrt{1 - \cos x} \rightarrow 1 - \cos x \geq 0 \Rightarrow 1 \geq \cos x \quad \checkmark$

د) $y^2 + x^2 + 2x + 1 = 0 \rightarrow y^2 + (x+1)^2 = 0 \rightarrow \begin{aligned} y=0 \\ x=-1 \end{aligned}$

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الف) $\sqrt[3]{y} + x^2 = 2x - 2 \rightarrow \sqrt[3]{y} = -x^2 + 2x - 2 \xrightarrow{y=0} -x^2 + 2x - 2 = -x^2 + 2x - 2 \Rightarrow \sqrt[3]{y_1} = \sqrt[3]{y_2} \Rightarrow y_1 = y_2$

ب) $x^3 + 2y = 0 \rightarrow \begin{aligned} x_1^3 &= -2y_1 \\ x_2^3 &= -2y_2 \end{aligned} \Rightarrow y_1^3 + 2y_1 = y_2^3 + 2y_2 \Rightarrow (y_1 - y_2)(y_1^2 + y_1y_2 + y_2^2) + 2(y_1 - y_2) = 0 \Rightarrow (y_1 - y_2)(y_1^2 + y_1y_2 + y_2^2 + 2) = 0$

$\Rightarrow y_1 = y_2$

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الف) $x \sin y = y \sin x \xrightarrow{x=0} 0 \times \sin y = y \times 0$

ب) $\sqrt{\frac{x}{y}} + \sqrt{\frac{y}{x}} = 2 \rightarrow \frac{x}{y} + \frac{y}{x} = 4 \quad x, y \neq 0$

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الف) $\sqrt{\frac{x}{y}} = a \rightarrow a + \frac{1}{a} = 2 \rightarrow a^2 - 2a + 1 = 0 \rightarrow (a-1)^2 = 0 \Rightarrow a=1 \Rightarrow \frac{x}{y} = 1 \Rightarrow x=y$