Subject: یازدهم یکشنبه ۱۸ — Date: / /

زهرا دیبایی

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۱)

$y = -x^2 + bx + 3$

۲)

$\frac{-\Delta}{4a} = 7 \Rightarrow \frac{-b^2+12}{-4} = 7 \Rightarrow b^2 = 16 \Rightarrow b = \pm 4$

۲)

الف) $f(x) = x^4 + 2x^2 + 3$

$\Rightarrow x^4 + 2x^2 + 3 = 0 \xrightarrow{x^2 = t} t^2 + 2t + 3 = 0 \Rightarrow b^2 - 4ac \Rightarrow 4 - 12 = -8 < 0 \Rightarrow$

$\Delta < 0 \Rightarrow$ این تابع ریشه ندارد

۲)

ب) $f(x) = (4 - x^2)^2 - 2(4 - x^2) - 15$

$(4-x^2)^2 - 2(4-x^2) - 15 = 0 \xrightarrow{4 - x^2 = t} t^2 - 2t - 15 = 0 \Rightarrow (t-5)(t+3) = 0$

$\Rightarrow \begin{cases} t = 5 \Rightarrow 4 - x^2 = 5 \Rightarrow x^2 = -1 \rightarrow \text{غ ق ق} \\ t = -3 \Rightarrow 4 - x^2 = -3 \Rightarrow x^2 = 7 \Rightarrow x = \pm\sqrt{7} \end{cases}$

۳)

$4x^2 - 16x + m = 0$

$\alpha + \beta = \frac{+16}{4} = 4 \rightarrow \frac{-b}{a}$

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$\alpha = \beta + 2 \Rightarrow \beta + 2 + \beta = 4 \Rightarrow 2\beta = 2 \Rightarrow \beta = 1, \alpha = 3$

$\Rightarrow P = \frac{m}{4} \Rightarrow 3 \times 1 = \frac{m}{4} \Rightarrow m = 12$

$4x^2 - 16x + 12 = 0$

$\Delta > 0$ ✓

۴)

$3x^2 - 6x + m - 1 = 0 \qquad 2\alpha - \beta = 4 \Rightarrow \frac{1}{2}\alpha + \frac{1}{2}\beta + \frac{3}{2}\alpha - \frac{3}{2}\beta = 4$

$\Rightarrow \frac{1}{2}(\alpha + \beta) + \frac{3}{2}(\alpha - \beta) = 4 \Rightarrow \alpha - \beta = 2$

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$3x^2 - 6x = 0 \quad \Delta > 0$ ✓

$\alpha - \beta = \frac{\sqrt{\Delta}}{|a|} \Rightarrow \frac{\sqrt{36 - 12(m-1)}}{3} = 2 \xRightarrow{\text{توان ۲}} 36 - 12(m-1) = 36 \Rightarrow m - 1 = 0 \Rightarrow m = 1$

۵)

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$-mx^2 + 4x + m^2 - 2 = 0 \qquad 16 + 4m^3 - 8m > 0$

$\Delta > 0 \Rightarrow 16 - 4(-m)(m^2 - 2) > 0 \qquad P = 1 \quad \frac{m^2 - 2}{-m} = 1 \Rightarrow m^2 + m - 2 = 0 \Rightarrow (m+2)(m-1) = 0$

$\Rightarrow \begin{cases} m = 1 & \Delta > 0 ✓ \\ m = -2 \longrightarrow \text{غ ق ق} & \Delta = 0 ✗ \end{cases}$

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۶)

$x^2 - mx + 3 = 0$

$\alpha\beta^2 = 4 \Rightarrow (\alpha\beta)(\beta) = 4 \Rightarrow \beta = \frac{4}{3} \Rightarrow \alpha = \frac{9}{4} \Longrightarrow m = \frac{9}{4} + \frac{4}{3} = \frac{43}{12}$

$x^2 - \frac{43x}{12} + 3 \quad \Delta > 0$ ✓

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۷)

$x^2 - 4x + m = 0 \qquad m = \alpha\beta \Rightarrow 1 \times 3 = 3$

$\alpha + \beta = 4 \qquad \alpha = 3\beta \qquad 4\beta = 4 \Rightarrow \beta = 1 ,\ \alpha = 3$

$x^2 - 4x + 3 \quad \Delta > 0$ ✓

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۸)

$x^2 - 7x + 2 = 0 \qquad \alpha^3 + \frac{8}{\alpha^3} = \left(\alpha + \frac{2}{\alpha}\right)\left(\alpha^2 - 2 + \frac{4}{\alpha^2}\right) = 301$

$\qquad\qquad 7 \qquad\qquad 43$

$\alpha^2 - 2 + \frac{4}{\alpha^2} \Rightarrow \left(\alpha + \frac{2}{\alpha}\right)^2 - 6 = 49 - 6 = 43$

$\qquad 7$

$\alpha + \frac{2}{\alpha} = \frac{\alpha^2 + 2}{\alpha} = \frac{7\alpha - 2 + 2}{\alpha} = 7 \qquad \alpha^2 = 7\alpha - 2 \qquad \left(\alpha + \frac{2}{\alpha}\right)^2 = \alpha^2 + \frac{4}{\alpha^2} + 4$

۲

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۹)

$h(t) = -10t^2 + 50t$

$t = 0 ,\ 5$ ✗ ✓

$\frac{-50}{-20} = \frac{5}{2} \to t$

$-10\left(\frac{25}{4}\right) + 50 \times \left(\frac{5}{2}\right) \Rightarrow \frac{125}{2} \to h$

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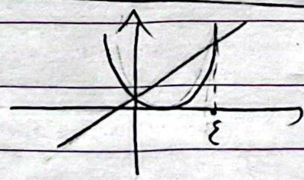
۱۰)

الف) $(x-1)^2 = 2x + 1$



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$x^2 - 2x + 1 = 2x + 1$

$\Rightarrow x^2 - 4x = 0 \Rightarrow x(x - 4) = 0 \Rightarrow x = 0 , 4$

۲

ب) $\underbrace{x^2 + 2x}_{x(x+2)} = |x + 2| \Rightarrow \begin{cases} x + 2 = x^2 + 2x \to x^2 + x - 2 = 0 \Rightarrow x = 1 , -2 \checkmark \\ x + 2 = -x^2 - 2x \Rightarrow x^2 + 3x + 2 = 0 \Rightarrow x = -2 , x = -1 \end{cases}$

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