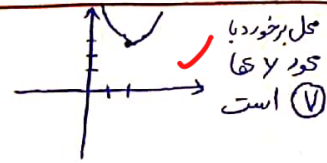
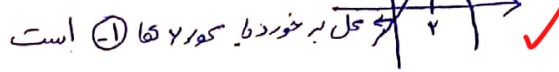


الف) $y = x^2 - 8x + 17 \Rightarrow y = x^2 - 8x + 4 + 13 \Rightarrow y = (x-4)^2 + 13$



ب) $y = -x^2 + 8x - 1 \Rightarrow \max \left| \begin{array}{l} -b \\ 2a \end{array} = \frac{-8}{-2} = 4 \right.$
 $- (4)^2 + 8(4) - 1 = 13$



$2x^2 + (m+1)x + \frac{1}{2}m + 2 = 0$

الف) $\Delta > 0 \Rightarrow (m+1)^2 - 4 \cdot 2 \cdot (\frac{1}{2}m + 2) > 0 \Rightarrow m^2 - 2m - 1 > 0 \Rightarrow (m-3)(m+1) > 0$

$\Rightarrow \frac{-3}{+} \frac{1}{-} \frac{1}{+} \Rightarrow m \in \mathbb{R} - [-3, 1]$

ب) $\Delta = 0 \Rightarrow m^2 - 2m - 1 = 0 \Rightarrow (m-3)(m+1) = 0 \Rightarrow m = -1, m = 3$

ج) $\Delta < 0 \Rightarrow m^2 - 2m - 1 < 0 \Rightarrow (m-3)(m+1) < 0 \Rightarrow \frac{-3}{+} \frac{1}{-} \frac{1}{+} \Rightarrow m \in (-3, 1)$

د) $\Delta \geq 0 \Rightarrow m^2 - 2m - 1 \geq 0 \Rightarrow (m-3)(m+1) \geq 0 \Rightarrow \frac{-3}{+} \frac{1}{-} \frac{1}{+} \Rightarrow m \in \mathbb{R} - (-3, 1)$

$y = (m-2)x^2 - 2(m+1)x + 10$

الف) $S < 0 \Rightarrow \frac{-b}{a} = \frac{2m+2}{m-2} < 0 \Rightarrow \frac{-1}{+} \frac{2}{-} \Rightarrow m \in (-1, 2)$ I

$\Delta > 0 \Rightarrow 4(m+1)^2 - 4(m-2) \cdot 10 > 0 \Rightarrow 4m^2 + 8m + 4 - 40m + 80 > 0 \Rightarrow 4m^2 - 32m + 84 > 0 \Rightarrow m^2 - 8m + 21 > 0 \Rightarrow (m-3)(m-7) > 0$

$P > 0 \Rightarrow \frac{c}{a} > 0 \Rightarrow \frac{10}{m-2} > 0 \Rightarrow m \in (2, +\infty)$ III

$I \cap II \cap III = \emptyset$

ب) $S < 0 \Rightarrow \frac{-b}{a} = \frac{2m+2}{m-2} < 0 \Rightarrow \frac{-1}{+} \frac{2}{-} \Rightarrow m \in (-1, 2)$ I

$\Delta > 0 \Rightarrow$ همواره مثبت $P < 0 \Rightarrow \frac{c}{a} = \frac{10}{m-2} < 0 \Rightarrow m < 2$ II $I \cap II = m \in (-1, 2) = -1 < m < 2$

$y = (m-2)x^2 - 2(m+1)x + 10$

الف) $S =$ اوج یا تهی $P < 0 \Rightarrow \frac{c}{a} = \frac{10}{m-2} < 0 \Rightarrow m < 2$ $\Delta > 0 \Rightarrow$ چون $P < 0$ پس همواره مثبت می شود و احتیاجی به محاسبه کردن نیست

ب) $\frac{c}{a} = \frac{10}{m-2} = -2 \Rightarrow \frac{2m+2}{m-2} = -2 \Rightarrow 2m+2 = -2m+4 \Rightarrow 4m = 2 \Rightarrow m = \frac{1}{2}$

$\frac{1}{2}x^2 - (1+\sin \alpha)x + \frac{3}{2}$

$\Delta \geq 0 \Rightarrow 4 \sin^2 \alpha - 4 \cdot \frac{1}{2} \cdot \frac{3}{2} \geq 0 \Rightarrow 4 \sin^2 \alpha - 6 \geq 0 \Rightarrow \sin^2 \alpha \geq \frac{3}{2}$ چون در سوال گفته ریشه منظور است $\sin \alpha = \pm 1$

$S = \frac{-b}{a} = \frac{1+\sin \alpha}{\frac{1}{2}} > 0 \Rightarrow \sin \alpha > -1$ $\sin \alpha = 1$

$\sin \alpha = 1 \Rightarrow \frac{1}{2}x^2 - 2x + \frac{3}{2} = 0 \xrightarrow{\times 2} x^2 - 4x + 3 = 0 \Rightarrow (x-3)(x-1) = 0 \Rightarrow x-3 = 0 \Rightarrow x = 3$

$\Rightarrow x = \frac{3}{2}$

$$y = \frac{(3z^2 - 2z - 1)(2z^2 - 3z - 4)}{1 - z^2} = \frac{(z-1)(3z+1)(z+1)(2z-4)}{(1-z)(1+z)} = -9z^2 + 13z + 4 \quad (2) -9$$

$$3z^2 - 2z - 1 \stackrel{\text{اعوجج}}{\Rightarrow} z^2 - 2z - 3 = 0 \Rightarrow (z-3)(z+1) = 0 \Rightarrow z = +1 \Rightarrow 3z^2 - 2z - 1 = (z-1)(3z+1)$$

$$2z^2 - 3z - 4 \stackrel{\text{اعوجج}}{\Rightarrow} z^2 - 3z - 4 = 0 \Rightarrow (z-4)(z+1) = 0 \Rightarrow z = -1 \Rightarrow 2z^2 - 3z - 4 = (z+1)(2z-4)$$

$$-9z^2 + 13z + 4 \Rightarrow \max \left\{ \frac{-b}{2a} = \frac{13}{18} \right. \\ \left. \text{و } \frac{4ac - b^2}{4a} = -9 \left(\frac{13}{18} \right)^2 + 13 \left(\frac{13}{18} \right) + 4 = -9 \left(\frac{169}{324} \right) + \frac{169}{18} + 4 = \frac{-169}{36} + \frac{169}{18} + 4 \right. \\ \left. \Rightarrow \frac{-169 + 338 + 144}{36} = \frac{313}{36} \right. \quad \checkmark$$

$$mz^2 - (m+2)z - 1 = 0 \quad (2) -V$$

$$3S = 4P + V \Rightarrow \frac{3-b}{a} = \frac{4c}{a} + V \Rightarrow \frac{3(m+2)}{m} = 4 \times \frac{-1}{m} + V \Rightarrow 3(m+2) = -4 + Vm \\ \Rightarrow 3m + 6 = -4 + Vm \Rightarrow Em = 10 \Rightarrow m = 5$$

$$5z^2 - 9z - 1 = 0$$

$$\alpha^2 + \beta^2 = 5^2 - 4P = \left(\frac{9}{5} \right)^2 - 4 \left(-\frac{1}{5} \right) = \frac{13}{5} \quad \checkmark$$

$$z^2 - \omega z + 1 = 0 \quad \frac{E\alpha + P\omega}{\omega\beta^2} = \frac{E\alpha}{\omega\beta^2} + \frac{P\omega}{\omega} = \frac{E\alpha}{\omega \left(\frac{\alpha}{\omega} \right)^2} + \frac{P\omega}{\omega} = \frac{\alpha^2}{\omega} + \frac{P\omega}{\omega} \quad (2) -A$$

$$\hookrightarrow P = 1 \Rightarrow \alpha\beta = 1 \Rightarrow \beta = \frac{1}{\alpha} \Rightarrow S = \omega$$

$$\frac{1}{\omega} (\alpha^3 + \beta^3) = \frac{1}{\omega} (S^3 - 3PS) = \frac{1}{\omega} (1^3 - 3(1)(\omega)) = \frac{1}{\omega} \times 9\omega = 9 \quad \checkmark$$

$$y_1 = az^2 + bz + c \xrightarrow[\text{اعوجج}]{\text{اعوجج}} c = y = 8 \Rightarrow y = az^2 + bz + 8$$

$$y_2 = 2z + 10 \Rightarrow z = 2 \Rightarrow y = 2(2) + 10 = 14 \Rightarrow (2, 14)$$

$$\Rightarrow z = -3 \Rightarrow y = 2(-3) + 10 = 4 \Rightarrow (-3, 4)$$

$$\text{نقطه } (2, 14) \Rightarrow 14 = 4a + 2b + 8 \Rightarrow 4a + 2b = 6 \Rightarrow 2a + b = 3 \Rightarrow 10a = 10 \Rightarrow a = 1$$

$$\text{نقطه } (-3, 4) \Rightarrow 4 = 9a - 3b + 8 \Rightarrow 9a - 3b = -4 \Rightarrow 3a - b = -\frac{4}{3} \Rightarrow 3a = b - \frac{4}{3} \Rightarrow b = 3$$

$$y = z^2 + 3z + 8 \Rightarrow \frac{-b}{2a} = \frac{-3}{2} \quad \checkmark$$

$$y_1 = 2z^2 + (m+1)z + m + 6 \quad y_2 = z \Rightarrow 2z^2 + (m+1)z + m + 6 = z$$

$$\Rightarrow 2z^2 + mz + m + 5 = 0 \Rightarrow \Delta = 0 \Rightarrow m^2 - 4m - 20 = 0 \Rightarrow (m-12)(m+8) = 0$$

$$\Rightarrow m = 12 \text{ or } -8$$

$$m = -8 \Rightarrow 2z^2 - 8z + 7 = 0 \Rightarrow z^2 - 4z + 3.5 = 0 \Rightarrow z = 1 \Rightarrow \sqrt{\text{دنا حید اول است}}$$

$$m = 12 \Rightarrow 2z^2 + 13z + 17 = 0 \Rightarrow z^2 + 6.5z + 8.5 = 0 \Rightarrow z = -3 \times \text{دنا حید اول قرار نگیرد} \Rightarrow m = -8 \quad \checkmark$$