

$$\begin{aligned} \frac{-b}{2a} &= -1 \rightarrow b = 2a & 1 &= 9a + \frac{3b}{2a} + c \rightarrow 1 = 15 + c \\ -\frac{\Delta}{2a} &= \frac{-b^2 + 4ac}{2a} = 9 \rightarrow -4a^2 + 4a(-1) = 36a \rightarrow 4a(-a-1) = 36a \\ \begin{cases} -a-1 &= 9 \\ 15a-1 &= -1 \end{cases} &\rightarrow -14a = 10 \rightarrow a = -\frac{5}{7}, b = -\frac{10}{7}, c = \frac{1}{7} \\ & \quad y = -\frac{5}{7}x^2 - \frac{10}{7}x + \frac{1}{7} \end{aligned}$$

$$\begin{aligned} S > 0 & \quad \Delta > 0 & P > 0 &\rightarrow \frac{m+4}{2} > 0 \rightarrow m > -4 \\ \downarrow & \quad \downarrow & & \\ \frac{-m}{2} > 0 & \quad m^2 - f(2)(m+4) > 0 & & \\ \downarrow & \quad (m-12)(m+4) > 0 & & \\ m < 0 & \quad \frac{-f(2)}{2} = \frac{-4-12}{2} = -8 & & \\ & \quad (-\infty, -8) \cup (2, +\infty) & & \end{aligned}$$

استرآن همواره عبارت $(-4, -2)$

$$\begin{aligned} \frac{-2m+1}{2} &= \frac{1}{2-m} = \frac{3}{2-m} & (2-m)(-2m+1) &= a \\ & & -2m+1+2m^2-m &= 9 \\ \Delta > 0 &\rightarrow (2m-1)^2 - f(2)(2-m) > 0 & m^2 - 5m - 14 &= 0 \\ & & (m-7)(m+2) &= 0 \\ & m \in \{3, 5, -1\} & m = \frac{7}{2} & \quad m = \frac{7}{2} \quad m = -\frac{2}{2} = -1 \end{aligned}$$

$$\begin{aligned} x^2 - x - 1 &= 0 \quad (f(x) = x^2 - 5x + 6) & x^2 - 5x + 6 &= 0 \rightarrow x^2 - 5x + 6 = 0 \\ S &= x_1^3 + x_2^3 + \frac{1}{x_1} + \frac{1}{x_2} & \frac{\alpha + \beta}{\alpha\beta} &= \frac{-b}{c} = \frac{-5}{6} = -\frac{5}{6} \rightarrow S = \frac{1}{6} \\ S - 3SP &\rightarrow 1 + 12 = 13 & & \\ P &= (x_1^2 + \frac{1}{x_1})(x_2^2 + \frac{1}{x_2}) = x_1^2 x_2^2 + x_1^2 + x_2^2 + \frac{1}{x_1 x_2} = \frac{-221}{6} \end{aligned}$$

$$\begin{aligned} \sqrt[3]{x^4+1} + \sqrt[3]{x^2} - \sqrt[3]{x^2} - \frac{1}{\sqrt[3]{x^2}} - 1 - 2\sqrt[3]{x} &= 0 \\ \sqrt[3]{x^2} - \frac{1}{\sqrt[3]{x^2}} - 2\sqrt[3]{x} &= 0 \\ x^2 - 1 - 2x &= x^2 - 2x - 1 = 0 \quad S = x_1 + x_2 \quad \frac{-b}{a} = \frac{2}{1} = 2 \end{aligned}$$

$x_1 = \frac{1}{2} x_1$ $\frac{1}{2} x_1^2 - a x_1 + f = 0 \rightarrow \frac{1}{2} f x_1^2 - \frac{1}{2} a x_1 = 0$ $\frac{1}{2} x_1 (12 x_1 - a) = 0$ $\frac{1}{2} x_1^2 - a x_1 + f = \frac{a^2}{4a} - \frac{a^2}{12} + f = 0 \rightarrow -\frac{2a^2}{12} = -f$ $\frac{a^2}{6} = f \rightarrow a^2 = 6f$ $\boxed{14} \leftarrow \text{اختلاف} \leftarrow a = \pm \sqrt{6f}$	6
$a > 0$ $\Delta > 0$ $f > 0$ $\frac{-\frac{1}{2} - \frac{1}{2}a}{a} > 0 \rightarrow \frac{-\frac{1}{2}(1+a)}{a} > 0 \rightarrow (-\frac{1}{2}, 0)$ 	7
$\frac{-a}{2} = \frac{2}{-2} \rightarrow 2a = f \rightarrow a = \frac{f}{2}$ $y = -x^2 - 2x + b \rightarrow \begin{cases} -x^2 - 2x + b = 1 \\ x^2 + 2x - 2 = 1 \end{cases} \rightarrow \begin{cases} b - 2 = 2 \\ b = 4 \end{cases}$ $ab = f \times \frac{f}{2} = 1$	8
$\frac{1}{2} x^2 - a x + b = -\frac{1}{2} x^2 - x + b$ $\frac{1}{2} a x^2 + a x - 4 = 0$ $\frac{1}{2} x^2 + x - 4 = 0$ $(x+4)(x-3) = 0$ $x = -\frac{4}{2} \text{ و } \frac{3}{2}$ $b = -4$ $\frac{a}{2} = \frac{-a}{2a} + \frac{ab}{f} = \frac{-4}{f}$ $\frac{a}{2} + \frac{1}{2} = 1 \rightarrow a+1=2 \rightarrow \boxed{a=1}$	9
$a = -a$ $a = -m$ $\frac{1}{2} m^2 - \frac{1}{2} m - \frac{1}{2} m = 0$ $m^2 - m - m = 0$ $m(m-2) = 0$ $m = 0 \text{ و } 2$ $(x+0)(x-2) \rightarrow x^2 + 2x - 1a$ $(x+0)(x+1) \rightarrow x^2 + 4x + a$ $a_1 = -11$ $a_2 = 11$ $ a_2 - a_1 = 22$ $ 11 - (-11) = 22$	10