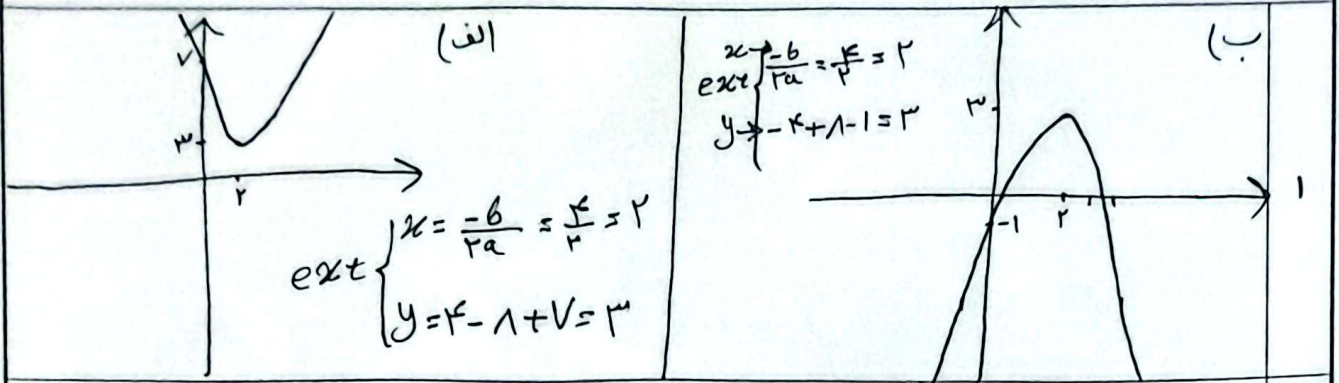




$\Delta = (m+1)^2 - 4 \times 2 \left(\frac{1}{2}m + 2\right) = m^2 + 2m + 1 - 4m - 16 = m^2 - 2m - 15 = (m-5)(m+3)$
 (الف) $\Delta > 0 \leftarrow$ ۲ ریشه متمایز $\Delta = 0 \leftarrow$ ۱ ریشه مضاعف $\Delta < 0 \leftarrow$ بدون ریشه حقیقی
 (ب) $m < -3$ یا $m > 5$ $\Delta < 0$ $-3 < m < 5$ $\Delta > 0$ دارای ریشه $m < -3$ یا $m > 5$ $\Delta < 0$

همیشه مثبت $\Delta = [-2(m+1)]^2 - 4(m-2)(10) = 4m^2 - 32m + 16 \rightarrow$
 (الف) $\Delta > 0 \leftarrow$ دو نقطه متمایز $\Delta = 0 \leftarrow$ یک نقطه $\Delta < 0 \leftarrow$ هیچ نقطه
 $P \rightarrow \frac{10}{m-2} > 0 \Rightarrow m > 2$ ①
 $S \rightarrow \frac{2(m+1)}{m-2} < 0 \Rightarrow$ صورت و مخرج مخالف $\Rightarrow$ حالت ① $m+1 > 0, m-2 < 0 \Rightarrow -1 < m < 2$ ②
 حالت ② $m+1 < 0, m-2 > 0 \Rightarrow m < -1, m > 2 \rightarrow$ غلط $P = \frac{10}{m-2} < 0 \Rightarrow m-2 < 0 \Rightarrow m < 2$ ③
 ① و ② $\Rightarrow m \in (-1, 2)$ ④ $\frac{2(m+1)}{m-2} < 0 \Rightarrow m+1 > 0, m-2 < 0 \Rightarrow -1 < m < 2$ ⑤

(الف) برای اینکه از هر ۴ ناحیه عبور کند باید $\Delta > 0$ و ریشه ها مختلف باشند $\frac{c}{a} < 0$
 $\frac{10}{m-2} < 0 \Rightarrow m < 2$

(ب) $\frac{-b}{2a} = -2 \Rightarrow -\frac{1(m+1)}{2(m-2)} = -2 \Rightarrow m+1 = -2(m-2) \Rightarrow 3m = 3 \Rightarrow m = 1$

$\Delta = (-2\sin a)^2 - 4 \times \frac{2}{9} \times \frac{2}{9} = 4\sin^2 a - \frac{16}{81} = 4(\sin^2 a - \frac{4}{81}) = 4\cos^2 a$
 $\Delta > 0 \Rightarrow -4\cos^2 a > 0 \Rightarrow \cos^2 a = 0 \Rightarrow \cos a = 0 \Rightarrow a = \frac{\pi}{2} + k\pi$
 $\Rightarrow \sin a = 1 \Rightarrow \frac{2x^2}{3} - 2x + \frac{2}{3} = 0 \xrightarrow{\times 3} 2x^2 - 12x + 2 = 0$
 $x = \frac{12 \pm \sqrt{144 - 16}}{4} = \frac{12 \pm 10}{4} = \frac{3}{2}$

$x^2 - 2x - 1 = (x+1)(x-1), \quad 2x^2 - 3x - 5 = (2x-5)(x+1)$ $y = \frac{(x^2-1)(2x+1)(2x-5)}{-(x^2-1)} = -4x^2 + 13x + 5$ $e_{2x} \begin{cases} x = \frac{-b}{2a} = \frac{13}{-4} \\ y = \frac{-\Delta}{4a} \Rightarrow \frac{-(149+16)}{-16} = \frac{165}{16} \end{cases}$	6
$\Rightarrow 3S = \Delta P + V \Rightarrow \frac{3m+4}{m} = \frac{Vm-10}{m} \Rightarrow 3m=14 \Rightarrow m=7$ $\xrightarrow{m=7} 2x^2 - 4x - 2 = 0$ $a^2 + b^2 = s^2 - 2p \Rightarrow \left(\frac{s}{r}\right)^2 + 1 = \frac{1}{r}$	7
$a + \beta = \omega, \quad a\beta = 2, \quad \beta^2 = \omega\beta - 2$ $\beta^3 = \beta \cdot \beta^2 = \beta(\omega\beta - 2) = \omega\beta^2 - 2\beta = \omega(\omega\beta - 2) - 2\beta = 2\omega\beta - 10$ $\beta^4 = \beta \times \beta^3 = \beta(2\omega\beta - 10) = 2\omega\beta^2 - 10\beta = 2\omega(\omega\beta - 2) - 10\beta = 10\omega\beta - 40 - 10\beta = 10\omega\beta - 50$ $\beta^5 = \beta \times \beta^4 = \beta(10\omega\beta - 50) = 10\omega\beta^2 - 50\beta = 10\omega(\omega\beta - 2) - 50\beta = 20\omega\beta - 100 - 50\beta = 20\omega\beta - 150$ $\Delta\beta^2 = \omega(\omega\beta - 2) = 2\omega\beta - 10 \Rightarrow \frac{a + \beta^5}{\Delta\beta^2} = \frac{20\omega\beta - 150 + 20\omega\beta - 150}{2\omega\beta - 10} = \frac{40\omega\beta - 300}{2\omega\beta - 10} = \frac{20(2\omega\beta - 15)}{2(\omega\beta - 5)} = 10$	8
$2, -3 \Rightarrow x=2 \rightarrow 2(2)+10=14, x=-3 \rightarrow 2(-3)+10=4 \Rightarrow (2, 14), (-3, 4)$ $ax^2 + bx + c = y \xrightarrow{c=4} ax^2 + bx + 4 = y \xrightarrow{x=2} \begin{cases} 4a + 2b = 10 \\ 12a + 4b = 16 \end{cases} \xrightarrow{x=-3} \begin{cases} 9a - 3b = 0 \\ 11a - 4b = 0 \end{cases}$ $\Rightarrow 30a = 30 \Rightarrow a = 1 \rightarrow 4(1) + 2b = 10 \Rightarrow b = 3$ ج) موزعاً $\rightarrow \frac{-b}{2a} = \frac{-3}{2}$	9
$\rightarrow f(x) = x \Rightarrow 2x^2 + (m+1)x + m+4 = x \Rightarrow 2x^2 + mx + m+4 = 0$ $\Delta = m^2 - 4(m+4) \rightarrow m = \frac{1 \pm \sqrt{(-1)^2 - 4(1)(-4)}}{2} = \frac{1 \pm \sqrt{17}}{2} \Rightarrow m \rightarrow \frac{1+14}{2} = 15$ $\xrightarrow{m=15} x = \frac{-b}{2a} = \frac{-m}{2} \Rightarrow \frac{-15}{2} = -7.5 \rightarrow \text{ربع سوس} \rightarrow \text{غوق} \times$ $\xrightarrow{m=-4} x = \frac{-b}{2a} = \frac{-m}{2} \Rightarrow \frac{-(-4)}{2} = 2 \rightarrow \text{ربع اول} \rightarrow \text{ق ق} \checkmark$	10