

الف) $x^2 - 4x + 8 = 0$: $(x-3)^2 = 1 \rightarrow x^2 - 6x + 9 = 1 \rightarrow x^2 - 6x + 8 = 0$
 $x - 3 = \pm 1 \rightarrow x = 4$
 $x = 2$

ب) $x^2 + 8x + 7 = 0$: $x^2 + 8x + 16 = 9 \Rightarrow (x+4)^2 = 9 \rightarrow (x+4) = \pm 3$
 $\rightarrow x = -7, x = -1$

الف) $x^2 - 5x + 6 = 0, (x-2)(x-3) = 0 \rightarrow x = 2, x = 3$

ب) $x^2 - 5x - 14 = 0, (x-7)(x+2) = 0 \rightarrow x = +7, x = -2$

الف) $x^2 - 3x - 4 = 0$, $x = \frac{-b \pm \sqrt{\Delta}}{2a}$, $\Delta = b^2 - 4ac$
 $\Delta = 9 + 16 = 25$
 $x = \frac{3 \pm \sqrt{25}}{2} = \frac{3+5}{2}, \frac{3-5}{2} = x$

ب) $x^2 - 3x + \frac{1}{4} = 0$, $\frac{3 \pm \sqrt{12}}{2}$
 $\Delta = b^2 - 4ac = 9 - 1 = 8$
 $\frac{1 + \sqrt{3}}{2} = x$
 $\frac{1 - \sqrt{3}}{2} = x$

الف) $x^2 - 3x + 2 = 0, (x-1)(x-2) = 0 \rightarrow \boxed{x=2}$
 $\boxed{x=1}$

ب) $x^2 + x - 3 = 0$, $\frac{-b \pm \sqrt{b^2 - 4ac}}{2a} = \frac{-1 \pm \sqrt{13}}{2}$
 $\frac{-1 - \sqrt{13}}{2} = (-1)$

الف) $x^2 - 12x + 27 = 0 \rightarrow x^2 - 12x + 36 = 9 \rightarrow (x-6)(x-3) = 0$
 $x = \frac{6}{3}, x = \frac{3}{3} = 1$

ب) $x^2 - 10x + 21 = 0 \rightarrow (x-3)(x-7) = 0 \rightarrow x = \frac{3}{3} = 1, \boxed{x = \frac{7}{3}}$

اگر $\Delta > 0$ معادله دو ریشه دارد
 اگر $\Delta = 0$ معادله یک ریشه و مفاد است دارد
 اگر $\Delta < 0$ معادله جواب ندارد

الف) $2x^2 + 5x - 1 = 0 \rightarrow$ (دو ریشه حقیقی)
 $b^2 - 4ac = 25 - 1 \times 2 = 23, \Delta > 0$

ب) $2x^2 - x + 1 = 0, b^2 - 4ac = 1 - 8 = -7, \Delta < 0$ (جواب حقیقی ندارد)

ج) $2x^2 - 4x + 1 = 0, b^2 - 4ac = 16 - 8 = 8, \Delta > 0$ (معادله یک ریشه دارد)

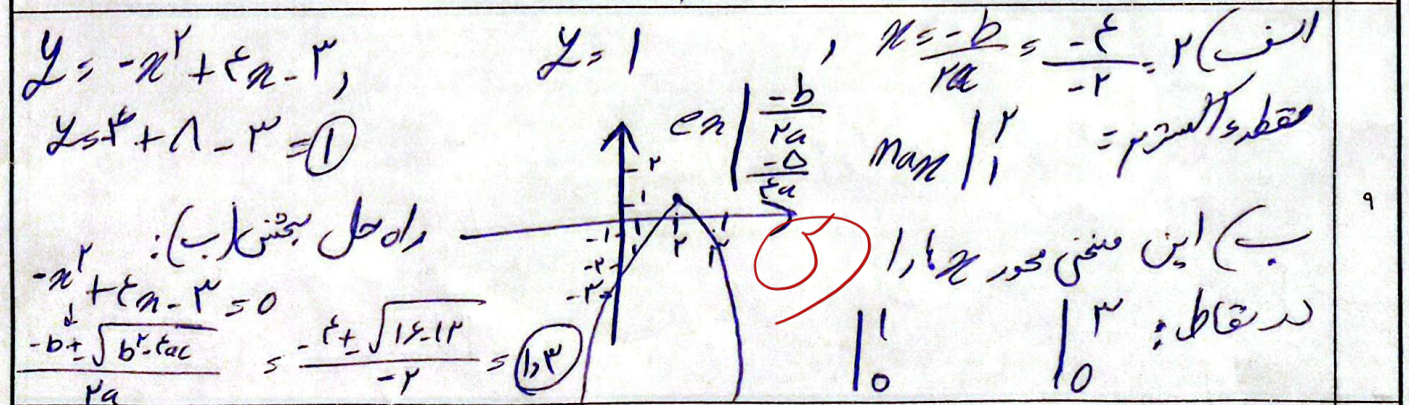
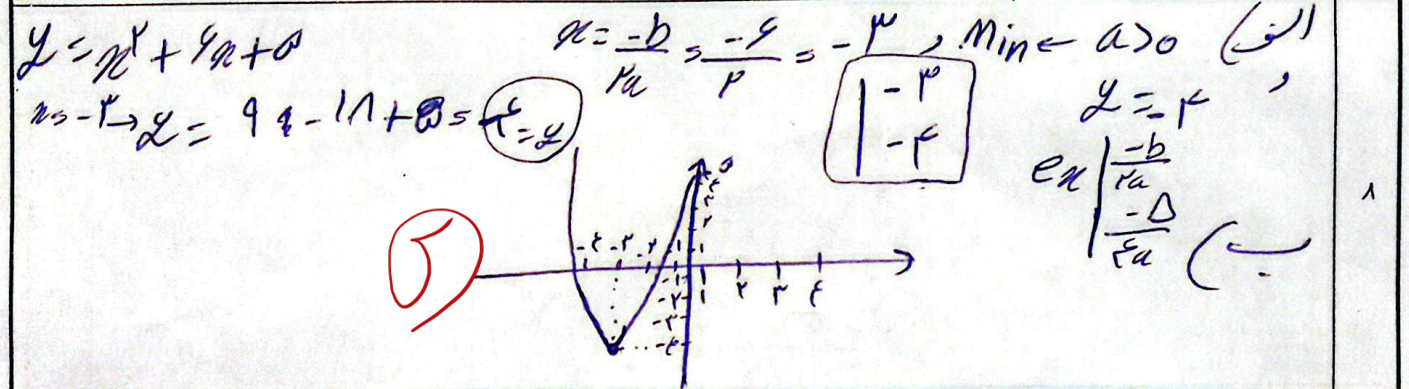
د) $2x^2 - x + 1 = 0, b^2 - 4ac = 1 - 8 = -7, \Delta < 0$ (جواب ندارد)

الف) $2x^2 - 2x + a = 0, a < \frac{9}{4}, a \in \mathbb{R}$: الف
 $b^2 - 4ac > 0, \Delta > 0$
 $4 - 4a > 0 \rightarrow 4 > 4a$
 $a \in \mathbb{R}, \frac{9}{4} > a$

ب) $2x^2 - 2x + a = 0, \Delta = 0$ (ج)
 $4 - 4a = 0 \rightarrow a = \frac{9}{4}$

ج) $2x^2 - 2x + a = 0, \Delta < 0$ (ج)
 $4 - 4a < 0 \rightarrow 4 < 4a \rightarrow a > \frac{9}{4} = 2$

د) $2x^2 - 2x + a = 0, \Delta \geq 0, b^2 - 4ac \geq 0$
 $4 - 4a \geq 0 \rightarrow 4 \geq 4a \rightarrow \frac{9}{4} \geq a$



الف) $x^2 - 2x - 2 = 0, x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} = \frac{2 \pm \sqrt{4 + 8}}{2} = \frac{2 \pm \sqrt{12}}{2}$

ب) $S = \frac{2 + \sqrt{12}}{2} + \frac{2 - \sqrt{12}}{2} = \frac{4}{2} = 2$

ج) $P = \frac{2 + \sqrt{12}}{2} \times \frac{2 - \sqrt{12}}{2} = \frac{4 - 12}{4} = \frac{-8}{4} = -2$

د) $x^2 - 2x - 2 = 0, x = \frac{2 \pm \sqrt{12}}{2}$