

۱۳، ۵

ext  $\left| \begin{aligned} -\frac{b}{2a} &= -\frac{4}{2} = -2 \checkmark \\ -\frac{\Delta}{4a} &= -\frac{b^2 - 4ac}{4} = -\frac{16 - 20}{4} = -\frac{14}{4} = -\frac{7}{2} \checkmark \end{aligned} \right.$

$y = x^2 + 4x + 5$   
 $ax^2 + bx + c$

الف (۲) - min

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ext  $\left| \begin{aligned} -\frac{b}{2a} &= -\frac{4}{2} = -2 \checkmark \\ -\frac{\Delta}{4a} &= -\frac{b^2 - 4ac}{4} = -\frac{16 - 12}{4} = -\frac{4}{4} = -1 \checkmark \end{aligned} \right.$

$y = -x^2 + 4x - 3$   
 $ax^2 + bx + c$

الف (۱) max

(-) نقاطی که منحنی محور را قطع می کند میان ریشه ها هستند.  $-3$  و  $-1$   
 $y = -x^2 + 4x - 3 \rightarrow a + c = b \rightarrow -3 + 1 = 4 - 3 = 1$   
 $a + b + c < 0 \rightarrow x < 1, x > \frac{c}{a} \rightarrow -\frac{3}{-1} = 3$

۱ اگر  $\Delta > 0$  = دو ریشه حقیقی متمایز  $\Delta = 0$  یک ریشه حقیقی مضاعف (دو ریشه یکسان)  $\Delta < 0$  = دو ریشه غیر حقیقی

الف (۱)  $\Delta > 0$   $\Delta = 9 - 1a = 9 - 1 = 8 > 0$   
 $x^2 - 2x + 1 = 0 \rightarrow \Delta = 4 - 4 = 0$   
 $\Delta = 9 - 1a$   $a = 9 \rightarrow \Delta = 0$   
 $\Delta = 9 - 1a$   $a = 2 \rightarrow \Delta = 5$   
 $\Delta \geq 0$  = حداقل یک ریشه حقیقی  $a = \{9, 1\}$

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الف)  $x^2 - 2x - 1 = 0 \Rightarrow x^2 - 2x - 1 + 2 = +2 = x^2 - 2x + 1 = +2$   
 $(x-1)^2 = +2 \Rightarrow x-1 = \pm\sqrt{2} \rightarrow x-1 = +\sqrt{2} \rightarrow x = 1+\sqrt{2}$   
 $x-1 = -\sqrt{2} \rightarrow x = 1-\sqrt{2} \checkmark$

ب)  $x^2 - x - 1 = 0 \Rightarrow x$   
 $(x^2 - x + \frac{1}{4}) - 1 - \frac{1}{4} < 0 \rightarrow (x - \frac{1}{2})^2 = \frac{5}{4} \rightarrow x - \frac{1}{2} = \pm\frac{\sqrt{5}}{2} \rightarrow x = \frac{1+\sqrt{5}}{2}$   
 $x - \frac{1}{2} = -\frac{\sqrt{5}}{2} \rightarrow x = \frac{1-\sqrt{5}}{2}$

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الف)  $x^2 - 2x - 1 = 0 \Rightarrow \Delta = 4 - 4(-1) = 8$   
 $\frac{2 \pm \sqrt{8}}{2} = \frac{2 \pm 2\sqrt{2}}{2} = 1 \pm \sqrt{2}$   
 $\Delta = 1 - 4(-1) = 5$   
 $\frac{-1 \pm \sqrt{5}}{2} = \frac{-1 \pm \sqrt{5}}{2}$

ب)  $x^2 + x - 3 = 0 \Rightarrow \Delta = 1 - 4(-3) = 13$   
 $\frac{-1 \pm \sqrt{13}}{2}$

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الف)  $x^2 - 2x - 1 = 0 \Rightarrow \Delta = 4 - 4(-1) = 8$   
 $\frac{2 \pm \sqrt{8}}{2} = \frac{2 \pm 2\sqrt{2}}{2} = 1 \pm \sqrt{2}$   
 $\Delta = 1 - 4(-3) = 13$   
 $\frac{-1 \pm \sqrt{13}}{2}$

$$\text{الف) } x^2 - 11x + 28 = 0 \Rightarrow (x-7)(x-4) = 0 \begin{cases} \rightarrow +7 \\ \rightarrow +4 \end{cases} \checkmark$$

(2)

$$\text{ب) } x^2 + 3x - 28 = 0 \Rightarrow (x+7)(x-4) = 0 \begin{cases} \rightarrow -7 \\ \rightarrow +4 \end{cases} \checkmark$$

$$\text{الف) } \Delta x^2 - 12x + 7 = 0 \Rightarrow x^2 - 12x + 3\Delta = 0$$

$$(x-\Delta)(x-7) = 0 \begin{cases} \rightarrow \frac{+\Delta}{\Delta} = 1 \\ \rightarrow \frac{+7}{\Delta} \end{cases} \checkmark$$

(2)

$$\text{ب) } 3x^2 - 10x + 7 = 0 \Rightarrow x^2 - 10x + 21 = 0$$

$$(x-3)(x-7) = 0 \begin{cases} \rightarrow \frac{+3}{3} = 1 \\ \rightarrow \frac{+7}{3} \end{cases} \checkmark$$

$$\text{الف) } 2x^2 - 5x + 3 = 0 \quad \text{ب) } 2x^2 - 5x + 1 = 0 \quad \Delta = \frac{25 - 4}{4} = \frac{21}{4}$$

$$\begin{cases} \rightarrow 1 \\ \rightarrow \frac{c}{a} = \frac{3}{2} \end{cases} \checkmark$$

$$a+b+c=0$$

$$\frac{5 - \sqrt{21}}{4} \text{ و } \frac{5 + \sqrt{21}}{4}$$

(1, 5)

$$\text{ب) } 2x^2 + 5x + 3 = 0$$

$$a+c=b$$

$$2x^2 + 5x + 9 = 0$$

$$\Delta = \frac{25 - 36}{4} \rightarrow \Delta < 0$$

لا يوجد حقيقي

$$\begin{cases} \rightarrow -1 \\ \rightarrow -\frac{c}{a} = -\frac{3}{2} \end{cases} \checkmark$$

$$x^2 - 3x - 2 = 0$$

$$S = -3$$

$$P = 2$$

(0)

$$\text{الف) } S^2 - 2P = 14 - 12 = 2$$

$$S = -\frac{b}{a} = \frac{3}{1}$$

$$P = \frac{c}{a} = -\frac{2}{1}$$

$$3 - 2(-2) = 9 + 4 = 13$$

$$\text{ب) } S^3 - 3SP = -27 \oplus (2) = -27 + 12 = -15$$

$$3 - 3(3)(-2) = 12 + 18 = 30$$

$$\text{الف) } \binom{7}{5} + \binom{9}{2} = \frac{7!}{2! \times 5!} + \frac{9!}{2! \times 7!} = \frac{7 \times 6}{2 \times 1} + \frac{9 \times 8}{2 \times 1} = 21 + 36 = 57$$

(2)

$$\text{ب) } \binom{9}{3} - \binom{7}{2} = \frac{9!}{3! \times 6!} - \frac{7!}{2! \times 5!} = \frac{9 \times 8 \times 7}{3 \times 2 \times 1} - \frac{7 \times 6}{2 \times 1} = 84 - 21 = 63$$