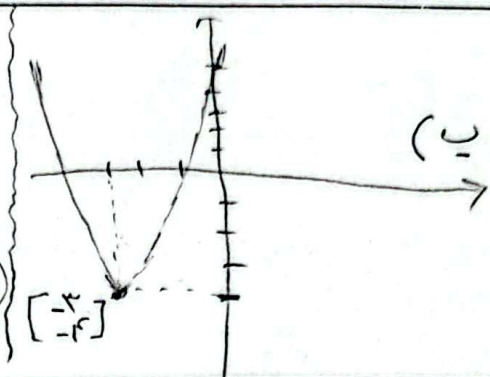


معرفی از مبدا $y = ax^2 + bx + c \rightarrow$

$a > 0 \Rightarrow \text{Min}$ (الف)

Ext $x = -\frac{b}{2a} = -\frac{4}{2} = -2$

$y = -\frac{\Delta}{4a} = \frac{-b^2 + 4ac}{4a} = \frac{-14}{2} = -7$

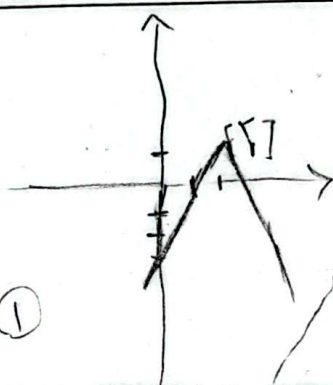


معرفی از مبدا $y = ax^2 + bx + c \rightarrow$

$a < 0 \Rightarrow \text{Max}$

Ext $x = -\frac{b}{2a} = \frac{-4}{-2} = 2$

$y = -\frac{\Delta}{4a} = \frac{-b^2 + 4ac}{4a} = \frac{2}{-2} = -1$



(ب) $\Delta = 0 \Rightarrow -x^2 + 4x - 2 = 0$
 $a + b + c = 0$
 $\Rightarrow \frac{c}{a} = \frac{-2}{-1} = 2$
 در نقاط $[0]$ و $[2]$

$ax^2 + bx + c = 0$

(الف) جواب متناظر $\Delta > 0 \Rightarrow a - \Delta a > 0 \Rightarrow \frac{4}{\Delta} > a$

$\Delta = b^2 - 4ac$

(د) رابطه داشته باشد $\Delta > 0$

(ب) رابطه ضاعف $\Delta = 0 \Rightarrow a - \Delta a = 0 \Rightarrow a = \Delta a \Rightarrow \frac{4}{\Delta} = a$

$a - \Delta a > 0$

$\Rightarrow a > \Delta a$

$\Rightarrow \frac{4}{\Delta} > a$

ج. فاند رابطه ضعیف $\Delta < 0$

$a - \Delta a < 0 \Rightarrow a < \Delta a \Rightarrow \frac{4}{\Delta} < a$

(الف) $x^2 - 2x - 1 = 0 \xrightarrow{(+2)}$ $x^2 - 2x + 1 = 2 \Rightarrow (x-1)^2 = 2$

$\Rightarrow x - 1 = \pm \sqrt{2} \Rightarrow \begin{cases} x = -\sqrt{2} + 1 \\ x = \sqrt{2} + 1 \end{cases}$

(ب) $x^2 - x - 1 = 0 \xrightarrow{(+\frac{1}{4})}$ $x^2 - x + \frac{1}{4} = \frac{5}{4} \Rightarrow (x - \frac{1}{2})^2 = \frac{5}{4}$

$\Rightarrow x - \frac{1}{2} = \pm \frac{\sqrt{5}}{2} \Rightarrow \begin{cases} x = \frac{1}{2} + \frac{\sqrt{5}}{2} \\ x = \frac{1}{2} - \frac{\sqrt{5}}{2} \end{cases}$

(الف) $ax^2 + bx + c = 0$

$\Delta = b^2 - 4ac$

$x = \frac{-b \pm \sqrt{\Delta}}{2a} = \frac{-2 \pm \sqrt{4}}{2} = 1 \pm \sqrt{2} \Rightarrow \begin{cases} 1 + \sqrt{2} \\ 1 - \sqrt{2} \end{cases}$

(ب) $ax^2 + bx + c = 0$

$\Delta = 1 + 14 = 15$

$x = \frac{-1 \pm \sqrt{15}}{2} \Rightarrow \begin{cases} \frac{-1 + \sqrt{15}}{2} \\ \frac{-1 - \sqrt{15}}{2} \end{cases}$

(د) رابطه

$\Delta = b^2 - 4ac$

$x = \frac{-b \pm \sqrt{\Delta}}{2a}$

الف) $x^2 - 11x + 28 = 0 \Rightarrow (x-4)(x-7) = 0$
 جمع اعداد داخل پرانتز ضرب اعداد داخل پرانتز
 $\Rightarrow \begin{cases} x=4 \\ x=7 \end{cases}$

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

الف) $x^2 - 12x + 35 = 0 \Rightarrow (x-5)(x-7) = 0$
 جمع ضرب
 $\begin{cases} x = \frac{5}{5} = 1 \\ x = \frac{7}{5} \end{cases}$

ب) $3x^2 - 10x + 7 = 0 \Rightarrow x^2 - 10x + 21 = 0$
 جمع ضرب
 $\Rightarrow (x-3)(x-7) = 0$
 $\begin{cases} x = \frac{3}{3} = 1 \\ x = \frac{7}{3} \end{cases}$

الف) $ax^2 + bx + c = 0$
 $a+b+c=0 \Rightarrow x = \frac{c}{a} = \frac{3}{1}$

ب) $5x^2 + 5x + 4 = 0$
 $a+c=b \Rightarrow x = \frac{b}{a} = \frac{5}{5} = 1$
 $x = \frac{-c}{a} = \frac{-4}{5}$

2) $ax^2 + bx + c = 0$
 $\Delta = b^2 - 4ac = 25 - 12 = 13$
 $x = \frac{-b \pm \sqrt{\Delta}}{2a} = \frac{-5 \pm \sqrt{13}}{2}$
 $\begin{cases} x = \frac{5 + \sqrt{13}}{2} \\ x = \frac{5 - \sqrt{13}}{2} \end{cases}$

3) $5x^2 + 7x + 4 = 0$
 $\Delta = b^2 - 4ac = 49 - 140 = -91$
 $x = \frac{-b \pm \sqrt{\Delta}}{2a}$
 $\Delta < 0$ ریشه حقیقی ندارد.

الف) $5x^2 - 2x - 13 = 0$
 حاصل جمع ریشه ها: S ، حاصل ضرب ریشه ها: P
 $S = -\frac{b}{a} = \frac{2}{5}$
 $P = \frac{c}{a} = -\frac{13}{5}$

ب) $S^2 - 3SP = 25 - (2 \times -13) = 25 + 26 = 51$

الف) $\binom{5}{0} + \binom{4}{1} = \frac{5!}{0!5!} + \frac{4!}{1!3!} = \frac{5!}{0!2!} + \frac{4!}{1!1!}$
 $\frac{5 \times 4}{2} + \frac{4 \times 3}{1} = 10 + 12 = 22$

ب) $\binom{9}{3} - \binom{8}{2} = \frac{9!}{3!6!} - \frac{8!}{2!6!} = \frac{9 \times 8 \times 7}{6} - \frac{8 \times 7}{2}$
 $126 - 28 = 98$