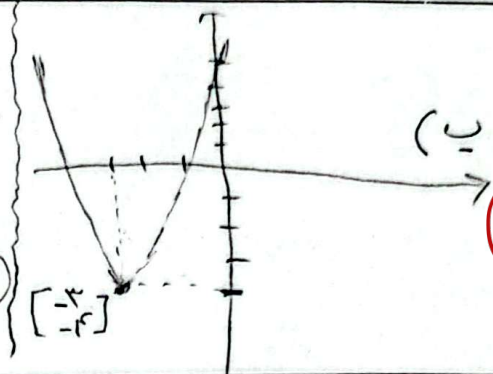


معرفی از مبدا $y = ax^2 + bx + c \rightarrow$

$a > 0 \Rightarrow \text{Min}$ (الف)

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

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

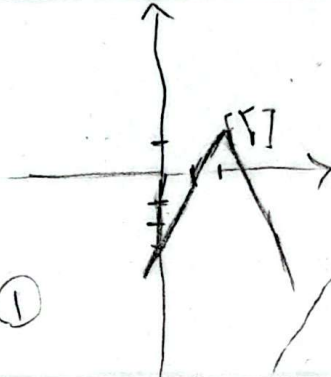


معرفی از مبدا $y = ax^2 + bx + c \rightarrow$

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

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

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



(ب) $\Delta = 0 \Rightarrow$ (الف)

$\Rightarrow -x^2 + 4x - 4 = 0$

$a + b + c = 0$

$\Rightarrow \frac{c}{a} = \frac{-4}{-1} = 4$

در نقاط $[0, 4]$ و $[4, 0]$

$ax^2 + bx + c = 0$

$\Delta = 9 - 4a$

(الف) جواب متمایز $\Delta > 0 \Rightarrow$

$a - 4a > 0 \Rightarrow a > 4a \Rightarrow \frac{4}{a} > a$

$\Delta = b^2 - 4ac$

(د) ریشه دایره باشد $\Delta > 0 \leftarrow$

$a - 4a = 0$

(ب) ۱ ریشه شاف $\Delta = 0 \Rightarrow$

$\Rightarrow a = 4a \Rightarrow a = \frac{4}{a}$

۲. فاقد ریشه حقیقی $\Delta < 0 \Rightarrow$

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

(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) $ax^2 + bx + c = 0$

$\Delta = 4 + 4 = 8$

$x = \frac{-b \pm \sqrt{\Delta}}{2a} = \frac{2 \pm \sqrt{8}}{2} = 1 \pm \sqrt{2} \Rightarrow \begin{cases} 1 + \sqrt{2} \\ 1 - \sqrt{2} \end{cases}$

(ب) $ax^2 + bx + c = 0$

$\Delta = 1 + 14 = 15$

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

ریشه دایره (د)

$\Delta = b^2 - 4ac$

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

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
 $\begin{cases} x=5 \\ x=7 \end{cases}$

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

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

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

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) $ax^2 + bx + c = 0$
 $\Delta = b^2 - 4ac = 49 - 144 = -95$
 $x = \frac{-b \pm \sqrt{\Delta}}{2a}$
 $\Delta < 0 \Rightarrow$ ریشه حقیقی ندارد.

الف) $S^2 - 2SP = 4 + 8 = 12$
 حاصل جمع ریشه ها: S، حاصل ضرب ریشه ها: P
 $P = \frac{c}{a} = -2$
 $S = -\frac{b}{a} = 4$

ب) $S^2 - 3SP = 25 - (3 \times 4) = 25 - 12 = 13$

الف) $\binom{5}{0} + \binom{4}{1} = \frac{5!}{0!5!} + \frac{4!}{1!3!} = \frac{5!}{0!5!} + \frac{4!}{1!3!}$
 $\frac{5 \times 4}{2} + \frac{4 \times 3}{2} = 10 + 6 = 16$

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