Date : ..../..../....

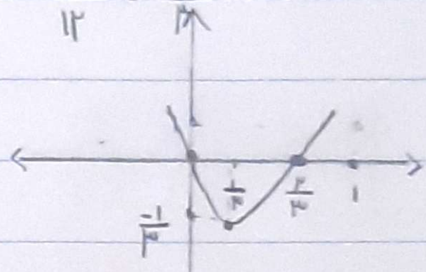
لیلا مرادی

۱- الف) $y = 3x^2 - 2x$ $\quad S(\frac{1}{3}, \frac{-1}{3})$

$a > 0 \rightarrow$ ۱و۲ ✓ $x_s = \frac{-b}{2a} = \frac{2}{6} = \frac{1}{3}$

$y_s = \frac{-\Delta}{4a} = \frac{-4}{12} = \frac{-1}{3}$

x	0	$\frac{1}{3}$	$\frac{2}{3}$
y	0	$\frac{-1}{3}$	0



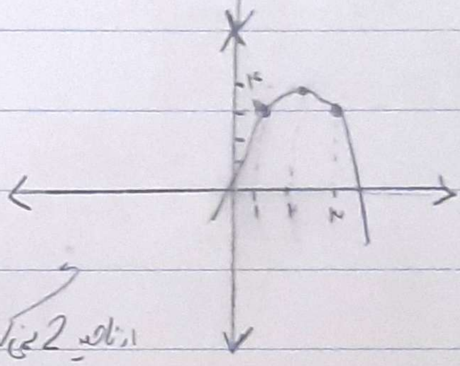
از ناحیه 3 نمی گذرد

ب) $y = -x^2 + 4x$

$a < 0 \rightarrow$ ۳و۴ ✓

$S(2, 4)$

x	1	2	3
y	3	4	3



از ناحیه 2 نمی گذرد

$x = 0 \rightarrow y = 0$

۲- الف) $y = 2x^2 - 5x + 2$ $\quad y_s = \frac{-\Delta}{4a} = 25 - 4\times2\times2 = \frac{-9}{8}$

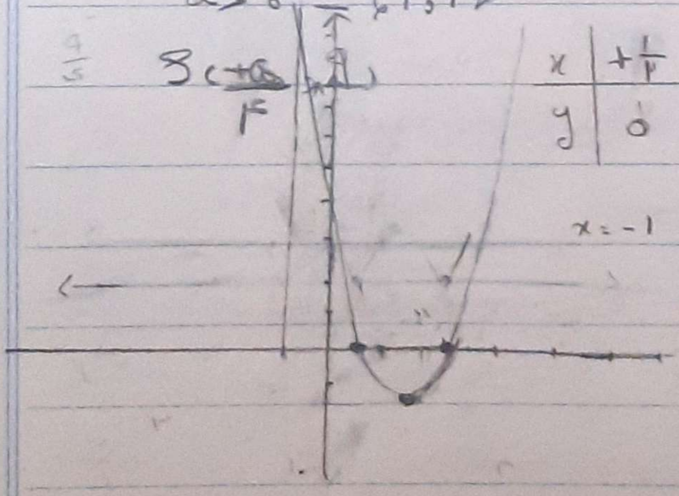
$a > 0 \rightarrow$ ۱و۲و۴ ✓

$S(\frac{+5}{4}, \frac{-9}{8})$

x	$+\frac{1}{2}$	$+\frac{5}{4}$	2
y	0	$\frac{-9}{8}$	0

از ۲ و ۳ می گذرد

$x = -1 \rightarrow y = 5$



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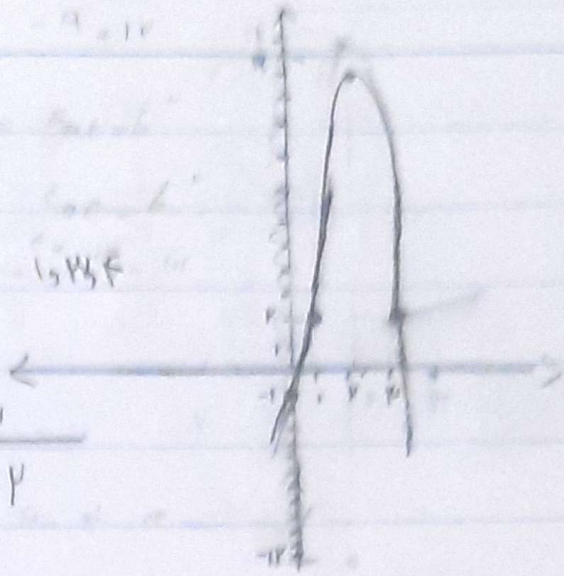
ب) $y = -x^2 + 4x - 1$

$a < 0$ ← سهمی

$S(2, -1)$

x	1	2	3
y	2	3	2



$x = 0 \to y = -1$

۴-

$x^2 - x - 3 = 0$

α, β

$\alpha + \beta = 1$

$\alpha \cdot \beta = -3$

الف) $\frac{\alpha+\beta}{\alpha-\beta} = \frac{\frac{-b}{a}}{\frac{\sqrt{\Delta}}{|a|}} = \frac{\frac{1}{1}}{\frac{\sqrt{1+12}}{1}} = \frac{1}{\sqrt{13}} = \frac{\sqrt{13}}{13}$

ب) $\alpha^2 + \beta^2 = (\alpha+\beta)^2 - 2\alpha\beta \to \frac{c}{a} = \frac{-3}{1}$

$1^2 - (-3)(-2) = 7$

ج) $\alpha^3 + \beta^3 = (\alpha+\beta)^3 - 3\alpha\beta(\alpha+\beta) =$

$1^3 - 3(-3)(1) = 1 + 9 = 10$

$\alpha^{-3} - \beta^{-3} =$

$(\alpha-\beta)(\alpha^2 + \alpha\beta + \beta^2)$

$\alpha^2 + \beta^2 = (\alpha+\beta)^2 - 2\alpha\beta = 1 - 2(-3) = 1 + 6 = 7$

$\alpha^2 + \alpha\beta + \beta^2 = (\alpha^2 + \beta^2) + \alpha\beta = 7 + (-3) = 4$

$\alpha^3 - \beta^3 = (\alpha - \beta) \times 4 = \pm 4\sqrt{13}$

۶-

$y = (x-2)(x^2 - ax + a)$

$\Delta < 0$

$a^2 - 4a < 0$

$a(a-4) < 0$

$0 < a < 4$

$[0, 4]$

a	0		4	
a	$-$	$-$	0	$+$
$a-4$	$-$	$-$	0	$+$
	$+$	$-$		$+$

$[0, 4]$

Date : / /

۵ـ

$3x^2 - 12x - a = 0 \to 144 + 12a$

$2\alpha^2 + \beta^2 - 4\alpha = 7$ $\quad S = -\frac{-12}{3} = 4$

$P = \frac{-a}{3}$

$3\alpha^2 - 12\alpha - a = 0 \to 3\alpha^2 - 12\alpha = a$

$\alpha^2 - 4\alpha = \frac{a}{3}$

$\alpha^2 + \beta^2 + \alpha^2 - 4\alpha$

$(\alpha + \beta)^2 - 2\alpha\beta + \frac{a}{3} = 7$

$4^2 - 2 \times \frac{-a}{3} + \frac{a}{3} = 16 + \frac{3a}{3} = 7$

$9 = \frac{-3a}{3}$

$27 = -3a$

$a = -9$

$3x^2 - 12x + 9 = 0$

$x^2 - 4x + 3 = 0$

$(x-3)(x-1)$ $\quad \frac{-9}{3} = -3$ برابر

۱ و ۳ ریشه‌ها

۶ـ نقطه رأس سهمی:

طول رأس ← $7 - 2a + 2a + 3 = 5$ در تساوی برابر

عرض رأس: $b - 2 = 3 \to$, رأس $= (5, 3)$

$x - 2 > 0 \to x > 2$, $7 - 2a > 0 \to a < 3.5$, $2a + 3 > 0 \to a = -1.5$

$(2, 3, 5)$ تنها عدد طبیعی ← $I \cap II \cap III$

تنها عددی که داخل این بازه باشد $= 3 \to \boxed{a = 3}$

نقاط: $(1, 1)$, $(9, 1)$ $\quad$ معادله $\to y = a(x-5)^2 + 3 \to y = \frac{-1}{8}(x-5)^2 + 3$

۷ـ عرض رأس $= 1$ $\quad \Leftarrow x - 8 \to y = x^2 + 1 + 10x \Leftarrow y = \frac{-1}{8} - \frac{1}{8} + \frac{10}{8}x - 7$

$\alpha + \beta = 1 \to 1 - \alpha = \beta$

$40(1-\alpha)^2 + 20\alpha^2 - 20(1-\alpha) = 17$

$90\alpha^2 - 90\alpha + 3 = 0 \to \alpha^2 - \alpha + \frac{1}{30} = 0$

$\Delta = 1 - 4(1)(\frac{1}{30}) = \frac{4}{5}$ $\quad S = 1$

$P = \frac{1}{30}$

$\frac{\sqrt{\Delta}}{|a|} = \frac{\frac{2}{\sqrt{5}}}{1} = \frac{2}{\sqrt{5}}$

۸-

$x_s = \frac{-5+1}{2} = -2$ $\quad y_s = \frac{-1}{2}$

$S(-2, -\frac{1}{2})$ $\quad y = a(x-h)^2 + k$

$(0, \frac{3}{2})$ $\quad h \to -2, \; k \to \frac{-1}{2}$

$y = a(x+2)^2 - \frac{1}{2}$

$\frac{3}{2} = a(0+2)^2 - \frac{1}{2} \to a = \frac{1}{2}$

$y = \frac{1}{2}(x+2)^2 - \frac{1}{2}$

$\beta = \frac{1}{2}(1+2)^2 - \frac{1}{2}$

$\boxed{\beta = 4}$

۹-

$S = \frac{-b}{a} = -6$ $\quad x^2 + 6x + \alpha = 0$

$P = \frac{c}{a} = \alpha$ $\quad \alpha^2 + 6\alpha + \alpha = 0$

$\Delta = 36 - 4\alpha$

$x_1, x_2 = \frac{-6 \pm \sqrt{36 - 4\alpha}}{2}$

$3 \times \left(\frac{-6 - \sqrt{36 - 4\alpha}}{2}\right)^2 + 3\left(\frac{-6 + \sqrt{36 - 4\alpha}}{2}\right)^2 = 90 - 5\alpha + 6\sqrt{9\alpha}$

$90 - 5\alpha + 6\sqrt{9\alpha} = 12 + \sqrt{2} + 85 \to 90 - 5\alpha = 85$

$\boxed{\alpha = 1}$ $\quad 60\sqrt{9\alpha} = 6\sqrt{8} + 12\sqrt{2}$

۱۰

$36x^2 - (m+14)x + 100$ / $mx^2 + 3x + 2 = 0$ [illegible]

$-x^2 + 3x + 2 = 0 \to P = -2$

$\left(\sqrt{\frac{1}{\alpha}} + \sqrt{\frac{1}{\beta}}\right)^2 = 5^2$ $\quad \frac{1}{\alpha} + \frac{1}{\beta} + 2\sqrt{\frac{1}{\alpha\beta}} = 25$ $\quad (36)$

$\frac{\frac{m+14}{36}}{\frac{\alpha+\beta}{\alpha\beta}} = 13 \to m + 14 = 13 \to \boxed{m = -1}$