عارف سبحانی - دهم ریاضی B

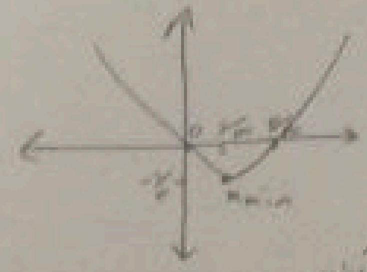
(۱

الف) $y = 3x^2 - 2x$

$S \left| \begin{array}{l} -\frac{b}{2a} = \frac{2}{6} = \frac{1}{3} \\ -\frac{1}{3} \end{array} \right.$ / $a > 0 \to min$

$3x^2 - 2x = 0 \to x(3x - 2) = 0$

$x = 0 , \frac{2}{3}$

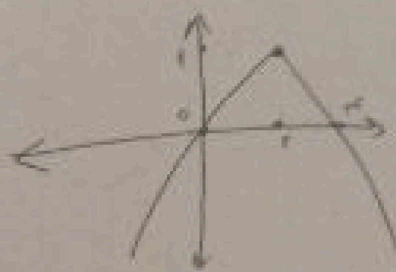


از ناحیه سوم نمی‌گذرد

ب) $y = -x^2 + 4x$

$S \left| \begin{array}{l} -\frac{b}{2a} = \frac{-4}{-2} = 2 \\ +4 \end{array} \right.$ / $a < 0 \to max$

$-x^2 + 4x = 0 \to x(-x + 4) = 0 \to x = 0, 4$



از ناحیه سوم نمی‌گذرد

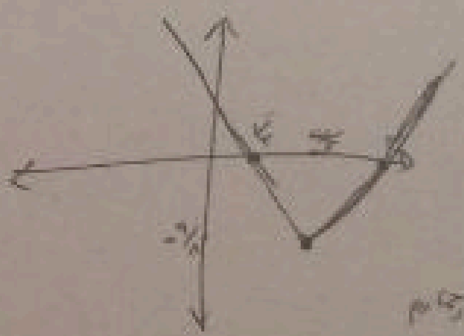
(2

الف) $y = 2x^2 - 5x + 2$

$S \left| \begin{array}{l} -\frac{b}{2a} = \frac{5}{4} \\ -\frac{9}{8} \end{array} \right.$ / $a > 0 \to min$

$2x^2 - 5x + 2 = 0 \to (x - 2)(x - \frac{1}{2}) = 0$

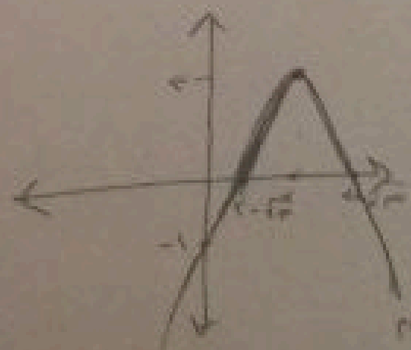
$x = 2 , \frac{1}{2}$



ناحیه اول، دوم و چهارم

ب) $y = -x^2 + 4x - 1$

$S \left| \begin{array}{l} -\frac{b}{2a} = \frac{-4}{-2} = 2 \\ +3 \end{array} \right.$ / $a < 0 \to max$



ناحیه اول، سوم و چهارم

$-x^2 + 4x - 1 = 0 \longrightarrow \Delta = b^2 - 4ac = 16 - 4 = 12$

$x_1 , x_2 = \frac{4 \pm \sqrt{12}}{2} = 2 \pm \sqrt{3}$

(3

$x^2 - x - 3 = 0$

$\Delta = 1 + 12 = 13$

$x_1 , x_2 = \frac{1 \pm \sqrt{13}}{2}$

الف) $= \frac{\alpha + \beta}{\alpha - \beta} = \frac{\frac{1+\sqrt{13}}{2} + \frac{1-\sqrt{13}}{2}}{\frac{1+\sqrt{13}}{2} - \frac{1-\sqrt{13}}{2}}$

$= \boxed{\frac{1}{\sqrt{13}}}$

(9

ب) $\alpha^2+\beta^2 = \left(\frac{1+\sqrt{13}}{2}\right)^2 + \left(\frac{1-\sqrt{13}}{2}\right)^2 = \frac{(1+\sqrt{13})^2+(1-\sqrt{13})^2}{4} =$

$\frac{1+13+2\sqrt{13}+1+13-2\sqrt{13}}{2} = \frac{28}{2} = \boxed{14}$

ج) $\alpha^3+\beta^3 = S^3+3SP = (1)^3+(3\times-3) = 1-9 = \boxed{-8}$

$S = \frac{1+\sqrt{13}+1-\sqrt{13}}{2} = 1$ / $P = \frac{(1+\sqrt{13})(1-\sqrt{13})}{4} = -3$ ($1-13=-12$)

د) $\alpha^3-\beta^3 = \left(\frac{1+\sqrt{13}}{2}\right)^3 - \left(\frac{1-\sqrt{13}}{2}\right)^3 = \frac{(1+\sqrt{13})^3-(1-\sqrt{13})^3}{8} =$

$\frac{1+3\sqrt{13}+3(13)+(\sqrt{13})^3-1+3\sqrt{13}-3(13)+(\sqrt{13})^3}{8} = \frac{6\sqrt{13}+2(13\sqrt{13})}{8} = \frac{32\sqrt{13}}{8} = \boxed{4\sqrt{13}}$

(4

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

$x=2$ → $\Delta \le 0 \rightarrow b^2-4ac = (-a)^2-4(1)(a) = a^2-4a \le 0$

$a(a-4) \le 0$

x	0		4	
y	+ 0	−	0 +	

$\boxed{0 \le a \le 4}$

(5

$3x^2-12x-a=0 \rightarrow \beta, \alpha$

$\alpha^2+\beta^2-4\alpha = 7$ ★

$S = \frac{-b}{a} = \frac{12}{3} = 4 \rightarrow \beta\times\alpha = 4$ [illegible]

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

$3x^2-12x-a=0 \xrightarrow{\div 3} x^2-4x-\frac{a}{3}=0 \xrightarrow{[illegible]} \alpha^2-4\alpha = \frac{a}{3}$

$\alpha^2+\beta^2 = S^2+2P \rightarrow \alpha^2+\beta^2 = 16+\frac{2a}{3}$

$\alpha^2+\beta^2-4\alpha = \alpha^2+\beta^2+\alpha^2-4\alpha = 16+\frac{2a}{3}+\frac{a}{3} = 7 \rightarrow 16+a = 7 \rightarrow a = -9$

$3x^2-12x+9 = (x^2-4x+3) = (x-1)(x-3) \rightarrow x = 1, \boxed{3}$ [illegible] $\rightarrow \frac{-9}{3} = \boxed{-3}$

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$ax^۲-ax-b=۰ \xrightarrow{\alpha \text{ ریشه}} a\alpha^۲-a\alpha-b=۰ \to a(\alpha^۲-\alpha)=b \Rightarrow \alpha^۲-\alpha=\frac{b}{a}$ (7

β ریشه $\to a\beta^۲-a\beta-b=۰ \to a(\beta^۲-\beta)=b$ $\quad \boxed{\alpha^۲=\frac{b}{a}+\alpha}$

$\beta^۲-\beta=\frac{b}{a} \to \boxed{\beta^۲=\frac{b}{a}+\beta}$

$۴۰\beta^۲+۲۰\alpha^۲-۲۰\beta=۱۷ \xrightarrow{\beta^۲, \alpha^۲ \text{ جایگذاری}} ۴۰(\beta+\frac{b}{a})+۲۰(\alpha+\frac{b}{a})-۲۰\beta=۱۷$

$S=\frac{-b}{a}=\frac{+a}{a}=\underline{1}$

$\cancel{۴۰\beta}+\frac{۴۰b}{a}+۲۰\alpha+\frac{۲۰b}{a}-\cancel{۲۰\beta}=۱۷$

$|\alpha-\beta|=\sqrt{\alpha^۲+\beta^۲-۲\alpha\beta}$

$۲۰\beta+\frac{۶۰b}{a}+۲۰\alpha=۱۷ \to ۲۰(\beta+\alpha)+\frac{۶۰b}{a}=۱۷$

$\alpha^۲+\beta^۲+۲\alpha\beta=(\alpha+\beta)^۲=1$

$\alpha^۲+\beta^۲=1-۲\alpha\beta$

$\frac{۶۰b}{a}=-۳ \to \boxed{\frac{b}{a}=-\frac{۱}{۲۰}}$

$\to \sqrt{1-۴\times\frac{۱}{۲۰}}=\sqrt{1-\frac{۴}{۲۰}}$

$P=\frac{c}{a}=\frac{-b}{a}=\frac{۱}{۲۰}$

$\sqrt{\frac{۲۰}{۲۰}-\frac{۴}{۲۰}}=\sqrt{\frac{۲}{۱۰}}=\boxed{\frac{\sqrt{۲}}{\sqrt{۱۰}}}=\frac{\sqrt{۲۰}}{۱۰}$

$y=a(x-h)^۲+k \to k=-\frac{۹}{۴} \to a(x-h)^۲-\frac{۹}{۴}$ (8

$(1,\beta) \to \beta=a(1-h)^۲-\frac{۹}{۴}$

$(-۵,\beta) \to \beta=a(-۵-h)^۲-\frac{۹}{۴}$

$\to a(1-h)^۲-\cancel{\frac{۹}{۴}}=a(-۵-h)^۲-\cancel{\frac{۹}{۴}}$

$1-h=\pm(-۵-h) \to 1-h=-۵-h$ غ ق ق

$\to 1-h=۵+h \Rightarrow \underline{h=-۲}$

$(۰,\frac{۷}{۴}) \Rightarrow \frac{۷}{۴}=a(۰-h)^۲-\frac{۹}{۴}=\frac{۷}{۴}=a(-۲)^۲-\frac{۹}{۴} \to \frac{۷}{۴}+\frac{۹}{۴}=۴a \to \boxed{a=\frac{۱}{۴}}$

$\beta=\frac{۱}{۴}(1+۲)^۲-\frac{۹}{۴} \Rightarrow \beta=\frac{۹}{۴}-\frac{۹}{۴}=\frac{۰}{۴}=\boxed{۰}$

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(9

$x^2+4x+5=0$ $\quad S=\frac{-b}{a}=\frac{-4}{1}=-4 \;/\; P=\frac{c}{a}=\frac{5}{1}=5$

$\alpha^2+\beta^2=S^2-2P \rightarrow$ [illegible] $\rightarrow \beta=-4-\alpha$

[illegible]

[illegible]

$x_1, x_2=\frac{-b\pm\sqrt{\Delta}}{2a}=\frac{[illegible]\pm\sqrt{[illegible]}}{10}$ [illegible]

$P=\frac{c}{a}=\frac{1}{[illegible]}$ $\quad S=\frac{-b}{a}=\frac{m+[illegible]}{[illegible]}$

[illegible]$x^2-(m+[illegible])x+1=0$

(10

$\sqrt{\frac{1}{\alpha}}+\sqrt{\frac{1}{\beta}}=[illegible] \rightarrow \frac{\sqrt{\alpha}+\sqrt{\beta}}{\sqrt{\alpha\beta}}=[illegible] \rightarrow \sqrt{\alpha}+\sqrt{\beta}=[illegible]$

$\alpha+\beta+2\sqrt{\alpha\beta}=[illegible] \quad (\;)^2$

$\alpha+\beta+[illegible]=[illegible]$

$\hookrightarrow \frac{m+[illegible]}{[illegible]}=[illegible] \rightarrow m+[illegible]=[illegible] \rightarrow \boxed{m=-1}$

$mx^2+[illegible]x+2=0 \rightarrow -x^2+[illegible]x+2=0$

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