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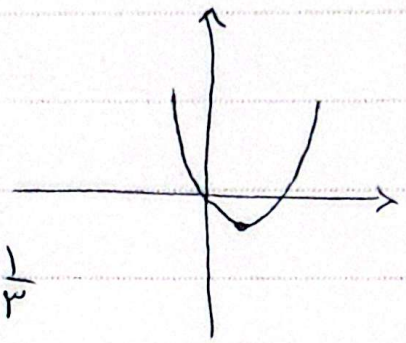
فاطمه حکیم الهی به نام خدا تکلیف ۲۵

سوال ۱)

الف) $y = 3x^2 - 2x$

$x_S = \frac{2}{6} = \frac{1}{3}$

$y_S = \frac{1}{3} - \frac{2}{3} = -\frac{1}{3}$

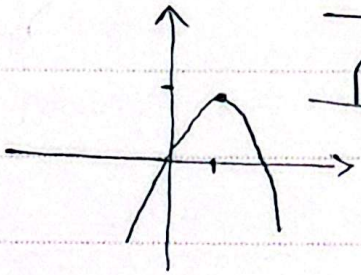


ناحیه ۳ام

ب) $y = -x^2 + 4x$

$x_S = \frac{-4}{-2} = 2$

$y_S = -4 + 8 = 4$



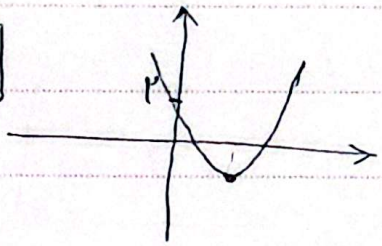
ناحیه دوم

سوال ۲)

الف) $y = 2x^2 - 5x + 2$ ناحیه ۱ و ۲ و ۴

$x_S = \frac{5}{4}$

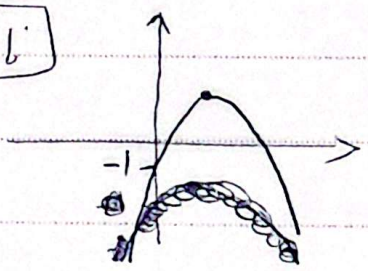
$y_S = \frac{25}{8} - \frac{25}{4} + 2 = \frac{-9}{8}$



ب) $y = -x^2 + 4x - 1$ ناحیه ۱ و ۳ و ۴

$x_S = \frac{-4}{-2} = 2$

$y_S = -4 + 8 - 1 = 3$



سوال ۳)

$x^2 - x - 3 = 0$

الف) $\frac{\alpha+\beta}{\alpha-\beta}$ $S = \frac{-b}{a}$ $P = \frac{c}{a}$ اختلاف $= \frac{\sqrt{\Delta}}{|a|}$

$\frac{1}{\pm\sqrt{13}}$ $(\sqrt{13})$ $= \frac{\pm\sqrt{13}}{13}$ $\frac{1}{1} = 1$ -3 $\frac{\sqrt{1 - 4(-3)(1)}}{1} =$

$\sqrt{13}$

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ب) $\alpha^2+\beta^2 = S^2 - 2P = 1 - 2(-3) = 7$

ج) $\alpha^3+\beta^3 = S^3 - 3PS = 1 - 3(-3)(1) = 10$

د) $\alpha^3-\beta^3 =$ [illegible]

$(\alpha-\beta)(\alpha^2+\beta^2+\alpha\beta) = \pm\sqrt{13} \times \left(7 + (-3)\right) = \pm 4\sqrt{13}$

سوال ۴) $x=2 \qquad y=(x-2)(x^2-ax+a)$

$x^2-ax+a=0 \Rightarrow$

$\Delta < 0 \Rightarrow a^2-4a<0 \Rightarrow a(a-4)<0$

	0		4	
	+	−		+

$0<a<4$

$0=x^2-ax+a \xrightarrow{x=2} (x-2)^2=0 \Rightarrow x^2-4x+4=0 \Rightarrow a=4$

$a \in [0,4]$

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سوال ۵)

$۳x^۲ - ۱۲x - a = ۰ \xrightarrow{\div ۳}$

$x^۲ - ۴x - \frac{a}{۳} = ۰ \Rightarrow \alpha^۲ - ۴\alpha - \frac{a}{۳} = ۰$

$S = ۴ \quad P = \frac{-a}{۳}$

$\Rightarrow \alpha^۲ = ۴\alpha + \frac{a}{۳}$

$۴\alpha^۲ + \beta^۲ - ۴\alpha = ۷ \Rightarrow \alpha^۲ + \alpha^۲ + \beta^۲ - ۴\alpha = ۷$

$۴\alpha + \frac{a}{۳}$ ، $S^۲ - ۲P = ۱۶ - \frac{-۲a}{۳} = \frac{۱۶ + ۲a}{۳}$

$\Rightarrow ۱۶ + a = ۷ \Rightarrow a = -۹$

$۳x^۲ - ۱۲x + ۹ = ۰ \Rightarrow \alpha = ۱$ ، $\alpha = ۳$ $\Rightarrow \frac{-۹}{۳} = -۳$ ✓

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سوال ۱۰)

$$\frac{1}{\sqrt{\alpha}} + \frac{1}{\sqrt{\beta}} = \frac{\sqrt{\alpha}+\sqrt{\beta}}{\sqrt{\alpha\beta}} = 3$$

$$3\sqrt{\alpha\beta} = \sqrt{\alpha}+\sqrt{\beta}$$

$$3x^2 - (m+14)x + 1 = 0 \xrightarrow{\div 3} x^2 - \frac{m+14}{3}x + \frac{1}{3} = 0$$

$$P = \alpha\beta = \frac{1}{3}$$

$$3\sqrt{\alpha\beta} = \frac{3}{3} = \sqrt{\alpha}+\sqrt{\beta} \xrightarrow{\text{توان ۲}}$$

$$\frac{25}{9} = \alpha + \beta + 2\sqrt{\alpha\beta}$$

$$\frac{1}{9} \Rightarrow$$

$$\alpha+\beta = \frac{16}{9}$$

$$\frac{m+14}{3} = \frac{16}{3} \Rightarrow m = -1$$

$$-x^2 + 3x + 2 = 0 \Rightarrow P = \frac{2}{-1} = \boxed{-2}$$

سوال ۹)

$\alpha, \beta < 0 \quad x^2 + 4x + a = 0$

$3\alpha^2 + 2\beta^2 = 12\sqrt{2} + 18$

$-4a + 2(\alpha^2 + \beta^2) = 12\sqrt{2} + 18$

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

$3\alpha^2 + 2\beta^2 - \beta^2 = 12\sqrt{2} + 18 \qquad -\beta^2 = 4\beta + a$

$3(4 - 2a) + 4\beta + a = 12\sqrt{2} + 18$

$12 - 6a + 4\beta + a = 12\sqrt{2} + 18$

$-4\alpha - 3a + 48 = 12\sqrt{2} + 18$

$+$

$-6a + 4\beta + a = 12\sqrt{2} + 6 \quad -12$

$-5a + 4\beta - 4\alpha = 12\sqrt{2} - 6$

$-5a + 4\left(\frac{-12 + 2a}{2}\right) = 12\sqrt{2} - 6$

$-5a + 4a - 12 = 12\sqrt{2} - 6$

$-a = 6 + 12\sqrt{2}$

$\Downarrow$

$a = -11 - 6\sqrt{2}$

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سوال ۱۱)

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

$y = a(x-x_s)^2 + y_s \quad y = a(x+2)^2 - \frac{1}{2} \xrightarrow{\text{از } \frac{9}{2}}$

$\frac{9}{2} = a(1)^2 - \frac{1}{2} \Rightarrow a = 1 \Rightarrow y = (x+2)^2 - \frac{1}{2}$

$x=1 \longrightarrow (1+2)^2 - \frac{1}{2} = 9 - \frac{1}{2} = \frac{17}{2} = \beta$

سوال ۱۲)

$20\beta^2 + 20\alpha^2 - 20\beta = 17$

$20\beta^2 - 20\beta + 20(\beta^2 + \alpha^2) = 17 \Rightarrow$

$P = \frac{-b}{a} \quad S = \frac{a}{a} = 1$

$\frac{20b}{a}$

$20(\beta^2 + \alpha^2 - 1) + 20\left(1 - \frac{-2b}{a}\right) = 17 = \frac{20b}{a} + 20 + \frac{40b}{a} = 17$

$x^2 - x - \frac{b}{a} = 0 \longrightarrow \beta^2 - \beta - \frac{b}{a} = 0 \xrightarrow{\times 20}$

$20\beta^2 - 20\beta = \frac{20b}{a}$

$\frac{60b}{a} = -3 \Rightarrow \frac{20b}{a} = -1 \Rightarrow$ (از بالا)

$20b + a = 0 \Rightarrow$

$19b + 1 = 0 \Rightarrow$

$b = \frac{-1}{19}$

$x^2 - x - \frac{1}{20} = 0$

$\Rightarrow$ مجذور $= \frac{-\Delta}{4a} = \frac{-(1 - 4(\frac{-1}{20}))}{4} = \frac{9}{10}$ $\Rightarrow a = \frac{20}{19}$

$\frac{a}{x_1^2} = \frac{-2}{10} = -0.2$

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$\frac{۷-۲a+۲a+۳}{۲} = a = b \Rightarrow b-۲=۳$ (سوال ۶)

$y = m(x-a)^۲ + ۳ \Rightarrow$

$x=۰ \longrightarrow a^۲ + ۳ = ۲۸$