1.48
4

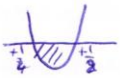
$(3a-1)x^2+2ax+3a=1 \rightarrow (3a-1)x^2+2ax+3a-1=0$

(א) $0 \le \Delta = 4a^2-4(3a-1)(3a-1) = 4a^2-4(9a^2-6a+1)$

$0 \le 4a^2-36a^2+24a-4$

$32a^2-24a+4 \le 0 \quad /:4$

$8a^2-6a+1 \le 0$

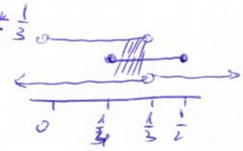


$\boxed{+\frac{1}{4} \le a \le +\frac{1}{2}}$

(ב) נדרוש קיום ל $\Delta \ge 0$ וגם $\frac{c}{a}>0$ $\frac{-b}{a}>0$

$0<\frac{c}{a}=\frac{3a-1}{3a-1} \rightarrow a \ne \frac{1}{3}$

$0<\frac{-b}{a}=\frac{-2a}{3a-1}$ $\quad - \underset{0}{|} + \underset{1/3}{|} - \quad$ $0<a<\frac{1}{3}$



$\boxed{\frac{1}{4} \le a < \frac{1}{3}}$

(ג) $x_1+x_2=3x_2=\frac{-b}{a}=\frac{-2a}{3a-1} \rightarrow x_2=\frac{-2a}{3(3a-1)}$

$x_1 \cdot x_2 = 2x_2^2 = \frac{3a-1}{3a-1}=1$

$2\left[\frac{-2a}{3(3a-1)}\right]^2=1$

$\left[\frac{-2a}{3(3a-1)}\right]^2=\frac{1}{2} \quad /\sqrt{\ }$

$\frac{-2a}{3(3a-1)}=\sqrt{\frac{1}{2}}=\frac{1}{\sqrt{2}}$ | $\frac{-2a}{3(3a-1)}=-\sqrt{\frac{1}{2}}=-\frac{1}{\sqrt{2}}$

$-2\sqrt{2}a=9a-3$ | $2\sqrt{2}a=9a-3$

$a(9+2\sqrt{2})=3$ | $a=\frac{3}{9-2\sqrt{2}}$

$a=\frac{3}{9+2\sqrt{2}}$

נשים לב ש-2 ~~התשובות~~ הפתרונות נמצאים בתחום של סעיף ב

(ד) $x_1+x_2=\frac{-2a}{3a-1}$ $\quad x_1 \cdot x_2=1$

$y_1+y_2=\frac{1}{x_1^2}+\frac{1}{x_2^2}=\frac{x_2^2+x_1^2}{x_1^2 \cdot x_2^2}=\frac{(x_1+x_2)^2-2x_1x_2}{(x_1x_2)^2}=\frac{\frac{4a^2}{(3a-1)^2}-2}{1}$

$=\frac{4a^2-2(9a^2-6a+1)}{(3a-1)^2}=\frac{-14a^2+12a-2}{(3a-1)^2}$

$y_1 \cdot y_2=\frac{1}{x_1^2}\cdot\frac{1}{x_2^2}=\frac{1}{(x_1x_2)^2}=1$

המשוואה המתאימה:

$y^2-\frac{-14a^2+12a-2}{(3a-1)^2}y+1=0$

$(3a-1)y^2+(14a^2-12a+2)y+(3a-1)^2=0$