

① Решить неравенства:

$$(I) \frac{2}{3}x^2 - 1\frac{1}{2}x - 1\frac{1}{4} \leq 1\frac{1}{3}x - 3\frac{3}{4} \quad (II) \frac{2}{3}x^2 - 2\frac{2}{9}x - 1\frac{1}{2}x + 5 \geq \frac{2}{9}x^2 - \frac{17}{18}x + 1$$

$$\frac{2}{3}x^2 - \frac{3}{2}x - \frac{5}{4} - \frac{4}{3}x + \frac{15}{4} \leq 0 / \cdot 12$$

$$\frac{2}{3}x^2 - \frac{20}{9}x - \frac{3}{2}x + 5 \geq \frac{2}{9}x^2 - \frac{17}{18}x + 1 / \cdot 18$$

$$8x^2 - 18x - 15 - 16x + 45 \leq 0$$

$$12x^2 - 40x - 27x + 90 \geq 4x^2 - 17x + 18$$

$$8x^2 - 34x + 30 \leq 0$$

$$8x^2 - 50x + 72 \geq 0 / : 2$$

$$4x^2 - 17x + 15 \leq 0$$

$$4x^2 - 25x + 36 \geq 0$$

$$x_{1,2} = \frac{17 \pm 7}{8} = \left\langle \begin{array}{l} 3 \\ \frac{5}{4} \end{array} \right.$$

$$x_{1,2} = \frac{25 \pm 7}{8} = \left\langle \begin{array}{l} 4 \\ \frac{9}{4} \end{array} \right.$$

$$\begin{array}{c} + + + \quad - - - \quad + + + \\ \frac{5}{4} \quad 3 \end{array}$$

$$\begin{array}{c} + + + \quad - - - \quad + + + \\ \frac{9}{4} \quad 4 \end{array}$$

$$x \in \left[\frac{5}{4}, 3 \right]$$

$$x \in (-\infty, \frac{9}{4}] \cup [4, +\infty)$$

② Решить уравнения

$$(I) 5\left(x + \frac{1}{x}\right)^2 - 16\left(x + \frac{1}{x}\right) - 52 = 0 \quad (II) 3\left(x - \frac{1}{x}\right)^2 - 12,5\left(x - \frac{1}{x}\right) + 12 = 0$$

сделаю: $x + \frac{1}{x} = t$

сделаю: $x - \frac{1}{x} = t$

$$5t^2 - 16t - 52 = 0$$

$$3t^2 - 12,5t + 12 = 0$$

$$t_{1,2} = \frac{16 \pm 36}{10} = \left\langle \begin{array}{l} \frac{26}{5} \\ -2 \end{array} \right.$$

$$6t^2 - 25t + 24 = 0$$

$$t_{1,2} = \frac{25 \pm 7}{12} = \left\langle \begin{array}{l} \frac{8}{3} \\ \frac{3}{2} \end{array} \right.$$

$$x + \frac{1}{x} = \frac{26}{5} / \cdot 5x$$

$$x - \frac{1}{x} = \frac{8}{3}$$

$$5x^2 - 26x + 5 = 0$$

$$3x^2 - 8x - 3 = 0$$

$$x_{1,2} = \frac{26 \pm 24}{10} = \left\langle \begin{array}{l} 5 \\ \frac{1}{5} \end{array} \right.$$

$$x_{1,2} = \frac{8 \pm 10}{6} = \left\langle \begin{array}{l} 3 \\ -\frac{1}{3} \end{array} \right.$$

$$x + \frac{1}{x} = -2 / \cdot x$$

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

$$x^2 + 2x + 1 = 0$$

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

$$(x+1)^2 = 0$$

$$x_{3,4} = \frac{3 \pm 5}{4} = \left\langle \begin{array}{l} 2 \\ -\frac{1}{2} \end{array} \right.$$

$$x_{3,4} = -1$$

$$\left\{ 3, -\frac{1}{3}, 2, -\frac{1}{2} \right\}$$

$$\left\{ 5, \frac{1}{5}, -1, -1 \right\}$$

В) Формиращи квадрат

$$(I) x_1 = \frac{\sqrt{5}-1}{\sqrt{5}-3} \quad x_2 = \frac{\sqrt{5}+1}{\sqrt{5}+3}$$

$$x_1 + x_2 = \frac{(\sqrt{5}-1)(\sqrt{5}+3) + (\sqrt{5}+1)(\sqrt{5}-3)}{(\sqrt{5}-3)(\sqrt{5}+3)} =$$
$$= \frac{5+2\sqrt{5}-3+5-2\sqrt{5}-3}{-4} = -1$$

$$-\frac{b}{a} = -1 \Rightarrow b = a$$

$$x_1 \cdot x_2 = \frac{4}{-4} = -1$$

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

$$ax^2 + ax - a = 0 \Rightarrow \boxed{x^2 + x - 1 = 0}$$

$$(II) x_1 = \frac{3-\sqrt{7}}{2+\sqrt{7}} \quad x_2 = \frac{3+\sqrt{7}}{2-\sqrt{7}}$$

$$x_1 + x_2 = \frac{(3-\sqrt{7})(2-\sqrt{7}) + (3+\sqrt{7})(2+\sqrt{7})}{(2+\sqrt{7})(2-\sqrt{7})} =$$
$$= \frac{6-5\sqrt{7}+7+6+5\sqrt{7}+7}{-3} = -\frac{26}{3}$$

$$b = -\frac{26}{3}a$$

$$x_1 \cdot x_2 = \frac{2}{-3} = -\frac{2}{3} \Rightarrow c = \frac{2}{3}a$$

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

$$x^2 - \frac{26}{3}x - \frac{2}{3} = 0 \quad \pi \quad \boxed{3x^2 - 26x - 2 = 0}$$

А) Решим систему:

$$(I) x^2 + y^2 = 29$$

$$x + y = 7$$

$$\underline{x^2 + (7-x)^2 = 29}$$

$$\underline{y = 7-x}$$

$$2x^2 - 14x + 20 = 0$$

$$\underline{y = 7-x}$$

$$x^2 - 7x + 10 = 0$$

$$\underline{y = 7-x}$$

$$x_{1,2} = \frac{7 \pm 3}{2} = \begin{matrix} 5 \\ 2 \end{matrix}$$

$$\underline{y = 7-x}$$

$$x=5: y=2$$

$$x=2: y=5$$

$$\boxed{(5,2) \text{ и } (2,5)}$$

$$(II) x^2 - y^2 = 16$$

$$x - y = 2$$

$$\underline{x^2 - (x-2)^2 = 16}$$

$$\underline{y = x-2}$$

$$4x = 20$$

$$\underline{y = x-2}$$

$$x = 5$$

$$y = 3$$

$$\boxed{(5,3)}$$