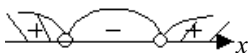


$$3) x + 8 < 3x^2 - 9; 3x^2 - x - 17 > 0$$

$$(x - \frac{1 + \sqrt{205}}{6})(x - \frac{1 - \sqrt{205}}{6}) > 0$$



$$\frac{1 - \sqrt{205}}{6} \quad \frac{1 + \sqrt{205}}{6}$$

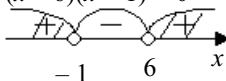
$$x \in \left(-\infty; \frac{1 - \sqrt{205}}{6}\right) \cup \left(\frac{1 + \sqrt{205}}{6}; +\infty\right)$$

$$5) 10x - 12 < 2x^2$$

$$2x^2 - 10x + 12 > 0$$

$$x^2 - 5x + 6 > 0$$

$$(x - 6)(x + 1) > 0$$



$$x \in (-\infty; -1) \cup (6; +\infty)$$

$$4) x^2 \leq 10 - 3x$$

$$x^2 + 3x - 10 \leq 0$$

$$(x + 5)(x - 2) \leq 0$$

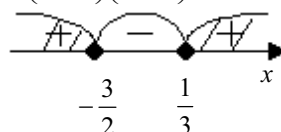


$$x \in [-5; 2]$$

$$6) 3 - 7x \leq 6x^2;$$

$$6x^2 + 7x - 3 \geq 0$$

$$6\left(x - \frac{1}{3}\right)\left(x + \frac{3}{2}\right) \geq 0$$



$$x \in \left(-\infty; -\frac{3}{2}\right] \cup \left[\frac{1}{3}; +\infty\right)$$

693.

$$1) x^2 + 4 < x$$

$$x^2 - x + 4 < 0,$$

$$D < 0 \text{ и } a = 1 > 0,$$

значит, нет решений

$$4) -x^2 - 5x \geq 8$$

$$x^2 + 5x + 8 \leq 0, D < 0$$

$$\text{и } a = 1 > 0, \text{ значит}$$

нет решений

$$2) x^2 + 3 > 2x$$

$$x^2 - 2x + 3 > 0,$$

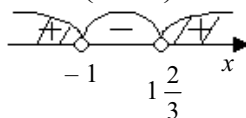
$$D < 0 \text{ и } a = 1 > 0,$$

значит, x — любое

$$5) 3x^2 - 5 > 2x$$

$$3x^2 - 2x - 5 > 0$$

$$(x + 1)\left(x - 1\frac{2}{3}\right) > 0$$



$$x \in (-\infty; -1) \cup$$

$$\cup \left(1\frac{2}{3}; +\infty\right)$$

$$3) -x^2 + 3x \leq 4$$

$$x^2 - 3x + 4 \geq 0,$$

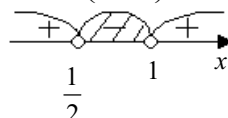
$$D < 0 \text{ и } a = 1 > 0,$$

значит x — любое

$$6) 2x^2 + 1 < 3x$$

$$2x^2 - 3x + 1 < 0$$

$$(x - 1)\left(x - \frac{1}{2}\right) < 0$$



$$x \in \left(\frac{1}{2}; 1\right)$$

$$7) \frac{x^2}{10} + 2 \leq \frac{7x}{10}$$

$$x^2 - 7x + 20 \leq 0, D < 0$$

и $a = 1 > 0$, значит
нет решений

$$8) \frac{x^2}{3} - \frac{2x}{3} > \frac{3x-10}{4}$$

$$4x^2 - 8x > 9x - 30; 4x^2 - 17x + 30 > 0, D < 0$$

и $a = 4 > 0$, значит x — любое

694.

$$1) \frac{1}{3}x - \frac{4}{9}x^2 \geq 1 - x$$

$$3x - 4x^2 \geq 9 - 9x$$

$$4x^2 - 12x + 9 \leq 0$$

$$(2x - 3)^2 \leq 0$$

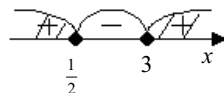
$$x = 1,5$$

$$2) \frac{1}{3}x(x+1) \leq (x-1)^2$$

$$x^2 + x \leq 3x^2 - 6x + 3$$

$$2x^2 - 7x + 3 \geq 0$$

$$\left(x - \frac{1}{2}\right)(x - 3) \geq 0$$



$$x \in (-\infty; \frac{1}{2}] \cup [3; +\infty)$$

$$3) x(1-x) > 1,5 - x$$

$$x - x^2 - 1,5 + x > 0$$

$$x^2 - 2x + 1,5 < 0, D < 0$$

и $a = 1 > 0$, значит нет
решений

$$4) \frac{1}{3}x - \frac{4}{9} \geq x(x-1)$$

$$3x - 4 \geq 9x^2 - 9x$$

$$9x^2 - 12x + 4 \leq 0$$

$$(3x - 2)^2 \leq 0; x = \frac{2}{3}$$

$$6) 2x - 2,5 > x(x-1)$$

$$2x - 2,5 - x^2 + x > 0$$

$$-x^2 + 3x - 2,5 > 0$$

$$x^2 - 3x + 2,5 < 0, D < 0$$

и $a = 1 > 0$, значит нет решений

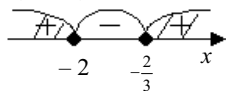
$$5) x\left(\frac{x}{4} - 1\right) \leq x^2 + x + 1$$

$$\frac{x^2}{4} - x - x^2 - x - 1 \leq 0$$

$$x^2 - 8x - 4x^2 - 4 \leq 0$$

$$3x^2 + 8x + 4 \geq 0$$

$$\left(x + \frac{2}{3}\right)(x + 2) \geq 0$$



$$x \in (-\infty; -2] \cup \left[-\frac{2}{3}; +\infty\right)$$

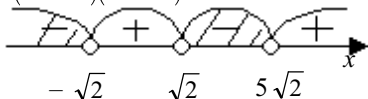
695.

$$1) \frac{2}{x-\sqrt{2}} > \frac{3}{x+\sqrt{2}}$$

$$\frac{2x+2\sqrt{2}-3x+3\sqrt{2}}{(x-\sqrt{2})(x+\sqrt{2})} > 0$$

$$\frac{-x+5\sqrt{2}}{(x-\sqrt{2})(x+\sqrt{2})} > 0;$$

$$\frac{x-5\sqrt{2}}{(x-\sqrt{2})(x+\sqrt{2})} < 0$$



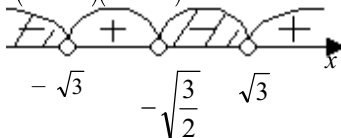
$$x \in (-\infty; -\sqrt{2}) \cup (\sqrt{2}; 5\sqrt{2})$$

$$2) \frac{\sqrt{3}}{3-x^2} < \frac{2}{\sqrt{3}-x}$$

$$\frac{\sqrt{3}-2(\sqrt{3}+x)}{(\sqrt{3}-x)(\sqrt{3}+x)} < 0$$

$$\frac{-2x-\sqrt{3}}{(\sqrt{3}-x)(\sqrt{3}+x)} < 0;$$

$$\frac{2x+\sqrt{3}}{(x-\sqrt{3})(x+\sqrt{3})} < 0$$



$$x \in (-\infty; -\sqrt{3}) \cup \left(-\frac{\sqrt{3}}{2}; \sqrt{3}\right)$$

$$3) \frac{9}{2x+2} + \frac{x}{x-1} \geq \frac{1-3x}{2-2x}$$

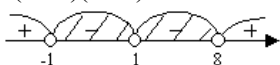
$$\frac{9(x-1)+2x(x+1)+(1-3x)(1+x)}{2(x+1)(x-1)} \geq$$

$$\frac{9x-9+2x^2+2x+1+x-3x-3x^2}{(x+1)(x-1)} \geq$$

$$\frac{-x^2+9x-8}{(x+1)(x-1)} \geq 0$$

$$\frac{x^2-9x+8}{(x+1)(x-1)} \leq 0;$$

$$\frac{(x-1)(x-8)}{(x+1)(x-1)} \leq 0$$



$$x \in (-1; 1) \cup (-1; 8]$$

$$4) \frac{3}{x^2-1} - \frac{1}{2} < \frac{3}{2x-2}$$

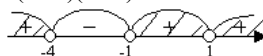
$$\frac{6-(x^2-1)-3(x+1)}{2(x-1)(x+1)} < 0$$

$$\frac{6-x^2+1-3x-3}{(x-1)(x+1)} < 0$$

$$\frac{-x^2-3x+4}{(x-1)(x+1)} < 0$$

$$\frac{x^2+3x-4}{(x-1)(x+1)} > 0;$$

$$\frac{(x+4)(x-1)}{(x-1)(x+1)} > 0$$

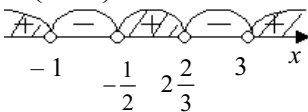


$$x \in (-\infty; -4) \cup (-1; 1) \cup (-1; +\infty)$$

696.

$$1) \frac{3x^2 - 5x - 8}{2x^2 - 5x - 3} > 0$$

$$\frac{3(x+1)\left(x-2\frac{2}{3}\right)}{2\left(x+\frac{1}{2}\right)(x-3)} > 0$$



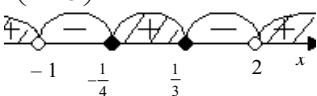
$$x \in (-\infty; -1) \cup$$

$$\cup \left(-\frac{1}{2}; 2\frac{2}{3}\right) \cup (3; +\infty)$$

$$3) \frac{2+7x-4x^2}{3x^2+2x-1} \leq 0$$

$$\frac{-4(x-2)\left(x+\frac{1}{4}\right)}{3\left(x-\frac{1}{3}\right)(x+1)} \leq 0;$$

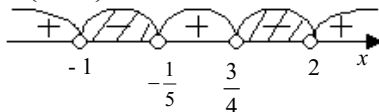
$$\frac{(x-2)\left(x+\frac{1}{4}\right)}{\left(x-\frac{1}{3}\right)(x+1)} \geq 0$$



$$x \in (-\infty; -1) \cup \left[-\frac{1}{4}; \frac{1}{3}\right] \cup [2; +\infty)$$

$$2) \frac{4x^2 + x - 3}{5x^2 - 9x - 2} < 0 \text{ (в книге в знаменателе } 5x^2 + 9x - 9 \text{ — опечатка)}$$

$$\frac{4(x+1)\left(x-\frac{3}{4}\right)}{5\left(x+\frac{1}{5}\right)(x-2)} < 0$$

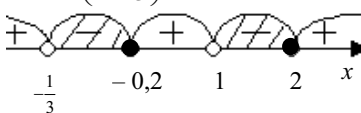


$$x \in \left(-1; -\frac{1}{5}\right) \cup \left(\frac{3}{4}; 2\right)$$

$$4) \frac{2+9x-5x^2}{3x^2-2x-1} \geq 0$$

$$\frac{-5(x-2)(x+0,2)}{3(x-1)\left(x+\frac{1}{3}\right)} \geq 0;$$

$$\frac{(x-2)(x+0,2)}{(x-1)\left(x+\frac{1}{3}\right)} \leq 0$$



$$x \in \left[-\frac{1}{3}; -0,2\right] \cup (1; 2]$$

697.

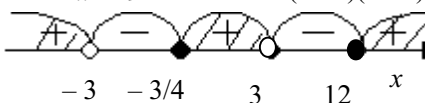
Если x км/ч — собственная скорость катера, то $(x+3)$ км/ч и $(x-3)$ км/ч — скорость по течению и против течения. Тогда $\frac{22,5}{x+3}$ час. — время движения по течению реки, $\frac{22,5}{x-3}$ час. — время движения против течения реки.

Т.к. на весь путь ушло не более 4 ч, то получаем:

$$\frac{22,5}{x+3} + \frac{22,5}{x-3} \leq 4;$$

$$\frac{22,5(x-3) + 22,5(x+3) - 4(x+3)(x-3)}{(x+3)(x-3)} \leq 0$$

$$\frac{-4(x-12)\left(x + \frac{3}{4}\right)}{x^2 - 9} \leq 0, \quad \frac{(x-12)(x + \frac{3}{4})}{(x-3)(x+3)} \geq 0$$



$$x \in (-\infty; -3) \cup \left[-\frac{3}{4}; 3\right) \cup [12; +\infty)$$

Так как $x > 0$ и $x > 3$, то скорость катера не менее 12 км/ч.

Ответ: не меньше 12 км/ч.

698.

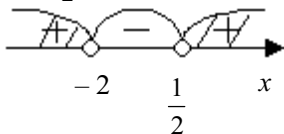
1) $y = 2x^2, y = 2 - 3x$

$$2x^2 > 2 - 3x;$$

$$2x^2 + 3x - 2 > 0$$

$$x_1 = -2,$$

$$x_2 = \frac{1}{2}$$



$$x \in (-\infty; -2) \cup \left(\frac{1}{2}; +\infty\right)$$

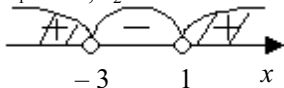
2) $y = x^2 - 2;$

$$y = 1 - 2x$$

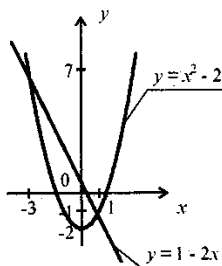
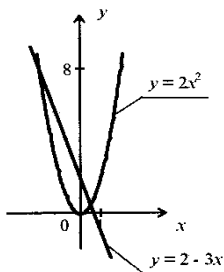
$$x^2 - 2 > 1 - 2x$$

$$x^2 + 2x - 3 > 0$$

$$x_1 = -3, x_2 = 1$$



$$x \in (-\infty; -3) \cup (1; +\infty)$$

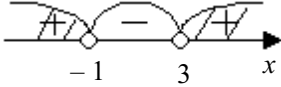


$$3) y = x^2 - 5x + 4, y = 7 - 3x$$

$$x^2 - 5x + 4 > 7 - 3x$$

$$x^2 - 2x - 3 > 0$$

$$x_1 = 3, x_2 = -1$$



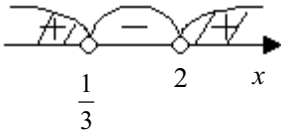
$$x \in (-\infty; -1) \cup (3; +\infty)$$

$$4) y_1 = 3x^2 - 2x + 5; y_2 = 5x + 3$$

$$3x^2 - 2x + 5 > 5x + 3;$$

$$3x^2 - 7x + 2 > 0$$

$$x_1 = \frac{1}{3}, x_2 = 2$$



$$x \in \left(-\infty; \frac{1}{3}\right) \cup (2; +\infty)$$

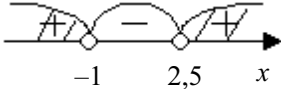
$$5) y_1 = x^2 - 2x; y_2 = -x^2 + x + 5$$

$$x^2 - 2x > -x^2 + x + 5$$

$$x^2 - 2x + x^2 - x - 5 > 0$$

$$2x^2 - 3x - 5 > 0$$

$$x_1 = -1, x_2 = 2,5$$



$$x \in (-\infty; -1) \cup (2,5; +\infty)$$

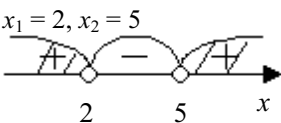
$$6) y_1 = 2x^2 - 3x + 5; y_2 = x^2 + 4x - 5$$

$$2x^2 - 3x + 5 > x^2 + 4x - 5$$

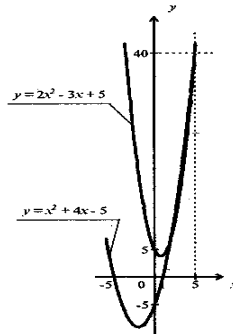
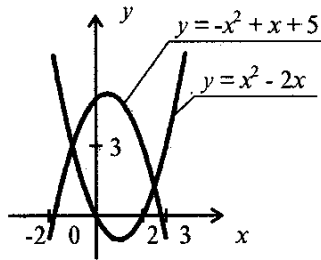
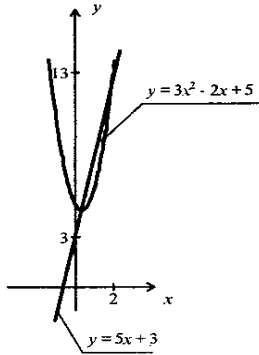
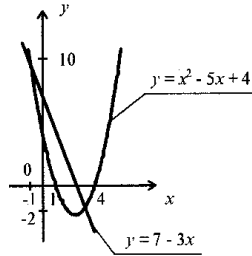
$$2x^2 - 3x + 5 - x^2 - 4x + 5 > 0$$

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

$$x_1 = 2, x_2 = 5$$

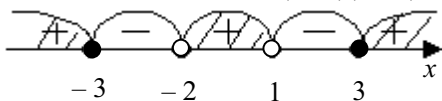


$$x \in (-\infty; 2) \cup (5; +\infty)$$



699.

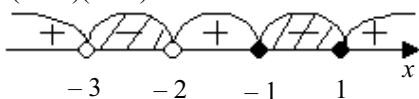
$$1) \frac{x^4 - 5x^2 - 36}{x^2 + x - 2} \geq 0; \frac{(x-3)(x+3)(x^2+4)}{(x-1)(x+2)} \geq 0; \frac{(x-3)(x+3)}{(x-1)(x+2)} \geq 0$$



$$x \in (-\infty; -3] \cup (-2; 1) \cup [3; +\infty)$$

$$2) \frac{x^4 + 4x^2 - 5}{x^2 + 5x + 6} \leq 0; \frac{(x-1)(x+1)(x^2+5)}{(x+2)(x+3)} \leq 0;$$

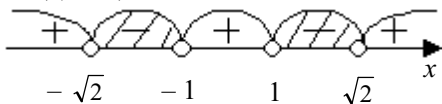
$$\frac{(x-1)(x+1)}{(x+2)(x+3)} \leq 0$$



$$x \in (-3; -2) \cup [-1; 1]$$

$$3) \frac{x^4 - x^2 - 2}{x^4 + x^2 - 2} < 0; \frac{(x-\sqrt{2})(x+\sqrt{2})(x^2+1)}{(x^2+2)(x-1)(x+1)} < 0;$$

$$\frac{(x-\sqrt{2})(x+\sqrt{2})}{(x-1)(x+1)} < 0.$$

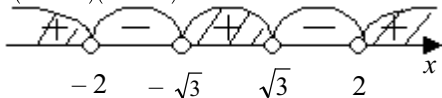


$$x \in (-\sqrt{2}; -1) \cup (1; \sqrt{2})$$

$$4) \frac{x^4 - 2x^2 - 8}{x^4 - 2x^2 - 3} > 0$$

$$\frac{(x^2+2)(x-2)(x+2)}{(x-\sqrt{3})(x+\sqrt{3})(x^2+1)} > 0;$$

$$\frac{(x-2)(x+2)}{(x-\sqrt{3})(x+\sqrt{3})} > 0$$



$$x \in (-\infty; -2) \cup (-\sqrt{3}; \sqrt{3}) \cup (2; +\infty)$$

700.

Если x – первое число, то $(x + 1)$, $(x + 2)$, $(x + 3)$ – остальные три числа

$(x + 1)^3$ – куб второго числа

$x(x + 2)(x + 3)$ – произведение трех остальных.

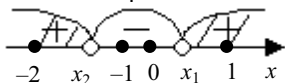
Используя условие задачи, получаем:

$$(x + 1)^3 > x(x + 2)(x + 3)$$

$$x^3 + 3x^2 + 3x + 1 > x^3 + 5x^2 + 6x$$

$$2x^2 + 3x - 1 < 0; D = 9 + 4 \cdot 2 = 17$$

$$x_{1,2} = \frac{-3 \pm \sqrt{17}}{4}$$



Так как $x \in \mathbb{Z}$, то $x = 1$ или $x = 0$. В первом случае данные числа – $-1, 0, 1, 2$. Во втором – $0, 1, 2, 3$.

Ответ: $-1; 0; 1; 2$ или $0; 1; 2; 3$.