Глава 1

Уравнения

1.1 Целые уравнения

1.1.1 Линейные уравнения

[_1] ЛУ вида $a \cdot x = b$, где a, b – целые числа:

1) [254] $12x = 0$ $\boxed{0}$
2) [255] $5x = 1$ $\boxed{\frac{1}{5}}$
3) [253] $-x = 0$ $\boxed{0}$
4) [256] $4x = 10$ $\boxed{2,5}$
5) [259] $-3x = 0$ $\boxed{0}$
6) [260] $2x = 0$ $\boxed{0}$

[_2] ЛУ вида $a \cdot x = b$, где a, b – рациональные числа:

1) [251] $\frac{1}{8}x = 5$ $\boxed{40}$
2) [252] $\frac{1}{3}x = 2$ $\boxed{6}$
3) [263] $3x = \frac{1}{7}$ $\boxed{21}$
4) [264] $-\frac{1}{2}x = 0$ $\boxed{0}$
5) [265] $-\frac{3}{4}x = -\frac{6}{7}$ $\boxed{?}$
6) [266] $1,8x = -0,72$ $\boxed{?}$
7) [267] $0,25x = 100$ $\boxed{400}$
8) [268] $0,2 = 5x$ $\boxed{0,04}$
9) [269] $\frac{x}{5} = 4$ $\boxed{20}$
10) [270] $3,5x = 2\frac{1}{3}$ $\boxed{?}$
11) [271] $-2\frac{1}{3}x = 7$ $\boxed{?}$
12) [272] $1\frac{2}{3}x = 2\frac{1}{3}$ $\boxed{?}$
13) [273] $\frac{x}{3} = 4$ $\boxed{?}$
14) [274] $\frac{1}{8}x = 5$ $\boxed{?}$

[_3] Не приведенные ЛУ без скобок (простые):

1) [246] $x + 4 = 9$ $\boxed{5}$
2) [250] $x + 2 = -4$ $\boxed{-6}$
3) [258] $x + 5 = 5$ $\boxed{0}$
4) [257] $x - 8 = 8$ $\boxed{16}$
5) [276] $3x - 5 = 0$ $\boxed{\frac{5}{3}}$
6) [277] $3x + 2 = 5x - 7$ $\boxed{4,5}$
7) [278] $3x - 5 = x$ $\boxed{2,5}$
8) [279] $15 - 7x = 0$ $\boxed{\frac{15}{7}}$
9) [280] $7 - x = 0$ $\boxed{7}$
10) [287] $5 - x = 0$ $\boxed{5}$
11) [281] $x - 3 = 2x + 1$ $\boxed{-4}$
12) [282] $x - 4x - 1 = 2$ $\boxed{-1}$
13) [283] $18 - 10x = 0$ $\boxed{1,8}$
14) [284] $7x - 4 = 0$ $\boxed{1,75}$
15) [285] $4x - 2 = x$ $\boxed{\frac{2}{3}}$
16) [286] $x - 2x + 3 = 7$ $\boxed{-4}$
17) [377] $x + 3 = 2x - 4$ $\boxed{?}$

[_4] Не приведенные ЛУ без скобок (более сложные):

1) [289] $7x - 3 + x = 4x - 9 + 5x$ $\boxed{?}$
2) [290] $x + 5 - 8x = 7 + 2x - 4$ $\boxed{?}$
3) [291] $0,5x - 3 = 0,8 - 1,4x$ $\boxed{?}$
4) [292] $x + 0,2 = 0,4x + 3,2$ $\boxed{?}$
5) [378] $5x - 8 - 3x = 8$ $\boxed{?}$
6) [379] $0,4x + 14 = 1 - 0,6x$ $\boxed{?}$
7) [380] $2x + 5 - 7x + 2 = 3$ $\boxed{?}$

[_7] ЛУ со скобками:

1) [346] $2x + (3x + 1) = 4$?
2) [347] $2x - (x - 1)$?
3) [348] $(2x + 5) + (3x - 8) = 7$?
4) [349] $(2x - 3) + (x + 5) = 13$?
5) [350] $3(x - 2) = 8$?
6) [351] $(2x + 1) \cdot 9 = 9$?
7) [352] $3(x - 5) + 8 = 17$?
8) [353] $5(x - 1) - 4(x - 2) = 10$?
9) [354] $4(x + 2) = 7$?
10) [355] $5(2 - 3x) - 7 = 0$?
11) [356] $6(x - 3) + 2(x + 2) = 10$?
12) [357] $2(x - 3) = 6$?
13) [358] $5(2x - 1) - 7 - x = 0$?
14) [359] $(x - 2) \cdot 4 = 15$?
15) [360] $6(x - 3) + 2(x + 2) = 10$?
16) [361] $2(x - 3) = 6$?
17) [362] $3(x - 3) - 5 - (2x - 5) \cdot 4 = 0$?
18) [363] $(2x + 5) + (3x + 8) = 7$?
19) [364] $2x + (x - 3) - 23 - (2 - 3x) = 0$?
20) [365] $4 + x - 8 + (2x - 5) = 0$?
21) [366] $2x + (x - 3) - 23 - (2 - 3x) = 0$?
22) [367] $(2x - 3) - (x + 1) = 1$?
23) [368] $2(x + 1) \cdot 9 = 9$?
24) [369] $0,1(1,2x - 2) - 2(0,5 + x) = 0,68$?
25) [372] $5x - 8 - (3x - 8) = 0$?
26) [373] $3x - 1 - (x + 5) = 0$?
27) [370] $5(2 - 3x) - 3(2 - x) - 2(3x - 8) + 7(2x - 8) = 0$?
28) [371] $0,6(x - 0,6) - 1 - 0,8(0,5 - x) = 0$?

[_5] ЛУ, содержащие дроби, знаменатели которых – числа:

1) [293] $\frac{2}{3} - 3x = \frac{1}{2}x - 2 + x$?
2) [294] $5 - \frac{1}{3}x - \frac{1}{2} = \frac{1}{4}x$?
3) [295] $\frac{2x}{7} - \frac{x}{4} = 1$?
4) [296] $\frac{x}{3} + \frac{x}{2} = 6$?
5) [321] $3x - 5 = \frac{x + 3}{4}$?
6) [322] $\frac{2x - 3}{4} + \frac{x + 2}{2} = 6 + \frac{2x - 3}{2}$?
7) [323] $\frac{2 - x}{3} = x - 3$?
8) [324] $\frac{x - 3}{5} + \frac{x + 2}{4} = \frac{1}{2}$?
9) [328] $1\frac{1}{5} - 0,5x - 0,4 + \frac{2}{5}x = 0$?
10) [329] $\frac{1}{2}x - 3 - \left(2 - \frac{1}{3}x\right) = 0$?
11) [325] $-2\left(3\frac{1}{2}x - 0,3\right) + x - 0,3\left(x - \frac{1}{10}\right) = 0$ 0,1
12) [326] $\frac{2}{3}(0,5x - 3) - 0,2\left(2\frac{1}{2} - 5x\right) - \frac{1}{3}(0,5x - 3) = 0$ $\frac{9}{7}$
13) [327] $\frac{1}{2}(x + 8) + 1\frac{1}{2} + 2\left(1\frac{1}{2} - x\right) = 0$ $5\frac{2}{3}$

[_6] Частные случаи ЛУ:

1) [330] $0 \cdot x = 3$?
2) [331] $0 \cdot x = -2$?
3) [332] $0 \cdot x = 15$?
4) [333] $0 \cdot x = 0$?
5) [334] $3x - 3x = 0$?
6) [335] $2x - 2x + 1 = 10$?

7) [336] $5x-(3x-1)=3+2x$?

8) [337] $(3x-2)-(3x+5)=-7$ Любое число

9) [338] $7+(5x-3)=x-(2-4x)$?

10) [339] $12x+4=3(4x-2)$?

11) [340] $-x+3+x=x-(x-3)$?

12) [341] $5x-4+2x=7(x-3)$?

13) [342] $6(x-3)=6x-18$?

14) [343] $14=7(x+2)$?

15) [344] $2(x-6)=6(x-2)$?

16) [345] $3(x+5)=5(x+3)$?

[_8] Уравнения, сводящиеся к линейным:

1) [374] $(x+1)(x-1)-(x-2)(x+3)=0$ 5

2) [375] $(2x-1)(x+2)-(x-5)(2x+1)=0$ $-0,25$

3) [376] $3(x+1)(x+2)=9+(3x-4)(x+2)$ $-\frac{5}{7}$

4) [381] $(x-1)(4x+5)+1=4x^2$ 4

5) [382] $(5+2x)(x-1)+(3x+1)(2+x)-5x^2=0$ $0,3$

6) [383] $(x^2-3)(3x+5)-3x^3=5x^2-5x$ $-3,75$

1.1.2 Квадратные уравнения

Неполные квадратные уравнения

[_10] НКУ, у которых $b=0$:

1) [384] $x^2=0$ 0

2) [385] $2x^2=0$ 0

3) [386] $x^2=9$ ± 3

4) [387] $x^2=25$ ± 5

5) [388] $x^2-16=0$ ± 4

6) [389] $x^2-100=0$ ± 10

7) [390] $x^2-64=36$ ± 10

8) [391] $x^2+20=141$ ± 11

9) [392] $-x^2+13=-12$ ± 5

10) [393] $2x^2=50$ ± 5

11) [394] $3x^2=48$ ± 4

12) [395] $4x^2-64=0$ ± 4

13) [396] $25-5x^2=-100$ ± 5

14) [397] $25x^2=16$ $\pm\frac{4}{5}$

15) [398] $9x^2=25$ $\pm\frac{5}{3}$

16) [399] $4x^2-49=0$ $\pm 1,75$

17) [400] $0,01x^2=0,04$ ± 2

[_12] НКУ, у которых $c=0$:

1) [401] $x^2-x=0$ 0; 1

2) [402] x^2+3x 0; -3

3) [403] $4x-x^2=0$ 0; 4

4) [404] $x+0,5x^2=0$ 0; $-0,5$

5) [405] $3,5x-x^2=0$ 0, 3,5

6) [415] $x^2-4x=0$?, ?

7) [416] $x^2-0,5x=0$?, ?

8) [417] $7x^2=5x$?, ?

9) [418] $x^2+6x=0$?, ?

10) [419] $x^2-8x=0$?, ?

11) [420] $15x-x^2=0$?, ?

12) [421] $5x=2x^2$?, ?

13) [422] $2x+3x^2=0$?, ?

14) [423] $2x^2-3x=0$?, ?

15) [424] $\frac{1}{3}x^2-5x=0$?, ?

16) [425] $\frac{3}{4}x+\frac{1}{8}x^2=0$?, ?

[_11] Разложенные на множители НКУ:

1) [406] $x(x-1)=0$ 0, 1
2) [407] $(x+13)x=0$?, ?
3) [408] $x(x+2)=0$?, ?
4) [409] $0,5x(2+x)=0$?, ?
5) [410] $3x(x-0,5)=0$?, ?
6) [411] $(x-7)(7+x)=0$?, ?
7) [412] $(x-6)(x+6)=0$?, ?
8) [413] $3(x-5)(5+x)=0$?, ?
9) [414] $0,8(x+1)(1-x)=0$?, ?

[_13] Не приведенные НКУ:

1) [430] $4x^2+6x=7x^2-12x$?, ?
2) [431] $1,2x-0,5x^2=4x^2-0,8x$?, ?
3) [432] $0,76x^2+14x=0$?, ?
4) [433] $0,6x^2+\sqrt{3}x=0$?, ?
5) [434] $0,07x^2-50=2,1x-50$?, ?
6) [435] $9x^2-10x-7x^2-15x$?, ?
7) [436] $-0,5x^2+\sqrt{5}x=0$?, ?

[_14] Не приведенные НКУ со скобками:

1) [437] $(x-1)^2+(x+1)^2=2$?
2) [438] $(x-7)(x+3)+(x-1)(x+5)+26=0$?
3) [439] $(3x-8)^2-(4x-6)^2+(5x-2)(x+2)=24$?
4) [440] $(2x-5)(3x-4)-(3x+4)(x-2)-10x-28=0$?
5) [441] $(x+2)(x+3)=2x(x+6)+6$?
6) [442] $\left(x+\frac{1}{2}\right)\left(x-\frac{1}{2}\right)=\frac{5}{16}$?
7) [447] $(3x+1,5)(3x-1,5)=54$?

[_15] НКУ, содержащие дроби, знаменатели которых – числа:

1) [443] $\frac{4x^2-1}{3}-\frac{3x^2+8}{5}=1$?
2) [444] $\frac{3x^2-4x}{2}=\frac{5x^2-x}{3}$?
3) [445] $\frac{2x-3x^2}{5}-\frac{7x^2-x}{4}=\frac{x^2}{2}$?
4) [446] $\frac{5x^2-48}{8}-\frac{33-2x^2}{6}=3\frac{5}{6}$?

Квадратные уравнения общего вида

[_9] КУ общего вида:

1) [42] $x^2+13x+22=0$ $-11;\ -2$
2) [43] $x^2+17x+66=0$ $-11;\ -6$
3) [451] $x^2+6x+8=0$?
4) [452] $x^2+8x+2=0$?
5) [453] $x^2-3x+1=0$?
6) [454] $x^2-5x-1=0$?
7) [455] $x^2+8x+15=0$?
8) [456] $x^2+5x-6=0$?
9) [457] $x^2-10x+21=0$?
10) [458] $x^2-2x+2=0$?
11) [459] $3x^2-4x-4=0$?
12) [460] $2x^2-8x-20=0$?
13) [461] $4x^2+6x+9=0$?
14) [462] $4x^2+12x+9=0$?
15) [464] $16x^2+21x-22=0$?

16) [465] $18x^2 - x - 1 = 0$?

17) [466] $7x^2 - x - 1 = 0$?

18) [467] $14x^2 + 11x - 3 = 0$?

19) [468] $\frac{x^2}{3} - 7x = 1$?

20) [463] $x^2 = \frac{x}{2} - 1$?

21) [469] $\frac{x^2}{2} - 3,5 = 2x$?

22) [470] $2x^2 - 3x - 5 = 0$?

23) [471] $-2x^2 + 7x - 3 = 0$?

24) [472] $x^2 - 6x + 8 = 0$?

25) [473] $x^2 + 5x + 6 = 0$?

26) [474] $x^2 - x - 2 = 0$?

27) [475] $x^2 + x - 6 = 0$?

28) [476] $x^2 + 4x + 15 = 0$?

29) [477] $x^2 + 4x + 4 = 0$?

30) [478] $5x^2 + 8x - 9 = 0$?

31) [479] $4x^2 - 8x + 3 = 0$?

32) [480] $x^2 - 10x + 9 = 0$?

33) [481] $3x^2 - 5x - 2 = 0$?

34) [482] $5x^2 - 6x + 1 = 0$?

35) [483] $4x - x^2 - 1 = 0$?

36) [484] $-2x^2 + 7x - 3 = 0$?

37) [485] $3 + 2x^2 - 7x = 0$?

38) [486] $x^2 - 3x = 1,75$?

39) [487] $x^2 + x = 2$?

40) [488] $x^2 - 6x + 6 = 0$?

[_16] Не приведенные КУ:

1) [490] $(x + 8)(x - 9) = -52$ $-4;\ 5$

2) [491] $(x - 1)(2x + 3) = 7$ $2;\ -2,5$

3) [492] $(x + 1)(x + 2) = (2x - 1)(2x - 10)$ $8;\ \frac{1}{3}$

4) [493] $(x - 1)(x - 2) = (3x + 1)(x - 2)$ $-1;\ 2$

5) [429] $(3x - 2)(x - 3) = 20$ $-1,\ 4\frac{2}{3}$

6) [499] $(x + 2)(4x - 5) = -3$ $-1,75;\ 1$

7) [495] $(x - 5)^2 + (3 - x)^2 - 4(x + 5)(3 - x) - 48 = (x + 1)^2$ $-3;\ 5$

8) [496] $(x - 1)(x - 3) + (x + 3)(x - 5) + 2x = 4$ $-2;\ 4$

9) [30] $(x + 3)(x - 2) + (x + 2)^2 = 3x + 10$ $-3;\ 2$

10) [500] $(8x - 9)(3x + 2) - (2x - 3)(8x - 2) = 33x + 96$ $-3;\ 5$

11) [501] $(4x - 5)(3x + 7) - (x - 2)(4x + 2) = 33x - 27$ $-0,25;\ 2$

[_20] КУ, содержащие дроби, знаменатели которых – числа:

1) [497] $\frac{x^2}{5} - \frac{2x}{3} = \frac{x + 5}{6}$ $-\frac{5}{6};\ 5$

2) [498] $\frac{5(x^2 - 1)}{4} + \frac{2x + 3}{6} = \frac{x^2 + 1}{12}$ $-1;\ \frac{5}{7}$

3) [489] $x^2 - 2 + \frac{x}{7} = \frac{2 - 5x}{7}$ $-2;\ \frac{8}{7}$

4) [29] $\frac{x - 3}{4} + \frac{2x + 3}{6} = \frac{x^2 - 11}{12}$ $-1;\ 8$

5) [502] $\frac{(x - 1)^2}{5} - \frac{x + 4}{6} = \frac{2x - 2}{3}$ $\frac{1}{6};\ 6$

6) [509] $\frac{x^2 - 1}{3} - \frac{(x - 1)^2}{8} = \frac{(x + 1)^2}{4} - x$ $1;\ 17$

1) [503] $\frac{(x + 2)(x - 5)}{3} - \frac{11x + 12}{10} = 2 - \frac{x - 2}{3}$ $-2,7;\ 8$

2) [504] $\frac{x^2 + 2x}{5} = \frac{3 - x}{2} - \frac{x^2 + x}{5}$ $-3,75;\ 1$

3) [505] $\frac{x^2 - 4x + 2}{10} = \frac{x + 2}{2} - \frac{x^2 + x + 1}{5}$ $-\frac{2}{3};\ 3$

4) [506] $\frac{(3x-4)^2}{5}+\frac{(2x-5)(x-1)}{2}=1+\frac{(x+2)^2}{5}$ $\frac{1}{2};\ 3$

5) [507] $\frac{(x+2)^2}{2}-\frac{x^2+2x}{3}=3+\frac{(x+1)^2}{4}$ $5\pm\sqrt{10}$

6) [508] $\frac{(x-3)(x-7)}{2}-3x=\frac{2x+1}{5}-\frac{(3x-3)^2}{2}$ $1,48;\ 2$

[_21] КУ с иррациональными коэффициентами:

1) [47] $x^2+2(1+\sqrt{8})x+8\sqrt{2}=0$ $-4\sqrt{2};\ -2$

2) [426] $x^2-3\sqrt{2}x+4=0$ $1-\sqrt{7};\ 2+\sqrt{7}$

3) [427] $x^2-3x-5-\sqrt{7}=0$ $1-\sqrt{7};\ 2+\sqrt{7}$

4) [428] $x^2+3x-\sqrt{3}-1=0$ $-2-\sqrt{3};\ -1+\sqrt{3}$

1.1.3 Уравнения высших степеней

Биквадратные уравнения

[_22] Приведенные БКУ:

1) [33] $x^4+2x^2-3=0$ $-1;\ 1$

2) [511] $x^4-3x^2+2=0$?

3) [512] $x^4-5x^2+4=0$?

4) [513] $x^4-20x^2+64=0$?

5) [514] $x^4-5x^2+6=0$?

6) [515] $3x^4-5x^2+2=0$?

7) [516] $x^4-10x^2+9=0$?

8) [517] $x^4-26x^2+25=0$?

9) [518] $x^4+20x^2+64=0$?

10) [519] $4x^4-41x^2+100=0$?

11) [520] $25x^4-25x^2+6=0$?

12) [521] $x^4+2x^2-8=0$?

13) [522] $x^4+9x^2=400$?

14) [523] $x^4=12x^2+64$?

15) [524] $x^4=21x^2+100$?

16) [525] $x^4-2x^2+1=0$?

17) [526] $9x^4-25x^2+16=0$?

18) [527] $6x^4-35=11x^2$?

19) [528] $-21+10x^4=x^2$?

20) [529] $6x^2+x^4+9=0$?

21) [530] $-9=25x^4+30x^2$?

22) [531] $-14x^2=15-x^4$?

23) [532] $7x^4+3=9x^2$?

24) [533] $9x^4=-1=9x^2$?

25) [534] $x^4+36=30x^2$?

26) [535] $-6-5x^2=-4x^4$?

27) [536] $-x^2-4+x^4=0$?

28) [537] $3-2x^4=11x^2$?

29) [538] $3x^4+21=4x^2$?

[34] Решить уравнение:

$$(x^2-10)(x^2-3)=78$$

$-4;\ 4$

Распадающиеся уравнения

[_23] "Готовые"распадающиеся уравнения:

1) [41] $(2x-1)(x+1)=0$ $\frac{1}{2};\ -1$

2) [539] $(x-1)(x-2)=0$?

3) [540] $(x+4)(x-6)=0$?

4) [541] $(2x+3)(2x+5)=0$?

5) [542] $(5-x)(3x+2)=0$?

6) [543] $(2x-3)(x^2+3x+2)=0$?

7) [544] $(x^2+2x+1)(x^2-5x+7)=0$?

8) [545] $(x^2-3x+1)(x^2-4x+4)=0$?

9) [546] $(x^2-3x+1)(x^2-4x+3)=0$?

10) [547] $(x^2+1)(x^2+5x+6)=0$?

11) [548] $(x^2-1)(x^2-2x+7)=0$?

12) [549] $(x^2-16)(x^2-4x+4)=0$?

13) [550] $x(x^2-6x+9)=0$?

[_24] "Не готовые"распадающиеся уравнения:

1) [35] $x^3+x^2+x+1=0$ -1

2) [36] $x^3-3x^2-4x+12=0$ $-2;\ 2;\ 3$

3) [551] $x^3+5x^2+6x=0$?

4) [552] $x^4=2x^3+3x^2$?

5) [553] $x^3-4x^2=x$?

6) [554] $x^5+x^3=x^4$?

7) [555] $x^3-4x^2+3x=0$?

8) [556] $10x^2=x^4+3x^3$?

9) [557] $x^3+x=2x^2$?

10) [558] $(x-3)^2x=0$?

1.1.4 Целые уравнения с модулем

[31] Решить уравнение:

$$|x^2-5x+2|=2$$

$0;\ 1;\ 4;\ 5$

1.2 Дробные уравнения

[15] Решить уравнение:

$$\frac{1}{x-1}+\frac{2}{1-x^2}=\frac{5}{x^2+2x+1}$$

4

[16] Решить уравнение:

$$\frac{21}{x}-\frac{10}{x-2}-\frac{4}{x-3}=0$$

$7;\ \frac{18}{7}$

[23] Решить уравнение:

$$\frac{3-5x}{x+2}=2+\frac{x-11}{x+2}$$

$\frac{5}{4}$

[32] Решить уравнение:

$$\frac{x^2+x-6}{x+3}=0$$

2

[37] Решить уравнение:

$$\frac{x}{x-2}-\frac{7}{x+2}=\frac{8}{x^2-4}$$

3

[38] Решить уравнение:

$$\frac{1}{x+3}-\frac{6}{9-x^2}=\frac{3}{x^2-6x+9}$$

6

[39] Решить уравнение:

$$\frac{1}{x-1}+\frac{2}{1-x^2}=\frac{5}{x^2+2x+1}$$

4

[40] Решить уравнение:

$$\frac{21}{x}-\frac{10}{x-2}-\frac{4}{x-3}=0$$

$\frac{18}{7}$; 7

[44] Решить уравнение:

$$\frac{x^2+2x}{x-2}=0$$

0; −2

[45] Решить уравнение:

$$\frac{3x^2-7x}{x^2+1}=0$$

$-\frac{7}{2}$; $\frac{5}{2}$

[46] Решить уравнение:

$$\frac{4x^2+4x-35}{x^2-7x+12}=0$$

$-\frac{7}{2}$; $\frac{5}{2}$

1.3 Логарифмические уравнения

[600] Решить уравнение:

$$\log_8 2^{8x-4}=4$$

2

[601] Решить уравнение:

$$2^{\log_8(5x-3)}=8$$

?

[602] Решить уравнение:

$$\left(\frac{1}{3}\right)^{x^2+x}=\frac{1}{9}$$

2

[603] Решить уравнение:

$$\log_5(x^2+2x)=\log_5(x^2+8)$$

4

[_29] Простейшие логарифмические уравнения:

1) [604] $\log_2(3x-7)=1$?

2) [605] $\log_{\frac{1}{4}}(3x-2)=0$?

3) [606] $\log_{\frac{1}{3}}(x+12)=-2$?

4) [607] $\log_3(2x-11)=2$?

5) [608] $\log_{\frac{1}{2}}(5x-2)=-3$?

6) [609] $\log_2(7x-5)=-2$?

7) [610] $\log_5(2x^2-3x+1,2)=-1$?

8) [611] $\log_{\frac{1}{4}}(2x^2-7x+6)=-2$?

9) [612] $\log_3(3x^2 - 5x + 1) = 1$?

10) [613] $\log_{\frac{1}{3}}(x^2 - 17x + 9) = -3$?

Глава 2

Неравенства

2.1 Показательные неравенства

[619]

$$4^{\frac{5}{x}} \geq 64$$

$\left(0; \frac{5}{3}\right]$

[620]

$$3^{\frac{4}{x}} \geq 27$$

$\left(0; \frac{4}{3}\right]$

[621]

$$\left(\frac{1}{3}\right)^{\frac{3x+2}{1-x}} < 81$$

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

[622]

$$\left(\frac{1}{2}\right)^{\frac{3x-2}{3-x}} < 16$$

$(-\infty; 3) \cup (10; +\infty)$

[623]

$$\begin{cases} 3^{x+1} - 2 \cdot 3^x \geq 81, \\ x^2 - 8x + 12 < 0. \end{cases}$$

$[4; 6)$

[624]

$$\begin{cases} 5^{x+1} - 4 \cdot 5^x \geq 25, \\ x^2 - 3x - 18 < 0. \end{cases}$$

$[2; 6)$

[625]

$$5^{x-3} + 5^{x-2} + 5^{x-1} \geq 155$$

$[4; +\infty)$

[626]

$$4^{x-1} + 4^{x-0,5} - 2^{2x-5} \leq 184$$

$(-\infty; 4]$

[627]

$$5 \cdot 3^x + 10^x > 2 \cdot 3^{x+1} + 10^{x-1} + 3^{x+2}$$

$(2; +\infty)$

[628]

$$9^x + 3^{2(x-1)} - 2 \cdot 27^{\frac{2}{3}(x-2)} < 264$$

$(-; 2, 5)$

[629]

$$|3^{3x^2-23} - 42| \leq 39$$

$[-3; -2\sqrt{2}] \cup [2\sqrt{2}; 3]$

[630]

$$|4^{9x^2-2} - 10| \geq 6$$

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

2.2 Логарифмические неравенства

[631]

$$\log_2 7\frac{2x^2 + 3x - 5}{x + 1} \leq \frac{1}{3}$$

$(-2, 5; -2] \cup (1; 2]$

[632]

$$\log_9 \frac{2x^2 + 15x + 22}{x + 4} \leq \frac{1}{2}$$

$(-5, 5; -5] \cup (-2; -1]$

[633]

$$\log_3(x + 2) + \log_3(8 - x) \leq 1 + \log_3(x + 4)$$

$(-2; -1] \cup [4; 8)$

[634]

$$\log_3(x + 3) + \log_3(7 - x) \leq 1 + \log_3(x + 5)$$

$(-3; -2] \cup [3; 7)$