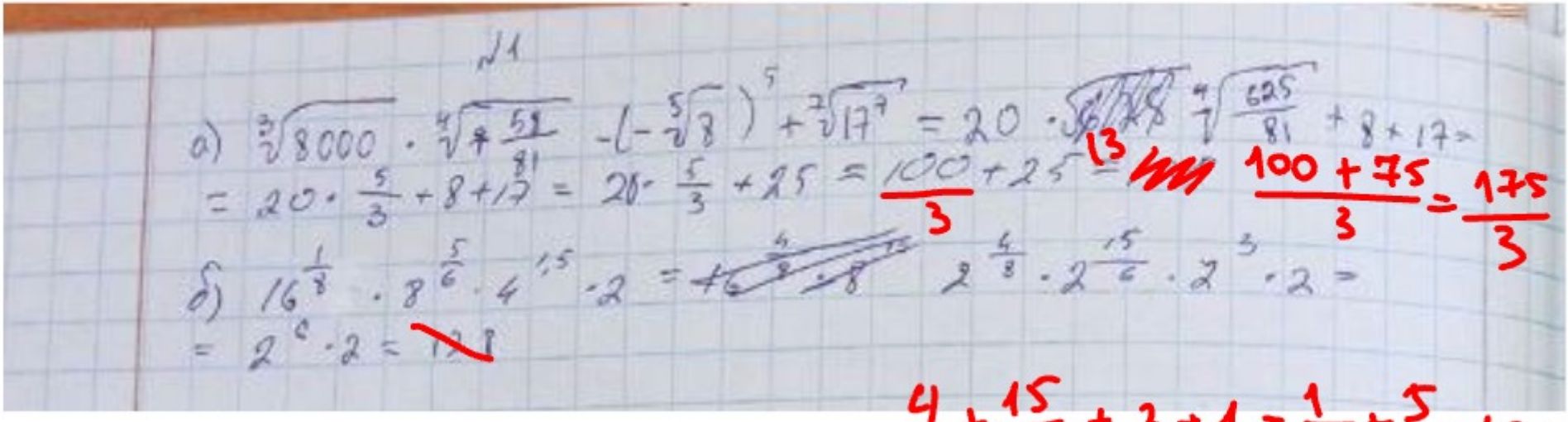
11.01.2024 (четверг)



№1

а) $\sqrt[3]{8000} \cdot \sqrt[4]{\frac{625}{81}} - \left(-\sqrt[5]{8}\right)^5 + \sqrt[7]{17^7} = 20 \cdot \frac{5}{3} + 8 + 17 = 20 \cdot \frac{5}{3} + 25 = \frac{100}{3} + 25 = \frac{100+75}{3} = \frac{175}{3}$

б) $16^{\frac{1}{8}} \cdot 8^{\frac{5}{6}} \cdot 4^{1,5} \cdot 2 = 2^{\frac{4}{8}} \cdot 2^{\frac{15}{6}} \cdot 2^3 \cdot 2 =$

$= 2^{\frac{4}{8}+\frac{15}{6}+3+1} = 2^{\frac{1}{2}+\frac{5}{2}+3+1} = 2^{0,5+2,5+3+1} = 2^{3+3+1} = 2^7 = 128$

$2^{10} = 1024$

№3

а) $2\sqrt{x-3} - \sqrt{x+2} = 1$ | $\uparrow^2$

$(a-b)^2 = a^2 + 2ab + b^2$

ОДЗ | $x-3 \geq 0$, $x \geq 3$

$x+2 \geq 0$, $x \geq -2$,

Замена: $\sqrt{x+2} = t$

$\sqrt{x-3} = t+5$

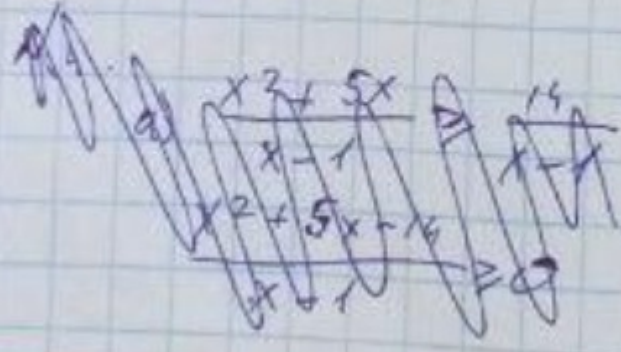
$2(t+5) - t = 1$

$2t + 10 - t - 1 = 0$

$2t + 9 - t = 0$

$D = 99$

$x_1 = \frac{-9+\sqrt{99}}{4} =$



$$\left(2\sqrt{x-3}\right)^2 + 2\cdot 2\sqrt{x-3}\cdot\sqrt{x+2} + \left(\sqrt{x+2}\right)^2 = 1$$

$$4\cdot(x-3) + 4\sqrt{(x-3)(x+2)} + (x+2) = 1$$

$$4x - 12 + 4\sqrt{(x-3)(x+2)} + x + 2 = 1$$

$$4\sqrt{(x-3)(x+2)} = 1 - 4x + 12 - x - 2$$

$$4\sqrt{(x-3)(x+2)} = 11 - 5x \quad \Big| \,()^2$$

$$4^2\cdot(x-3)(x+2) = (11-5x)^2$$

$$16\,(x-3)(x+2) = 11^2 - 2\cdot 11\cdot 5x + (5x)^2$$

$$16\cdot(x^2 + 2x - 3x - 6) = 121 - 110x + 25x^2$$

$$16x^2 - 16x - 96 = 121 - 110x + 25x^2$$

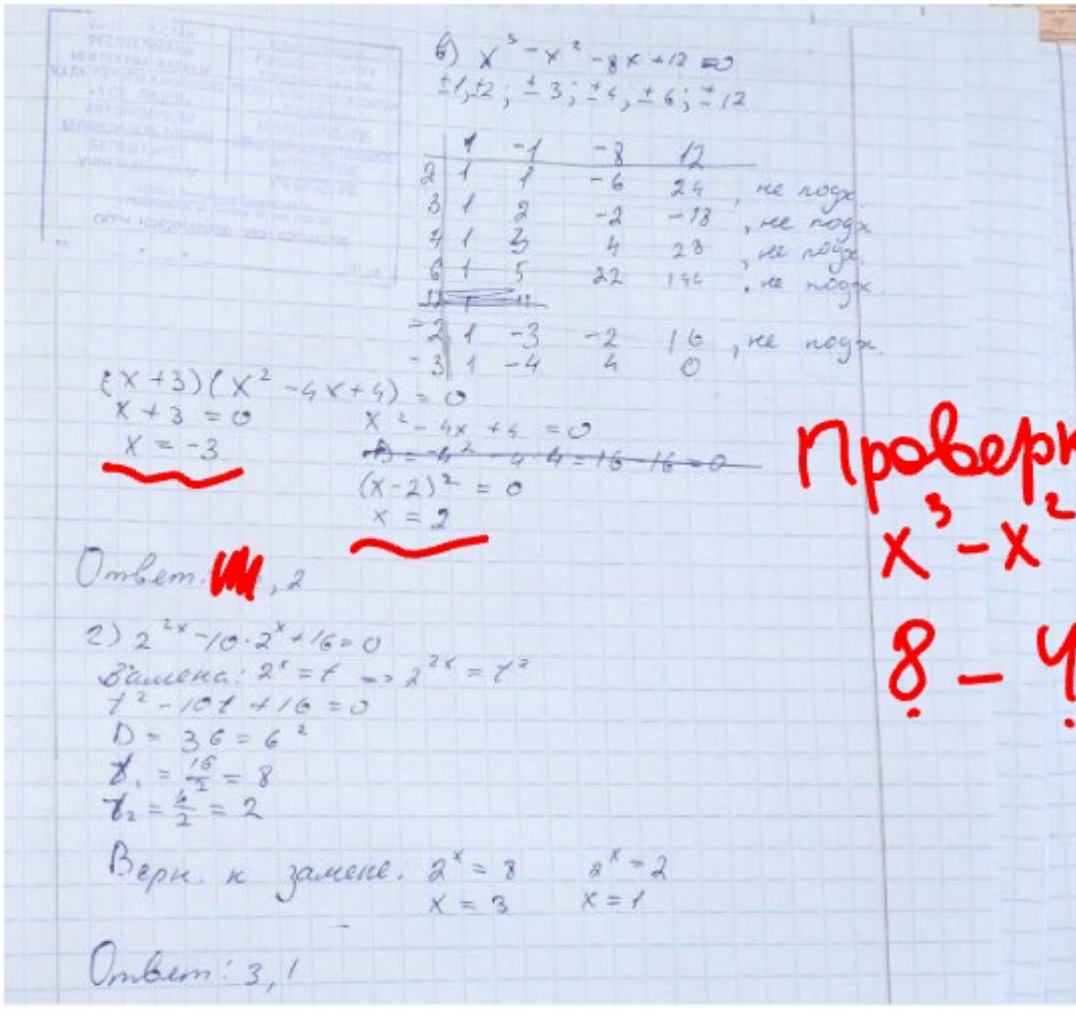
$$16x^2 - 16x - 96 - 121 + 110x - 25x^2 = 0$$

$$-9x^2 + 94x - 217 = 0$$

$$\Delta = 94^2 - 4 \cdot (-9) \cdot (-217) = 8836 - 7812 = 1024 = 32^2$$

$$X = \frac{-94 + 32}{-18} = \frac{-62}{-18} = \frac{31}{9}$$

$$X = \frac{-94 - 32}{-18} = \frac{-126}{-18} = 7$$



б) $x^3 - x^2 - 8x + 12 = 0$

$\pm 1, \pm 2, \pm 3, \pm 4, \pm 6, \pm 12$

	1	-1	-8	12	
2	1	1	-6	24	не подх.
3	1	2	-2	-18	не подх.
4	1	3	4	28	не подх.
6	1	5	22	144	не подх.
-2	1	-3	-2	16	не подх.
-3	1	-4	4	0	

$(x+3)(x^2 - 4x + 4) = 0$

$x + 3 = 0$

$x = -3$

$x^2 - 4x + 4 = 0$

~~$D = 4^2 - 4 \cdot 4 = 16 - 16 = 0$~~

$(x-2)^2 = 0$

$x = 2$

Ответ: -3, 2

2) $2^{2x} - 10 \cdot 2^x + 16 = 0$

Замена: $2^x = t \Rightarrow 2^{2x} = t^2$

$t^2 - 10t + 16 = 0$

$D = 36 = 6^2$

$t_1 = \frac{16}{2} = 8$

$t_2 = \frac{4}{2} = 2$

Верн. к замене. $2^x = 8$ $x = 3$ $2^x = 2$ $x = 1$

Ответ: 3, 1

Проверка

$x^3 - x^2 - 8x + 12 = 0$

$8 - 4 - 16 + 12 = 0$

$x = 2$

№4

$$\frac{x^2+5x}{x-1} \geq \frac{14}{x-1}$$

$$\frac{x^2+5x-14}{x-1} \geq 0$$

$x-1$: $-$ при $x<1$, $+$ при $x>1$

$x^2+5x-14=0$

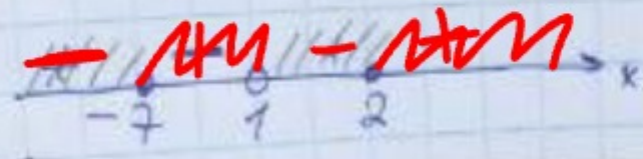
$D = 81 = 9^2$

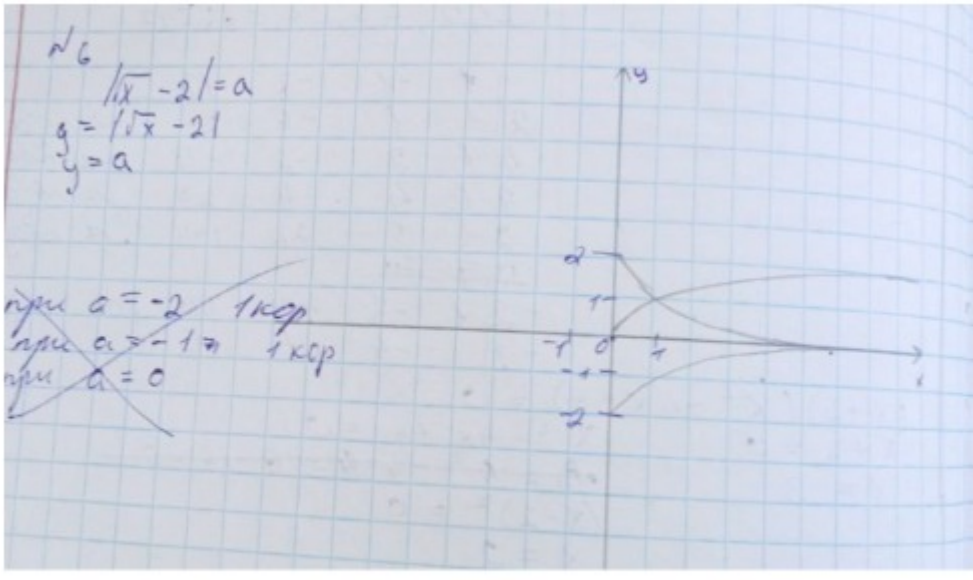
$x_1 = 2$

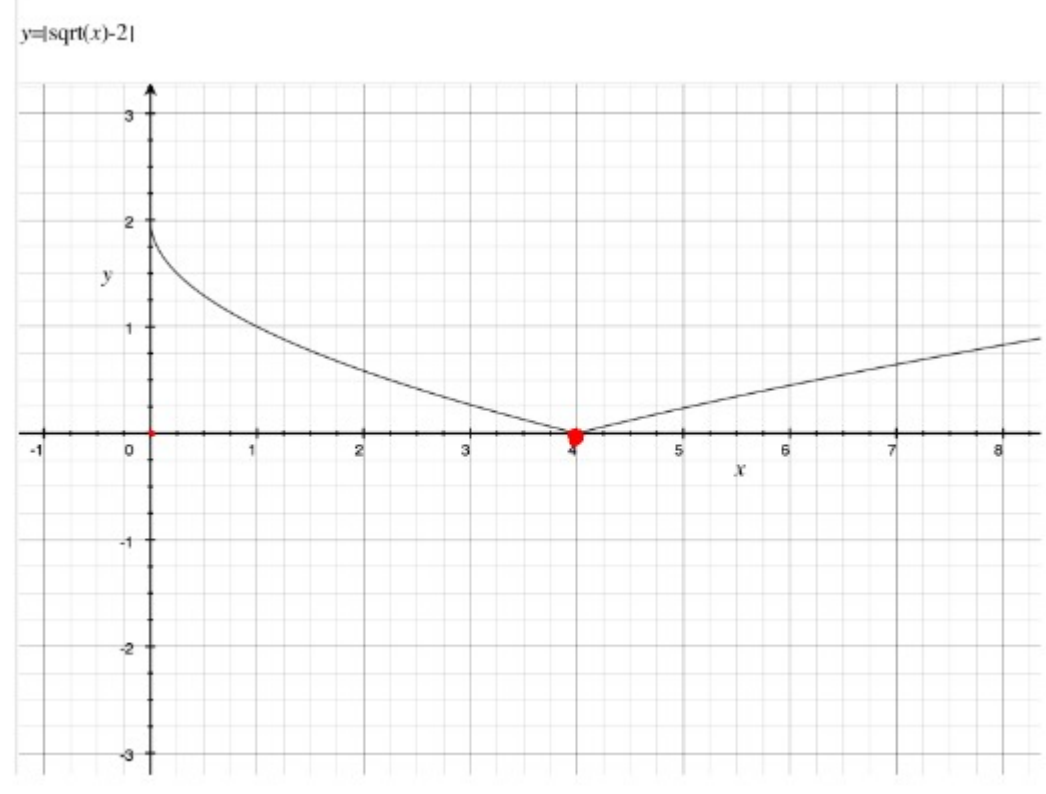
$x_2 = -7$

$x-1 \neq 0$

$x \neq 1$




№6
|√x - 2| = a
y = |√x - 2|
y = a
при a = -2 1 кор
при a > -1 2 кор
при a = 0
y
2
1
-1
0
1
-1
-2


y=|sqrt(x)-2|
y
x
3
2
1
0
-1
-2
-3
-1
0
1
2
3
4
5
6
7
8

$y = |\sqrt{x} - 2|$

x	4	0
y	0	2