

KPI B1

$$\textcircled{1} \textcircled{a} \left(3 \frac{7}{8} - 2 \frac{5}{24} \right) \cdot 0,36 + 2 \frac{3}{20} : 0,95$$

$$\textcircled{a} = \left(1 + \frac{7}{18} - \frac{5}{24} \right) 0,36 + \frac{19 \cdot 100}{8 \cdot 95} =$$

$$= \left(\frac{14}{100} - \frac{15}{200} + \frac{36}{100} \right) + \frac{5}{2} = \frac{28 - 15 + 42}{200} + \frac{5}{2}$$

$$= \frac{85}{200} + \frac{500}{200} = \frac{585}{200} = 2,925$$

$$\textcircled{2} 4(2a - 0,5b) - 5(a - 1,5b) \quad a = \frac{5}{18} \quad b = \frac{3}{8}$$
$$14a - 3,5b - 5a + 7,5b = 9a + 4b =$$

$$= \frac{5}{2} + \frac{3}{2} = 4$$

$$\textcircled{3} y - \frac{x^2}{3} = \textcircled{a} \quad x = \frac{(-1,4)^2 - (4,6)^2 - (-1,4 + 4,6)}{2 \cdot (-1,4 - 4,6)} = \frac{-(-3) \cdot 0,2}{-6} = +0,6$$
$$y = \frac{3}{2} (2,4 - 1,2) = \frac{3}{2} \cdot 1,2 = 1,8$$

$$\textcircled{a} = 1,8 + \frac{0,6}{3} = 1,8 + 0,2 = 2$$

KPI B1 4np.

KPI B1 y ap.

④ x - сумма расходов $x_1 = 1,2x$
 y - сумма доходов $y_1 = x \cdot 0,85$
 $x \cdot y$ - индекс инфляции x и y в разное время
 x_1, y_1 — — — — — в разное время

$$\frac{x_1 \cdot y_1}{x \cdot y} = \frac{1,2x \cdot 0,85y}{x \cdot y} = 1,02 \Rightarrow \uparrow \text{на } 2\% \Rightarrow 19\%$$

⑤ а) $a = \frac{72}{71}$ $b = \frac{645}{646}$ $a - b = \frac{72 \cdot 646 - 71 \cdot 645}{71 \cdot 646}$

$$= \frac{645 \cdot 71}{71 \cdot 646} = \frac{72 \cdot 646 - (72-1)(646-1)}{71 \cdot 646}$$

$$= \frac{72 + 646}{71 \cdot 646} > 0 \quad a > b$$

б) $a - b = \frac{99}{100} - \frac{199}{201} = \frac{99 \cdot 201 - 199 \cdot 100}{100 \cdot 201}$

$$= \frac{99 \cdot 201 - (200-2)(100+1)}{100 \cdot 201} = \frac{-201 + 2 \cdot 99 + 2}{100 \cdot 201}$$

$$= \frac{-201 + 198 + 2}{100 \cdot 201} < 0 \quad a < b$$

KPI B2

7 up

$$\textcircled{1} \left(3\frac{1}{16} + 1\frac{3}{20}\right) \cdot 3,34 - 3\frac{1}{6} \cdot 0,24 = 0,49$$

$$= \left(3 + \frac{1}{16} + 1 + \frac{3}{20}\right) \cdot 100 - \frac{19 \cdot 24}{6 \cdot 100} =$$

$$= \frac{1}{337} \left(4 + \frac{337 \cdot 5 + 3 \cdot 14}{4 \cdot 4 \cdot 5}\right) \cdot 100 - \frac{19 \cdot 4}{100} =$$

$$= \frac{1}{337} \left(400 + \frac{17 \cdot 5}{4}\right) - \frac{19}{25} = \frac{1600 + 85}{337 \cdot 4} - \frac{19}{25} =$$

$$= 5\frac{19}{25} - \frac{19}{25} = 4\frac{1}{25} = 1\frac{1}{4} - \frac{19}{25} = 1,25 - 0,76 = 0,49$$

$$\textcircled{2} 3(1,2x + 3y) - 2(0,3x - 13y) \quad x = 1,5$$

$$3,6x + 9y - 0,6x + 26y = 3x + 35y = y = \frac{3}{70}$$

$$= 4,5 + 1,5 = 6$$

$$\textcircled{3} x + \frac{y}{3} \quad x = (7,43 - 6,33)^2 = (1,1)^2 = 1,21$$

$$y = 2(2,14 + 1,16) = 2 \cdot 3,3, \quad \textcircled{4} = 1,21 + 2,2 = 3,41$$

$$\textcircled{4} x, y \text{ neighbors for } S = xy$$

$$x_1 = 1,2x \quad y_1 = 0,9y \quad S = 1,2x \cdot 0,9y$$

$$\frac{S_1}{S} = 1,2 \cdot 0,9 = 1,08 \Rightarrow 9\% \text{ or } 8\%$$

$$\textcircled{5} a) a = \frac{98}{100} \quad b = \frac{202}{201}$$

$$a - b = \frac{98}{100} - \frac{202}{201} = \frac{(100-2) \cdot 201 - 100 \cdot 201}{100 \cdot 201} =$$

$$= \frac{100 \cdot (201-1) - 202 \cdot 100}{100 \cdot 201} = \frac{-902 - 1000}{100 \cdot 201} < 0$$

a < b

$$b) a = \frac{159}{160} \quad b = \frac{313}{315}$$

$$a - b = \frac{159(313+2) - (159 \cdot 1)315}{160 \cdot 315} =$$

$$= \frac{159 \cdot 2 - 313 - 318 - 313}{160 \cdot 315} = \frac{-313 - 318 - 313}{160 \cdot 315} < 0$$

a > b

① KPI B4 FKU mp

$$\left(2 \frac{7}{20} + 3 \frac{11}{16}\right) : 24,15 - 0,07 \cdot 1 \frac{3}{7} =$$

$$= \frac{5 + (28 + 55)}{80} : 24,15 - \frac{4 \cdot 10}{100 \cdot 7} = 1$$

$$= \left(5 + \frac{83}{80}\right) \cdot \frac{100}{2415} - \frac{1}{10} = \left(\frac{500}{2415} + \frac{83 \cdot 10}{8 \cdot 2415}\right) -$$

$$-0,1 = \frac{(2000 + 415)}{2415 \cdot 4} - 0,1 = 0,95 - 0,1 = 0,15$$

② $3(x^2 - y^2) - 4(x+y)$ $x = 2,5$ $y = -1,5$

$$3(x-y)(x+y) - 4(x+y) = (x+y)(3x-3y-4)$$

$$= 7,5 + 4,5 - 4 = +8$$

③ $0,1a - 0,5b$ $a = (2,7 - (-1,3))^2$

$$b = 2^3 + (-1)^3$$

$$a = 4^2 = 16, b = 7$$

$$= 1,6 - 3,5 = -1,9$$

④ x, y emp 4 brasa kapal.

$$x_1 = 1,5x$$

$$y_1 = 0,4y$$

$$x^2 y = V$$

$$\frac{V_1}{V_2} = \frac{0,4(1,5)^2 x^2 y}{x^2 y}$$

$$= 0,4 \cdot (1,5)^2 = 0,9 \rightarrow V \downarrow \text{ Ha } 10\%$$

⑤

$$a) a - b = \frac{317}{315} - \frac{874}{873} = \frac{(315+2)(874+1) - 874 \cdot 315}{315 \cdot 873}$$

$$> 0 \Rightarrow a > b$$

$$f) a - b = \frac{98}{100} - \frac{97}{99} = \frac{99 \cdot 98 - 97 \cdot 100}{99 \cdot 100} = \frac{(100-1)(97+1) - 97 \cdot 100}{99 \cdot 100}$$

$$= \frac{99 \cdot 98 - 97 \cdot 100}{99 \cdot 100} = 2 \cdot 20 \quad a > b$$

KP2 B1 7np

$$\textcircled{1} \frac{2x+3}{4} - \frac{x}{3} - \frac{x+1}{2} \quad 03 = 12$$

$$6x+9 - 4x = 6x+6 \quad 4x = 3 \quad x = \frac{3}{4}$$

$$\textcircled{2} \quad \begin{array}{c} \text{---} \\ \text{---} \\ \text{---} \end{array} \quad \begin{array}{c} \text{---} \\ \text{---} \\ \text{---} \end{array} \quad \begin{array}{c} \text{---} \\ \text{---} \\ \text{---} \end{array} \quad \begin{array}{c} \text{---} \\ \text{---} \\ \text{---} \end{array}$$

-8 0

$-8 < x < \infty$
(-8; ∞) Ответ.

$$\textcircled{3} |2-3x|=1 \quad \text{a) } 2-3x \geq 0$$

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

$$\text{б) } 2-3x < 0$$

$$-2+3x=1 \quad 3x=3 \quad x=1$$

$\textcircled{5}$ x - количество 2х гушек
 y - количество 1х

$$x = y + 3$$

$$\frac{10 \cdot y + x}{(x+y)} = 4 + \frac{9}{x+y}$$

$$10y + x = 4x + 4y + 9 \Rightarrow 6y - 3x = 9$$

$$\begin{cases} x = y + 3 \\ 6y - 3x = 9 \end{cases} \quad 6y - 3y - 9 = 9$$

$$3y = 18 \quad y = 6 \quad x = 9$$

$\textcircled{4}$ x - стр. прочитан в пятницу
 $1,2x$ - кол. страниц, прочитанных в субботу
 $x-20$ - кол-во страниц, прочитанных в воскресенье
 $x + 1,2x + x - 20 = 140 \quad 3,2x = 160 \quad x = 50$
 $1,2x = 60$ - в субботу

KP2 B1 7np

KP2 B3 7 up

$$\textcircled{1} \quad \frac{3a-1}{6} = \frac{a}{4} = \frac{4a-6}{12}$$

$$6a-2-3a = 4a-6; \quad 4a=4 \quad a=1$$

$$\textcircled{2} \quad \frac{-5}{-5} \leq x; \quad \frac{5}{5} x = [-5 + \infty)$$

$$\textcircled{3} \quad |3x-5| = 1$$

$$3x-5 \geq 0 \quad x \geq \frac{5}{3}$$

$$3x-5=1 \quad \underline{\underline{x=2}}$$

$$-(3x-5) > 0 \quad 3x < \frac{5}{3}$$

$$-3x+5=1 \quad 3x=4 \quad x = \frac{4}{3}$$

$$\textcircled{5} \quad \begin{array}{l} x - \text{eg}, y - \text{see} \\ x + y = 14 \end{array} \quad x - y > 0$$

$$\frac{10y + 3}{x - y} = 14 + \frac{3}{x - y}$$

$$10y + 3 = 14x - 14y + 3$$

$$24y - 13x = 3$$

$$x + y = 14 \quad x = 14 - y$$

$$24y - 13 \cdot 14 + 13y = 3$$

$$37y = 3 + 182 \quad 37y = 185 \quad y = 5$$

$$x = 9 \quad 59 - \text{учащ}$$

$$\textcircled{4} \quad \begin{array}{l} x - \text{кол учебн алгебры} \\ y - \text{кол учебн геометрии} \end{array}$$

$$y = \frac{3}{5}x$$

$$x - 2 = y + 6 \quad x - 2 = \frac{3}{5}x + 6$$

$$\cancel{2x} - 40 \cancel{x} = 10 \quad y = 5$$

$$5x - 10 = 3x + 30 \quad 2x = 40$$

$$x = 20 \quad y = 12$$

KP2 B3 7 up

KP2 B4 4, 7 лп

$$\textcircled{1} \quad \frac{2y+5}{8} + \frac{y}{6} = \frac{3.5+y}{12}$$

$$3y+15 + 4y = 4 + 2y$$

$$8y = -8 \quad y = -1$$

$\textcircled{2}$ ~~_____~~ $(-2x-18) \quad x < 18$
18 18 мес

$\textcircled{3}$ $|3-5x|=1 \Rightarrow 3-5x \geq 0 \rightarrow x \leq \frac{3}{5}$
 \Downarrow $3-5x=1 \quad x = \frac{2}{5}$

$3-5x < 0 \rightarrow -(3-5x)=1 \quad x > \frac{3}{5}$
 ~~$3x-3=1 \quad x = \frac{2}{3}$~~

$\textcircled{5}$ x - eq. числа $x < y$

y - ср. числа

$$x+y=11$$

$$\frac{10y+x}{y-x} = 13 + \frac{1}{y-x}$$

$$10y+x = 13y - 13x + 1$$

$$3y - 12x + 1 = 0$$

$$x+y=11 \quad y=11-x$$

$$33 - 3x - 12x + 1 = 0 \quad 17x = 34 \quad x=2$$

$$y=9 \quad 92 \text{ мес}$$

$\textcircled{4}$ x - кол-во орех y - кол-во шоко

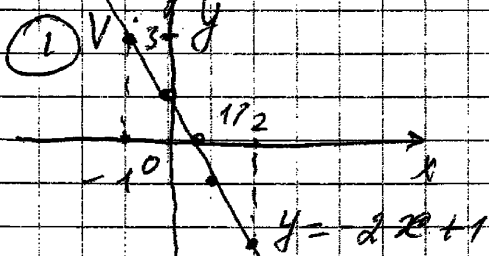
$$y = \frac{4}{7}x \quad x-8 = y+1$$

~~$x+y=8 + 7(x-8) = 4x+7$~~

$$3x = 7 \cdot 9 \quad x=21 \quad y=12 \quad x+y=33$$

KP2 B4 7 лп

КРЗ В1 7кл up



а) $y_{\max} = 3$ при $x = -1$

б) $0 = -2x + 1 \quad x = 1/2$
 $x > 1/2$

② $y = 3 - x$ $2x = 3 - x \Rightarrow x = 1$
 $y = 2x$

③ а) $y = \frac{3}{2}x + 3$ $x = 0 \quad y = 3$ (.) (0, 3) -

точка пересек с OY; $y = 0 \quad x = -2$ (-2, 0) - пересек с OX

б) $K = (\frac{1}{3}, 3.5)$ $y = \frac{3}{2} \cdot \frac{1}{3} + 3 = 3.5 \Rightarrow$ (.) K
 уравнение имеет уравнение $y = \frac{3}{2}x + 3$

④ $y = 3x + 4$ а) $y = 3x$

с) вып (k > 0) с вып x

⑤ $5x + py - 3p = 0$ (.) (1, 1)

$5 + p - 3p = 0 \quad -2p = 5 \quad p = -\frac{5}{2}$

КРЗ В1 7кл up.

⑥ x - стоимость 1 шоколада = $n \cdot 10$
 y - " " " 1 вафельки = $m \cdot 10$
 $3x + 2y = 180$ на м. ценник = 0.

$3n + 2m = 18$

$n = 6 - \frac{2}{3}m$ n целое число, > 0

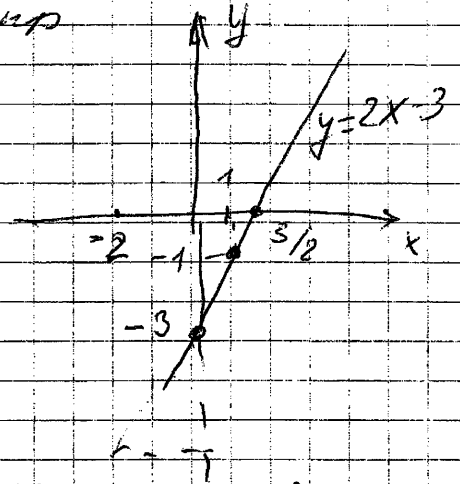
при $m = 3, \Rightarrow m = 3 \quad n = 4 \Rightarrow$

$x = 40 \quad y = 30.$

КРЗ В2 №111111

① а) $[-2; 1]$

$y_{max} = -1$ при $x = 1$
 $y_{min} = -7$ при $x = -2$



б) $x > 1/2$

② $y = -x$
 $y = x + 8$
 $2x = 8 \Rightarrow x = 4$
 $M(-1; -4)$

③ а) $y = \frac{2}{3}x - 5$
 $x = \frac{15}{2}$, $y = -5$ при $y = -5$ $(0; 5)$

б) $M(-1/2; -2,6)$ $y = \frac{2}{3}(-\frac{3}{2}) - 5 = -6$

в) M не лежит на пр $y = \frac{2}{3}x - 5$

$2x - 5y - 10 = 0$ пересекает Ox ось

$y = 0 \Rightarrow x = 5$, пересекает Oy ось $x = 0 \Rightarrow y = -2$

$M(-1/2; -2,6) \Leftrightarrow M(-\frac{3}{2}; -2,6)$

$+3 - 13 - 10 = 0 \Rightarrow$ (.) M не лежит на пр.

④ а) $y = -4x - 4$ б) $y = -4x$ в) $y = -4x - 4$ (КСВ)

⑤ $-px + 2y + p = 0$ $(-1; 2)$

$p + 4 + p = 0 \Rightarrow 2p = -4 \Rightarrow p = -2$

КРЗ В2 №111111

⑥ $x - 1 \text{ кг сахара} = 10 \text{ кг}$ $z \text{ кг сахара}$
 $y - 2 \text{ кг} = 10 \text{ кг}$ $m \text{ кг}$
 $z, m \geq 0$

$2x + 5y = 400$

$2n + 5m = 40, m = 8 - \frac{2}{5}n$

$n = 5 \quad m = 6 \quad x = 50 \quad y = 60$

$n = 10 \quad m = 4 \quad x = 100 \quad y = 40$

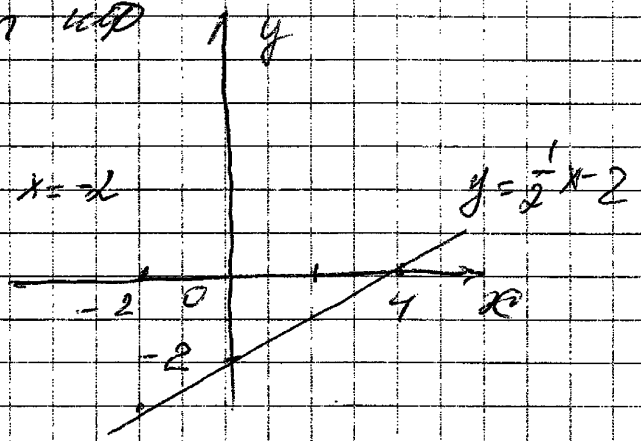
$n = 15 \quad m = 2 \rightarrow$ не совсем разрешено

✓ КР 2 В 3 7 кл учр

① $y = \frac{1}{2}x - 2$

а) $[-2; 4]$ $y_{\min} = -2$ при $x = -2$

$y_{\max} = 0$ при $x = 4$



б) $x \leq 4$

② $y = 3x$

$2y = -2x - 5 \rightarrow 3x = -2x - 5$
 $5x = -5 \rightarrow x = -1 \rightarrow y = -3(-1, -3)$

③ а) $y = -\frac{3}{5}x - 3$ $x = 0 \rightarrow y = -3$ $O(0, 5)$

в среисе $y = 0 \rightarrow 0 = -3x - 3 \rightarrow x = -\frac{3}{-3} = -1$

б) $C(\frac{1}{3}, -3, 2) \rightarrow y = -\frac{3}{5} \cdot \frac{1}{3} - 3 = -\frac{2}{5} - 3 = -3,2$

$\Rightarrow C$ принадлежит при $y = -\frac{3}{5}x$

④ $y = 6x - 5$ а) $y = 6x$

б) возрастает с возр x ($k > 0$)

⑤ $2px + 3y + 5p = 0$ (*) $(1,5, -4)$

$3p - 12 + 5p = 0 \rightarrow 8p = 12 \rightarrow p = \frac{3}{2} = 1,5$

КР 3 В 3 7 кл

⑥ x - тетрадей $x = 40$ стоим гер
 y - блокнотов $x = 30$ стоим блокн

$x \cdot 40 + y \cdot 30 = 500$ - все пок.

$x > y$

$x = 13 - \frac{y \cdot 3}{4}$, где x - целое $\Rightarrow y$ кратно 4

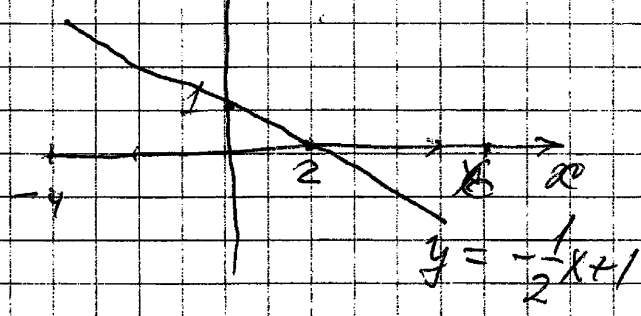
$x - y > 0 \Rightarrow 13 - \frac{1}{4}(4y) > 0$ и целое

$y = 4 \rightarrow x = 10$

KP3 B4 7кл

xy

① $y = -\frac{1}{2}x + 1$
 $[-4, 6]$
 а) y_{\max} при $x = -4 = 3$



$y_{\min} = \text{при } x = 6 = -2$

б) $y > 0$ при $x < 2$

② $\begin{cases} y = -4x & -4x = 2x + 6 & x = -1 \\ y = 2x + 6 & y = 4 & (-1, 4) \end{cases}$

③ а) $-4x - 3y + 12 = 0$ параллельна с ОУ при $x = 0$

$y = 4$, с ОУ $y = 0$ $x = 3$

б) $D(-0,5; 4\frac{2}{3}) \Rightarrow (-\frac{5}{10}; \frac{14}{3})$

$2 - 14 + 12 = 0 \Rightarrow (0) D$ принадлежит пр.

④ $-5x - y + 4 = 0$ $y = -5x + 4$

а) $y = -5x$ параллельна с осью x

б) убывает ($k < 0$) с возр. x

⑤ $\forall p = \frac{15}{10} + 3p \frac{15}{10} + 6 = 0$ $(1,5; -1,5)$

$\frac{3}{10} \cdot p \cdot \frac{2}{4} = -6$ $p = -1$

KP3 B4 7кл

⑥ x - занят 3кл
 y - занят 5кл

3х их все

8х

$3x + 5y = 75$

$x + y = ?$

$x < y$ $y - x > 0$

$5(y - x) + 8x = 75$ $y - x = 15 - \frac{8x}{5}$

$(y - x)$ - целое и > 0 когда x кратно 5

и $\frac{8x}{5} < 15 \Rightarrow x = 5 \Rightarrow 15 + 5y = 75$

$y = 12$; $x + y = 17$

KP4 B1 7 up

$$\textcircled{1} a) y^4 / y \cdot (y^2)^3 = y^4 / y^7 = y^{-3} = \frac{1}{y^3}$$

$$b) 5x^2y - 8x^2y + x^2y = -2x^2y$$

$$c) (2a^2b^2)^4 \cdot (2a^2b)^3 = 2^4 \cdot a^8 b^4 \cdot 2^3 a^6 b^3 = 2^7 a^{14} b^7$$

$$d) \frac{(m^4)^7}{(m^3)^9 \cdot m} = \frac{m^{28}}{m^{27} \cdot m} = 1$$

$$\textcircled{2} (2^5)^2 \cdot 3^{10} / 6^7 = \frac{2^{10} \cdot 3^{10}}{2^7 \cdot 3^7} = 2^3 \cdot 3^3 = 8 \cdot 27 = 216$$

$$\textcircled{3} \left(\frac{3}{5}\right)^3 \cdot \left(\frac{5}{3}\right)^2 \cdot 1,6^0 \cdot \frac{3^3 \cdot 5^2}{5^3 \cdot 3^2} = \frac{3}{5}$$

$$\downarrow 1,6^0 = 1 \quad 1 < \frac{3}{5}$$

KP4 B1 7 up

$$\textcircled{4} a) \frac{2^{10+2} \cdot 3^{10+5}}{2^4} = 2^{10} \Rightarrow \frac{2^2 \cdot 2^2 \cdot 3^3 \cdot 3^5}{3^3} = 2^4 \cdot 3^2 = 216 \Rightarrow 6^x = \frac{216}{4 \cdot 9} = 6$$

$$6^1 = 6 \Rightarrow x = 1$$

$$b) \frac{(2x^3)^5 (2x^2)^4}{(4x^5)^4} = 54 \Rightarrow \frac{2^5 x^{15} \cdot 2^4 x^8}{2^8 x^{20}} = 2 x^3$$

или $x \neq 0$ $2x^3 = 54$ $x^3 = 27$ $x = 3$

$$\textcircled{5} \frac{2+3x}{2} - \frac{x+1}{4} = (5x-1)^0 \Rightarrow 1$$

$$2(2+3x) - x - 1 = 4, 4 + 6x - x - 1 = 4$$

$$5x = 1 \Rightarrow x = \frac{1}{5} \text{ но } (5x-1) \neq 0 \Rightarrow$$

решения не существует.

KP B2 7 Kcl 15

① a) $(a^5)^3 / a^{10} \cdot a = \frac{a^{15}}{a^{11}} = a^4$

b) $20y^2 - 13xy^2 + 5xy^2 = -7xy^2$

c) $(3x^3y^4)^3 / (3xy^2)^2 = \frac{3^3 x^9 y^{12}}{3^2 x^2 y^4} = 3 \cdot x^7 y^8$

d) $(z^9)^4 / z(z^5)^7 = \frac{z^{36}}{z \cdot z^{35}} = 1$

② $\frac{(3^2)^4 \cdot 5^8}{3^6 \cdot 5^6} = \frac{3^8 \cdot 5^8}{3^6 \cdot 5^6} = 3^2 \cdot 5^2 = 9 \cdot 25 = 225$

③ $\left(\frac{7}{4}\right)^5 \cdot \left(\frac{4}{7}\right)^4 = \frac{7}{4} = 1 \frac{3}{4} \quad (-2)^0 = 1 \quad 1 < 1 \frac{3}{4}$

d) $(-2)^0 < 1 \frac{3}{4} \Rightarrow \otimes \geq (-2)^0$

KP4 B2 4 Kcl wp

④ a) $\frac{3^{2x+3} \cdot 5^{-2x+1}}{135} = 225, \quad \frac{3^3 \cdot 3^{2x} \cdot 2 \cdot 5^{2x}}{3 \cdot 24} =$
 $= \frac{3^3 \cdot 15^{2x}}{5 \cdot 3^3}, \quad \frac{15^{2x}}{5} = 225, \quad 15^2 = 225 = x = 1$

b) $\frac{(3x^3)^5 \cdot (3x^3)^4}{(9x^6)^4} = 24, \quad \frac{3^5 x^{15} \cdot 3^4 x^{12}}{3^8 x^{24}} = 24$

$3x^{27} / x^{24} \Rightarrow x^3 = 8 \quad x = 2$

⑤ $\frac{x}{3} - \frac{4x-1}{6} = \frac{(2x+5)^0}{(2x+5) \neq 0} \Rightarrow \frac{x}{3} - \frac{4x-1}{6} = 1$

$2x - 4x + 1 = 6 \Rightarrow -2x = 5 \Rightarrow x = -\frac{5}{2} = -2 \frac{1}{2} \in \mathbb{R}$

$405 \cdot 9 = 56 \quad (2x+5) = 0 \quad \text{wpn stonk su.}$

KP4 B3 7 kor KP

① a) $6(E^3)^4 / 6^9 = \frac{6^{13}}{6^9} = 6^4$

b) $9x^2y^3 - x^2y^3 - 10x^2y^3 = -9x^2y^3$

c) $(3x^2y)^4 \cdot (3xy^3)^2 = 3^4 x^8 y^4 \cdot 3^2 x^2 y^6 = 3^6 x^{10} y^{10}$

d) $(c^4)^5 \cdot c^8 / (c^7)^4 = c^{28} / c^{28} = 1$

② $\frac{2 \cdot 1^{12}}{(4^4)^3 \cdot (3^2)^4} = \frac{4^{12} \cdot 3^{12}}{4^{12} \cdot 3^8} = 3^4 = 3^2 \cdot 3^2 = 9 \cdot 9 = 81$

③ $\left(\frac{3}{2}\right)^6 \cdot \left(\frac{2}{3}\right)^5 = 125^0 = 1$

$= \frac{3^6}{2^6} \cdot \frac{2^5}{3^5} = \frac{3}{2} = 1 \frac{1}{2} \quad \otimes > 1 > 125^0$

KP4 B3 7 kor KP

④ a) $\frac{2^{3x+1} \cdot 125^{x-1}}{2^8 \cdot 125^x} = 500, \quad \frac{2 \cdot 2^{3x} \cdot 125^x}{125 \cdot 2^5} = 500$

$(8 \cdot 125)^x = 125 \cdot 4 \cdot 2 \cdot 125 \cdot 2^3 \Rightarrow$

$x = 2$

b) $\frac{(9x^4)^5 \cdot (3x)^2}{(27x^5)^4} = -192, \quad \frac{3^{10} x^{20} \cdot 3^2 x^2}{3^{12} x^{20}} = -192$

ошибка кор $x=2$ не имеет кор $x^2 < 0$

кор $n=3 \Rightarrow 3 \cdot x^3 = -192 \quad x^3 = -64 \quad x = -4$

⑤ $\frac{2x+1}{3} - \frac{3x-2}{2} = (5x-2)^0 = 1 \quad (5x-2) \neq 0$

$4x+2 - 9x+6 = 6 \quad 5x=2$

$x = \frac{2}{5} = \text{отв } 6 \text{ кор } (5x-2)$

нет кор нет

KP 4 B 4 7 Keri MP

① a) $c \cdot c^{15} / (c^7)^2 = c^{16} / c^{14} = c^2$

c) $-x^3y^2 + 2x^3y^2 - 3x^3y^2 = -2x^3y^2$

b) $(2ab^3)^4 / (2a^2b)^2 = \frac{2^4 a^4 b^{12}}{2^2 a^4 b^2} = 4b^{10}$

2) $\frac{(n^8)^4 \cdot n}{(n^3)^{11}} = \frac{n^{25}}{n^{33}} = \frac{1}{n^8}$

② $\frac{10^9}{(2 \cdot 3)^3 \cdot (5^3)^2} = \frac{10^9}{2^3 \cdot 3^3 \cdot 5^6} = \frac{2^9 \cdot 5^9}{2^3 \cdot 3^3 \cdot 5^6} = 5^3 = 125$

③ $\left(\frac{3}{4}\right)^8 \cdot \left(\frac{4}{3}\right)^7 \Rightarrow \left(\frac{3}{4}\right)^1 ; (-0,75)^0 = 1$

$\frac{3}{4} < 1 \Rightarrow \left(\frac{3}{4}\right)^1 < (-0,75)^0$

KP 4 B 4 7 MP

④ a) $\frac{3^{4x+2} \cdot 16}{9 \cdot 4^{2x+2}} = 5 \frac{1}{16} \quad \frac{3^2 \cdot 3^{4x} \cdot 4^2}{3^2 \cdot 4^2 \cdot 4^{2x}} = \frac{81}{16}$

$\left(\frac{3}{2}\right)^{4x} = \frac{3 \cdot 3 \cdot 3 \cdot 3}{2 \cdot 2 \cdot 2 \cdot 2} \quad \left(\frac{3}{2}\right)^{4x} = \left(\frac{3}{2}\right)^4, x=1$

5) $\frac{(25x^3)^2 \cdot (5x^5)^3}{(125x^8)^2} = -160 \quad \frac{5^4 x^6 \cdot 5^3 x^{15}}{x^{16} \cdot 5^6} =$

$= -160, 5 \cdot x^5 = -160, x^5 = -32, x = -2$

~~⑤ $\frac{3x-7}{4} = \frac{x+2}{6} \Rightarrow (19-7x)^0 \quad 6x-2-3x-6=12$~~

⑤ $\frac{3x-1}{4} = \frac{x+2}{6} \Rightarrow (19-7x)^0 \quad 9x-3-2x-4=1$

$7x-7=12 \quad 7x=19 \quad x = \frac{19}{7} = 2 \frac{5}{7}$ Keri
 MP $x = 2 \frac{5}{7} \quad (19-7x)=0$ Keri

KP5 B1 ket 7 up

$$\textcircled{1} \checkmark P(x) = -2x^2 + 3x + 4x^2 - 3 - 4(2x - 4) = \\ = +2x^2 + \underline{3x} - 3 - \underline{8x} + 16 = 2x^2 - 5x + 13$$

$$\textcircled{2} \text{ a) } 4xy(2x + 0,5y - xy) = 8x^2y + 2xy^2 - 4xy^2 = \\ = -4x^2y^2 + 8x^2y + 2xy^2$$

$$\text{ b) } (x-3)(x+2) = x^2 + 2x - 3x - 6 = x^2 - x - 6$$

KP5 B1 7 up.

$$\textcircled{3} P(x; y) = 27x^3 + (4y - 3x)(16y^2 + 12xy + 9x^2)$$

$$x = 2,376 \quad y = -1$$

$$f(x; y) = 27x^3 + 64y^3 + 48xy^2 + 36yx^2 - \\ - 48xy^2 - 36x^2y - 27x^3 = 64y^3 = -64$$

$$\textcircled{5} A = m + 1, \quad B = 4 \cdot n + 3 \Rightarrow$$

$$2A + 3B = 2 \cdot (m + 1) + 3 \cdot (4 \cdot n + 3) =$$

$$= 2m + 2 + 12n + 9 = 2m + 12n + 11 \quad \text{otp} = \underline{11}$$

$\textcircled{4} \checkmark$ 3 uslova uslozhnaya $x, x+1, x+2$

KP5 B1 $(x+2)^2 = x(x+1) + 34$

4 up $x^2 + 4x + 4 = x^2 + x + 34$

$$3x = 30 \quad \text{uslova } \underline{10, 11, 12}$$

KP5 B2 7 up

$$\textcircled{1} \quad 2x^2 - 5x - 3x^2 - 1 + 3x - 6 = -x^2 - 2x - 7$$

$$\textcircled{2} \quad a) \quad 5ab(3a^2 - 0,2b^2 + ab) = 15a^3b - ab^3 + 5a^2b^2$$

$$b) \quad (a+4)(a-5) = a^2 - 5a + 4a - 20 = a^2 - a - 20$$

KP5 B2

7 up.

$$\textcircled{3} \quad P(x, y) = (5x - 3y)(25x^2 + 15xy + 9y^2) - 125x^3$$
$$= \cancel{125x^3} + \cancel{75x^2y} + \cancel{45xy^2} - \cancel{75y^3} - \cancel{125x^3} = 24y^3 = 27 \quad \text{when } y = 1 \quad x = 2,375$$

$$\textcircled{5} \quad A = m6 + 3, \quad B = n6 + 2 \quad 5A + 4B = ?$$
$$5 \cdot 5m + 15 + 4 \cdot 6n + 8 = 6(5m + 4n) + 6 \cdot 2 + 3 + 6 + 2 = 6(5m + 4n + 2 + 1) + 5$$
$$\Rightarrow \text{answer} = 5$$

④ $x, x+1, x+2$ maybe odd numbers

KP5 B2

$$x^2 + 47 = (x+1)(x+2)$$
$$x^2 + 47 = x^2 + 3x + 2 \quad 3x = 45 \quad x = 15$$

15; 16; 17

KP5 B3 \int \int \int \int

① $p(x) = -6x^2 + 4 + 1 - x - x^2 + 4x = -7x^2 + 3x + 5$

② $\sqrt{a) \frac{3}{4} m^2 n^2 (4m - 8n - \frac{4}{3} mn) = 3m^3 n^2 - 6m^3 n^3 - m^3 n^3 = -m^3 n^3 + 3m^3 n^2 - 6m^3 m^2$

$\sqrt{b) (2m+1)(4-m) = 8m - 2m^2 + 4 - m = -2m^2 + 7m + 4$

KP5 B3 \int \int \int \int $p(x, y) = 64x^3 - (4x - 3y)(16x^2 + 2xy +$

③ $+ 9y^2) = 64x^3 - 64x^3 - 8xy^2 + 36xy^2 + 48x^2y + 6xy^2 + 27y^3 = 27y^3 = 27$

⑤ $A = m \cdot 7 + 1 \quad B = n \cdot 7 + 3$

$6AB = 6(m \cdot 7 + 1)(n \cdot 7 + 3) = 6(4 \cdot 7nm + 3m \cdot 7 + 7n + 3) = 4k + 18 = 4k + 2 \cdot 7 + 4$

$det = 4, \quad k = 4 \text{ или } 10$

$\sqrt{④} \quad x - 1 \text{ делит } x(x+14) = 56 +$

LP5 B3

$x+4 \quad 2 \text{ делит } x(x+4)$

$x+14 - 3 \text{ делит } x^2 + 14x = 56 + x^2 + 4x$

$7x = 56 \quad x = 8 \text{ - делит } 15 - 2 \text{ делит } 22$

KPS B4 4np

$$\textcircled{1} \quad v_p(x) = -x^2 + 4 + 9x - 6 + 6x^2 + 3x = -x^2 + 12x - 2$$

$$\textcircled{2} \quad \text{a) } -\frac{2}{3} p^2 q^2 (6p^2 - \frac{3}{2} pq + 3q^2) = -4p^4 q^2 + p^3 q^3 - 2p^2 q^4 = -4p^4 q^2 - 2q^4 p + p^3 q^3$$

$$\text{b) } (2-3p)(p+3) = 2p + 6 - 3p^2 - 9 = -3p^2 + 2p - 3$$

KPS B4 4np

$$\textcircled{3} \quad v(x; y) = (3x + 5y)(9x^2 - 15xy + 25y^2) - 125y^3 = 27x^2 - 45xy + 45y^2x^2 - 15xy^2 + 125y^3 - 125y^3 = 27x^2 = 27 \text{ wenn } x = 1$$

$$\textcircled{5} \quad A = 6m + 3, B = 6m + 2 \quad 5AB = (5 \cdot 6m + 15)(6m + 2) = 5 \cdot 6m + 10 - 6 \cdot 6mm - 12m + 15 \cdot 6m + 15 \cdot 6m + 30 = 6m + 10 - 36m - 12m + 90m + 30 = 6m + 10 - 36m - 12m + 90m + 30 = 60m + 40$$

$$\textcircled{4} \quad v \quad x = 100 \text{ wenn } x+6 = 200 \quad x+12 = 300$$

$$\text{KPS B4} \quad x(x+12) + 96 = (x+6)(x+12)$$

$$x^2 + 12x + 96 = x^2 + 18x + 72$$

$$6x = 24 \quad x = 4 \quad \text{wenn } \underline{10} \cdot 200 = \underline{16} \cdot 300$$

$$\textcircled{1} (2p-3)(2p+3) + (p-2)^2 = 4p^2 - 9 + p^2 - 4p + 4 =$$

KP 6 B 1

$$= 5p^2 - 4p - 5$$

$$\textcircled{3} 5x^3 - 5(x+2)(x^2 - 2x + 4) =$$

$$= 5x^3 - 5(x^3 - 2x^2 + 4x + 2x^2 - 4x + 8) =$$

$$= 5x^3 - 5x^3 + 10x^2 - 20x - 40 = 10x^2 - 20x - 40$$

he gab es x

$$\textcircled{2} (24x^2y + 18x^2) / (-6x) = -4y - 3$$

KP 6 B 1 7 mp

$$\textcircled{4} (x-1)^3 - x^2(x-3) = 8$$

$$x^3 - 3x^2 + 3x - 1 - x^3 + 3x^2 = 8 \quad 3x - 1 = 8 \quad 3x = 9 \quad x = 3$$

$$\textcircled{5} f(x) = 19 - 8x - x^2 = 16 + 3$$

$$= 19 - (x^2 + 8x + 16) + 16 =$$

$$= 19 + 16 - (x+4)^2, \quad (x+4)^2 \geq 0 \Rightarrow p_{\max} = 35$$

$$x = -4$$

KP6 B2

$$\textcircled{1} (m+3)^2 + (3m-1)(3m+1) = \underline{m^2 + 6m + 9} + \underline{9m^2 - 1} = 10m^2 + 6m + 8$$

$$\textcircled{3} 2y^3 + 2(3-y)(y^2 + 3y + 9) = 2y^3 + 2(\cancel{3y^2} + \cancel{9y} + 27 - y^3 - 3y^2 - \cancel{9y}) = 2y^3 + 54 = 54$$

\Rightarrow we get $y = 0$

$$\textcircled{2} (35a^3b - 28a^4) / 7a^2 = 5b - 4a$$

KP6 B2 4kp

$$\textcircled{4} (y+1)^3 - y(y^2 + 3y) = 7$$

$$\cancel{y^3} + 3y^2 + 3y + 1 - \cancel{y^3} - 3y^2 = 7 \quad 3y = 6 \quad y = 2$$

$$\textcircled{5} f(x) = x^2 + 10x + 1 = (x^2 + 10x + 25) - 25 + 1 = (x+5)^2 - 24$$

$f(x) = \min = -24$ when

$$x + 5 = 0 \quad \text{т.к. } (x+5)^2 \geq 0 \text{ всегда.}$$

KP6 B3

$$\textcircled{1} (3x+4)(4-3x) - (2x+1)^2 = 16 - 9x^2 - (4x^2 + 4x + 1)$$

$$= 16 - 9x^2 - 4x^2 - 4x - 1 = -13x^2 - 4x + 15$$

KP6 B3

$$\textcircled{3} 3(1-2y)(1+2y+4y^2) + 4(6y^3-1) =$$

$$= (3-6y)(1+2y+4y^2) + 24y^3 - 4 =$$

$$= (3 + 6y + 12y^2 - 6y - 12y^2 - 24y^3) + 24y^3 - 4 =$$

$$= -21 \text{ (the value of } y)$$

$$\textcircled{2} (25m^2n - 30mn^2) / (-5mn) =$$

$$= -5m + 6n$$

KP6 B3 Sup

$$\textcircled{4} (2x-1)^3 - 4x^2(2x-3) = 17$$

$$8x^3 - 12x^2 + 6x - 1 - 8x^3 + 12x^2 = 17$$

$$6x - 18 \quad x = 3$$

$$\textcircled{5} p(x) = 11,25 - (3x + x^2 + \frac{9}{4}) + \frac{9}{4} =$$

$$= 11,25 + 2,25 - (x + 2,25)^2 \quad p_{\max} = 13,5$$

wenn $(x + 2,25) = 0$ ist $(x + 2,25)^2 \geq 0$

$$\textcircled{1} (2+5y)(5y-2) - (4y-1)^2 = \frac{25y^2-4}{2} - \frac{16y^2+8y-1}{2} = 9y^2+8y-5$$

$$\textcircled{3} = 6x(9x^3+2) - 2(1-3x+9x^2)(1+3x) = 54x^3+12 - 2(1+3x-3x-9x^2+9x^2+27x^3) = 54x^3 - 54x^3 + 12 - 2 = 10$$

KPO 8y

$$\textcircled{2} (-24pq^2 + 28p^2q) / 4pq = -6q + 7p$$

KPO N6 B4 4np

$$\textcircled{4} (2y+3)^3 = 4y(2y^2+9y)$$

$$2 \cdot 3 \cdot 2y^3 + 3 \cdot 3 \cdot 2y^2 + 3 \cdot 3 \cdot 2y + 3^3 = 2 \cdot 3 \cdot 2y^3 + 2 \cdot 3 \cdot 4y^2$$

$$3 \cdot 3 \cdot 2y = 3 \cdot 4 = \frac{3}{2} = 1 \frac{1}{2}$$

$$\textcircled{5} f(x) = x^2 - 5x + 8,75 = (x - \frac{5}{2})^2$$

$$8,75 = \frac{25}{4} = 8,75 - 6,25 = 2,5$$

KP B 1 7 mp KPN 7 B 1 7 mp

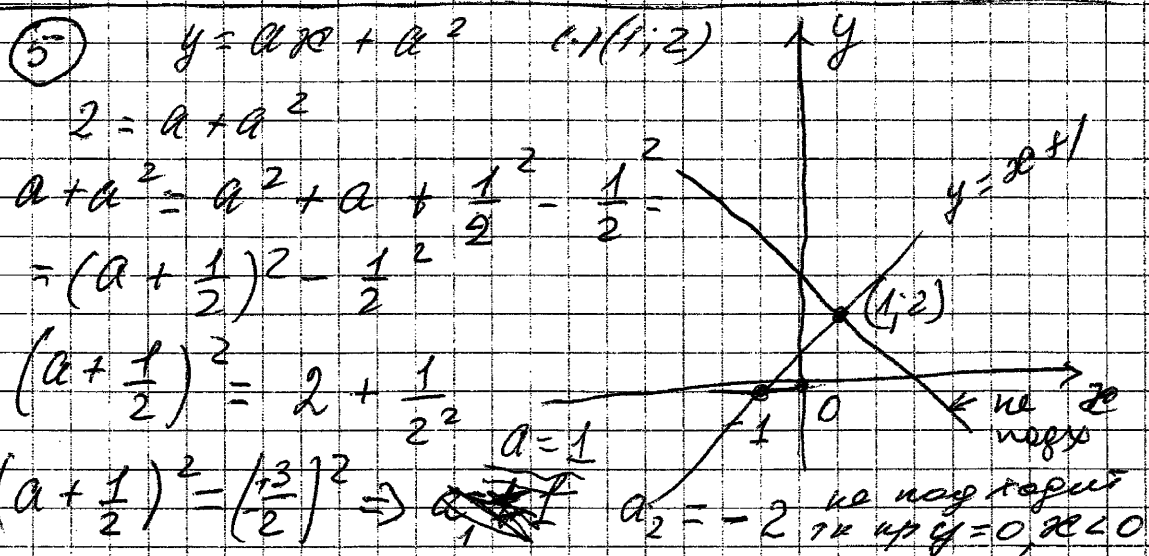
① a) $3x^2 - 12x = x(3x - 12) = 3x(x - 4)$
 b) $ab - 2a + b^2 - 2b = a(b - 2) + b(b - 2) = (b - 2)(a + b)$
 c) $4x^2 - 9 = (2x - 3)(2x + 3)$
 d) $x^3 - 8x^2 + 16x = x(x - 4)^2$

KPN 7 B 1 4 mp.

① d) $a^6 - 8 = (a^3)^2 - (\sqrt{8})^2 = (a^3 - \sqrt{8})(a^3 + \sqrt{8})$
 $(a^2)^3 - 2^3 = (a^2 - 2)(a^2 + 2a + 4)$

③ $(2ab + 1)(2a - b) - b(2a - b)^2 =$
 $= 4a^2b - 2ab^2 + 2a - b - b(4a^2 - 4ab + b^2) =$
 $= 4a^2b - 2ab^2 + 2a - b - 4a^2b + 4ab^2 - b^3 =$
 $= 2ab^2 - b^3 + 2a - b = -b^3 + 2ab^2 + 2a - b$

$= -b^2(b - 2a) - (b - 2a) = (b - 2a)(1 + b^2)(-1)$
 $= (2a - b)(1 + b^2)$



④ $\sqrt{87 \cdot 43} + \frac{(87 - 43)(87^2 + 43 \cdot 87 + 43^2)}{44}$
 $= 87 \cdot 43 + \frac{44(87^2 + 43 \cdot 87 + 43^2)}{44} =$
 $= 87^2 + 2 \cdot 87 \cdot 43 + 43^2 = (87 + 43)^2 =$
 $= 130^2 = 16900$

RPT BX

② $x^3 - 64x = 0 \quad x(x^2 - 64) = 0$
 $x(x - 8)(x + 8) = 0$
 $x_1 = 0 \quad x_{2,3} = \pm 8$

KP B2 Fku

① a) $4x(x+2)$ б) $3m-6n+mn-2n^2 =$
 $= 3(m-2n) + n(m-2n) = (m-2n)(3+n)$

в) $9a^2-16 = (3a-4)(3a+4)$

2) $y^3 + 18y^2 + 81y = y(y+9)^2$

KP B2 Fku up.

① d) $x^6+27 = (x^2)^3 + 3^3 = (x^2+3)(x^4-3x^2+9)$

③ $(2a-b)^2 + (a^2+b)(2a-b) = 4a^2 - 4ab + b^2 +$
 $+ 2a^3 - a^2b + 2ab - b^2 = 2a^3 - a^2b - 2ab =$
 $= a(a^2 - ab - 2b)$

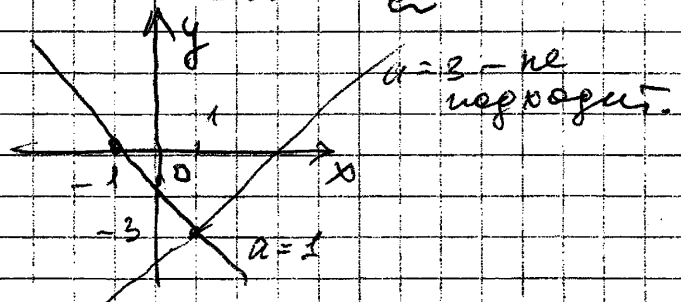
⑤ $y = 2ax - a^2$ (c) (1; -3)

$-3 = 2a - a^2$ $a^2 - 2a + 1 - 1 = 3$

$(a-1)^2 = 4$ $(a-1) = \pm 2$ $a_1 = +3$ $a_2 = -1$

$y = 0$ $2ax - a^2 = 0$ и $x < 0$ и пересек Ох
 ниже $2ax - a^2 = 0$ $x = \frac{a^2}{2a} = \frac{a}{2}$ выше

пересекает $a = -1$



① $\frac{169^3 + 59^3}{228} - 169 \cdot 59 = (\frac{169+59}{228} \cdot (169^2 + 169 \cdot 59 + 59^2) - 169 \cdot 59)$

$= (169+59)(169^2 + 169 \cdot 59 + 59^2) - 169 \cdot 59 =$

$\frac{228}{228} (169^2 + 2 \cdot 59 \cdot 169 + 59^2) = (169+59)^2 =$

$= 110^2 = 12100$

② $x^3 - 36x = 0$ $x(x^2 - 36) = 0$

$x_1 = 0$ $x_{2,3} = \pm 6$

KP 7 B 3 7 up

$$\textcircled{1} a) -12a^2 + 18a^3 = 6a^2(3a - 2)$$

$$b) 2a + 4b - ab - 2b^2 = 2(a+2b) - b(a+2b) = (a+2b)(a-b)$$

$$c) x^2 - 64y^2 = (x-8y)(x+8y)$$

$$d) -2x^3 - 28x^2 - 98x = -2x(x^2 + 14x + 49) = -2x(x+7)^2$$

KP 7 B 3 7 up

$$\textcircled{1} a) a^6 - 8b^3 = (a^2)^3 - (2b)^3 = (a^2 - 2b) \times (a^4 + 4a^2b + 4b^2)$$

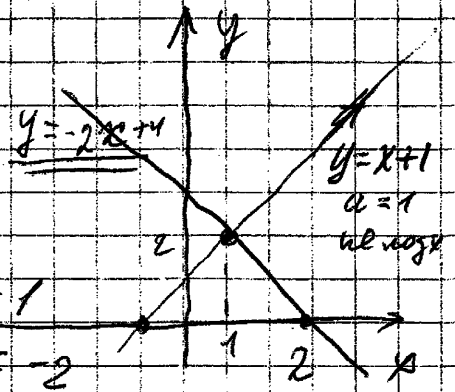
$$\textcircled{3} (3x+y)(3xy+1) - y(3x+y) = (3x+y) \times (3xy+1 - 3xy - y^2) = (3x+y)(1-y)(1+y)$$

$$\textcircled{5} y = ax + a^2 \quad (*) \quad (1, 2)$$

$$2 = a + a^2$$

$$a^2 + a + \frac{1}{4} - \frac{1}{4} = 2$$

$$(a + \frac{1}{2})^2 = \frac{9}{4} \quad (a + \frac{1}{2}) = \pm \frac{3}{2} \quad a_1 = 1 \quad a_2 = -2$$



KP 7 B 3

$$\textcircled{4} \frac{99^3 - 61^3}{3 \cdot 8} + 99 \cdot 61 = \frac{(99-61)(99^2 + 61 \cdot 99 + 61^2)}{3 \cdot 8} + 99 \cdot 61 = (99+61) \cdot 2 = 160 \cdot 2 = 25600$$

$$\textcircled{2} (x-4)^2 - 25 = 0 \quad (x-4-5)(x-4+5) = 0$$

$$(x+9)(x-1) = 0 \quad x_1 = 9 \quad x_2 = -1$$

KP 4 B 4 4 Kd

① a) $21b^3 - 14b^2 - 7b^2(3b-2)$

b) $m^2 + 3m - n^2 - 3n = m(m+3) - n(n+3) = (m-n)(m+3)$

b) $9a^2 - 6^2 = (9a-6)(9a+6)$

c) $3y(y^2 - 12y + 36) = 3y(y-6)^2$

KP 7 B 4 4 Kp

① d) $x^6 + 27y^3 = (x^2)^3 + (3y)^3 = (x^2 + 3y)(x^4 - 3yx^2 + 9y^2)$

③ $(y-3x)^2 - (y-3x)(x^2+y) = (y-3x)(y-3x-x^2-y) = (y-3x)(-x^2-2y) = -(y-3x)x^2(2+y)$

⑤ $y = 2ax - a^2 \quad (-1; -3)$

$-3 = -2a - a^2$

$3 = a^2 + 2a + 1 - 1$

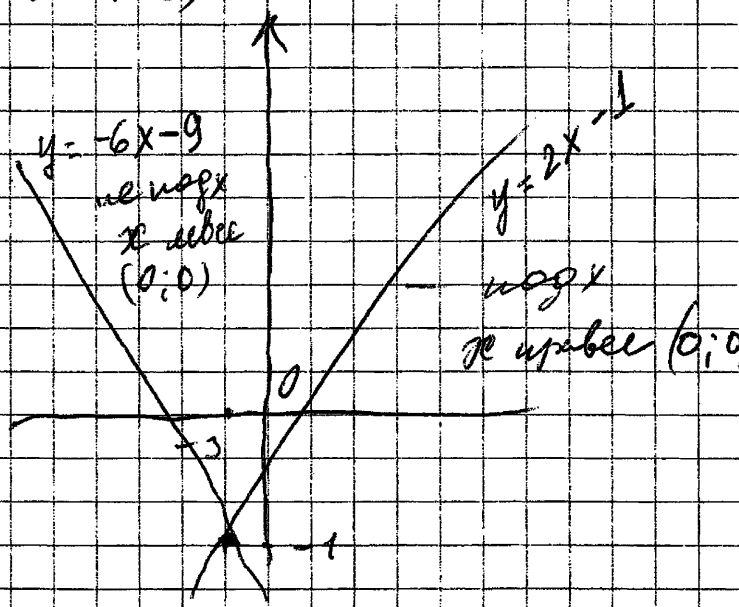
$(a+1)^2 = 4$

$(a+1) = \pm 2$

$a_1 = 1$

$a_2 = -3$

$a = 1$



④ $\frac{182^3 + 62^3}{244} - 182 \cdot 62 =$

$\frac{244}{244} = (182+62) (182^2 - 2 \cdot 182 \cdot 62 + 62^2) = (182-62)^2 = 120^2 = 14400$

KP 4 B 4

② $(x+2-7)(x+2+7) = (x-5)(x+9) = 0$

$x_1 = 5 \quad x_2 = 9$

KP8 B1

7 KP

$$\textcircled{1} \quad a) \frac{5(3-y)}{(3-y)(3+y)} = \frac{5}{3+y} \quad b) \frac{m^2 - 4mn - 4n^2}{m^2 - 4n^2} =$$

$$= \frac{(m-2n)^2}{(m-2n)(m+2n)} = \frac{m-2n}{m+2n}$$

$$\textcircled{2} \quad \frac{x^3 + 1}{x^2 - x + 1} - 1 = \frac{x^3 + x}{x^2 + 1} = x \frac{(x^2 + 1)}{x^2 + 1} = x$$

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

$$x = x$$

$$\textcircled{3} \quad a^3 + a^2 + 3a + 27 = a^3 + 27 + a(a+3) =$$

$$= (a+3)(a^2 - 3a + 27) + a(a+3) =$$

$$= (a+3)(a^2 - 2a + 27)$$

$$\textcircled{4} \quad 3 \cdot 5^6 - 81 \div 33$$

$$3((5^2)^3 - 3^3) = 3 \cdot (25 - 3)(25^2 + 25 \cdot 3 + 3^2) =$$

$$= \underline{3} \cdot \underline{2} \cdot \underline{11} \cdot (\textcircled{2}) \div 33 \quad \textcircled{2}$$

① KP8 B2

Imp.

$$a) \frac{36 - a^2}{18 + 3a} = \frac{(6-a)(6+a)}{3(6+a)} = \frac{6-a}{3}$$

$$b) \frac{9p^2 - q^2}{9p^2 + 6pq + q^2} = \frac{(3p-q)(3p+q)}{(3p+q)^2} = \frac{3p-q}{3p+q}$$

$$② \frac{a^3 - 8}{a^2 + 2a + 4} + 2 = \frac{a^3 + 3a}{a^2 + 3}$$

$$\frac{(a-2)(a^2 + 2a + 4)}{(a^2 + 2a + 4)} + 2 = a + \frac{a^2(a+3)}{(a^2+3)} = a$$

4. 7. 8.

$$③ x^3 + 2x^2 - 2x - 1 = (x-1)(x^2 + 2x + 1) - 2x(x+1) = (x-1)(x^2 + 1) - 3x$$

$$④ 7^7 + 7 : 35$$

$$7(7^6 + 1) = 7 \left[(7^2)^3 + 1^3 \right] =$$

$$= 7 [7^2 + 1] [7^4 - 7^2 + 1] =$$

$$= 7 \cdot 5 \cdot 10 [\dots] : 35$$

① КР 8 В 3 7 мр

$$a) \frac{(7m-n)(7m+n)}{3m(n-7m)} = -\frac{7m+n}{3mn}$$

!!! ошибка в выборе гласного
было $3m^2 - 2m^2$ и 8 глас.

$$b) \frac{81x^2 - 16}{16 + 48x + 81x^2} = \frac{(9x+4)(9x-4)}{(9x+4)^2} = \frac{9x-4}{9x+4}$$

$$② \frac{(2x-1)(4x^2 + 2x + 1)}{4x^2 + 2x + 1} + 1 = 2x$$

в гл. ст. $\frac{2x(x^2+1)}{x^2+1} = 2x$ в. ф. ф.

$$③ \underline{x^3 - x^2 + 2x - 8} = (x-2)(x^2 + 2x + 4) - (x+2)x = (x-2)(x^2 + x + 4)$$

$$④ 5 \cdot 4^6 - 40 : 70$$

$$\underline{5(4^6 - 8)} = \underline{5(4^3 - 2)} = \underline{5(4-2) \cdot (\dots)} = \underline{5}$$

$$5(4^6 - 8) = 5[(4^2)^3 - 2^3] = 5(16-2)(\dots)$$

$$5 \cdot 14 \cdot (\dots) = 70(\dots) : 70$$

KP 8 B 4 7 up

$$\textcircled{1} \text{ a) } \frac{4ab(3a+2b)}{(3a-2b)(3a+2b)} = \frac{4ab}{3a-2b}$$

$$\text{b) } \frac{(6c-5)^2}{(5-6c)(5+6c)} = \frac{+(5-6c)}{5+6c}$$

$$\textcircled{2} \frac{27a^3+8}{9a^2-6a+4} = \frac{(3a+2)(9a^2-6a+4)}{(9a^2-6a+4)} = 3a$$

$$\frac{3a^7+12a}{a^6+4} = \frac{3a(a^6+4)}{(a^6+4)} = 3a$$

$$\textcircled{3} \begin{aligned} x^3 - 3x^2 - 15x + 125 &= (x+5)(x^2 - 5x + 25) \\ - 3x(x+5) &= (x+5)(x^2 + 8x + 25) \end{aligned}$$

$$\textcircled{4} 3 \cdot 5^6 - 24 \quad ; \quad 69$$

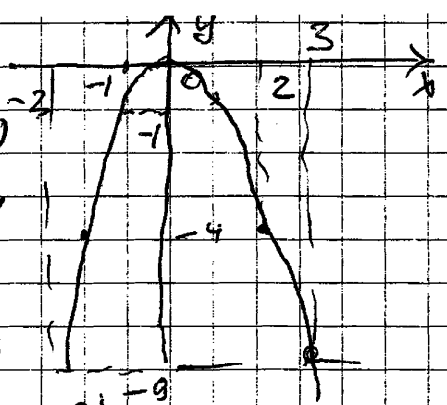
$$3(5^6 - 8) = 3 \cdot [(5^2)^3 - 2^3] = 3 \cdot (5^2 - 2) \cdot (\dots)$$

$$3 \cdot (25 - 2) \cdot (\dots) = 3 \cdot 23 \cdot (\dots) = 69 \cdot (\dots) \quad ; \quad 69$$

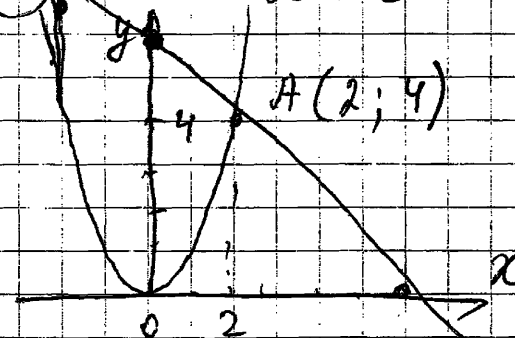
KPD B2 4 KOT

① a) $(-3; -9)$ $(-1; -1)$ $(2; -4)$

b) ± 3 b) $y_{\max} = 0$ $y_{\min} = -4$
 $x=0$ $x=2$



② $x^2 = -x + 6$



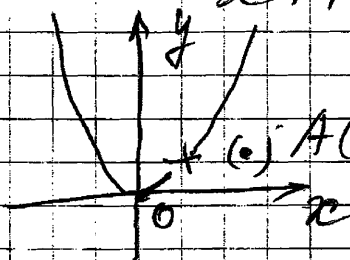
A(2; 4)

(.) B = (-3, 9)

③ $f(x) = \begin{cases} x+3 & -5 \leq x < -1 \\ x^2+1 & 5 \leq x \leq 3 \end{cases}$ a) 1; 1; 0 is b) $5 \leq x \leq 3$

④ $(x+5)^2 = x^2$ $10x = -25$ $x = -\frac{5}{2}$

⑤ $y = \frac{x^2(x+1)}{x+1}$ $x \neq -1$



(.) A(1; 1) не входит в зп f.

KP N 9 B3 Kcl 7

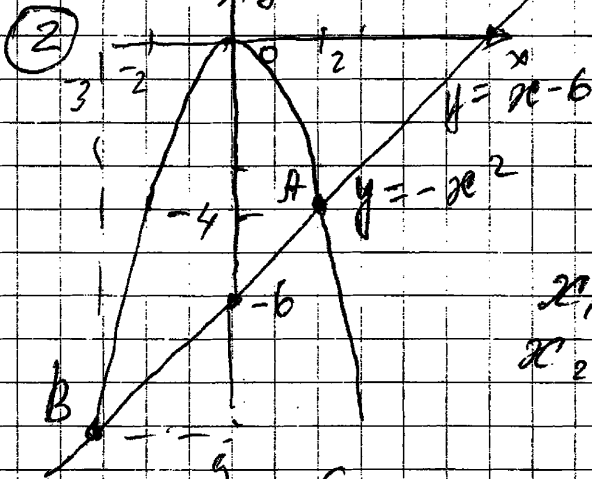
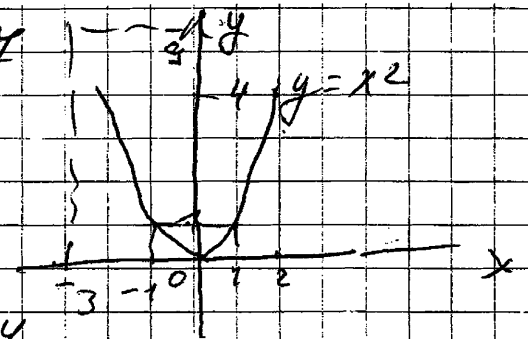
① a) $y = 9; y = 1; y = 4$

b) $x = \pm 4$

b) $y_{min} = 0$
 $x = 0$

$[-1, 2]$

$y_{max} = 4$
 $x = 2$



$y = x^2 - 6$

(1) $A = (2; -4)$

(2) $B = (-3; -9)$

$x_1 = 2 \quad y_1 = -4$

$x_2 = -3 \quad y_2 = -9$

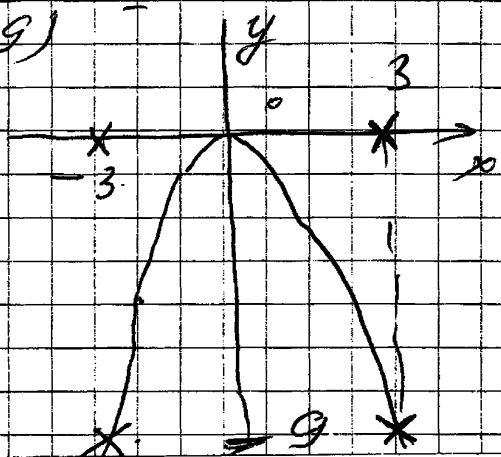
③ $f(x) = \begin{cases} -x^2 & -3 \leq x \leq 2 \\ 2x - 4 & x > 2 \end{cases}$ a) $-9; -4; 2; 6$
 $\delta \quad -3 \leq x$

④ $(x-4)^2 = (x+3)^2 \quad x^2 - 8x + 16 = x^2 + 6x + 9$

$14x = 7 \quad x = \frac{7}{14} = \frac{1}{2}$

⑤ $y = \frac{x^2(x^2-9)}{(3+x)(3-x)}$ $x \neq \pm 3$

$= \frac{x^2(x^2-9)}{(3+x)(3-x)} = \frac{-x^2(x^2-9)}{\sqrt{x^2-9}} = -x^2$

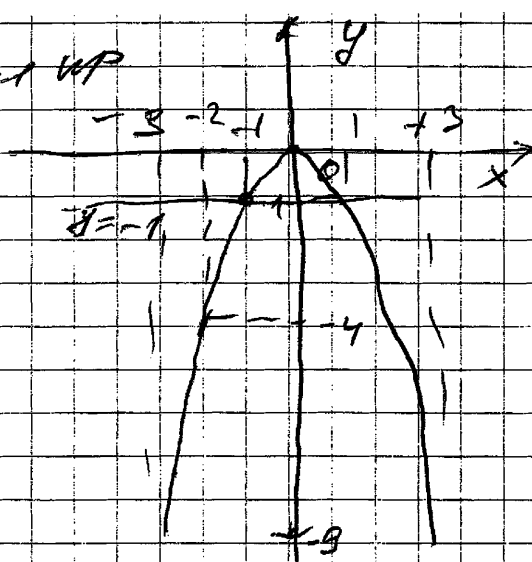


KP9 B4 Fact up

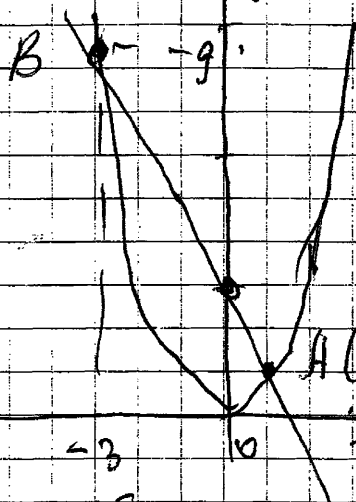
① a) $-4; -1; -9$

б) $x = \pm 1$ в) $y_{\max}_{x=0} = 0$

$y_{\min}_{x=-3} = -9$



②



$B(-3; 0)$

$A(1; 1)$

$x_1 = 1 \quad y_1 = 1$

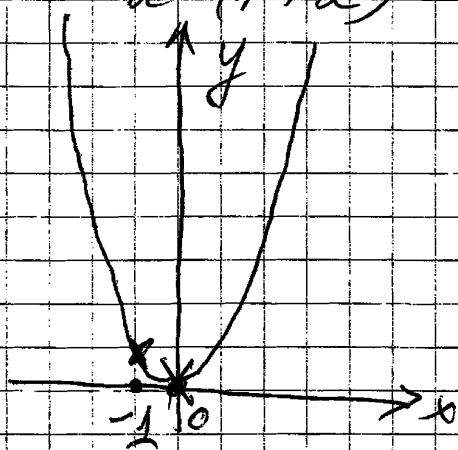
$x_2 = -3 \quad y_2 = 0$

③ $f(x) = \begin{cases} -2x - 4 & x < -1 \\ -x^2 - 1 & -1 \leq x \leq 3 \end{cases}$ а) $0; -1; 0; -9$
 б) $x \leq 3$

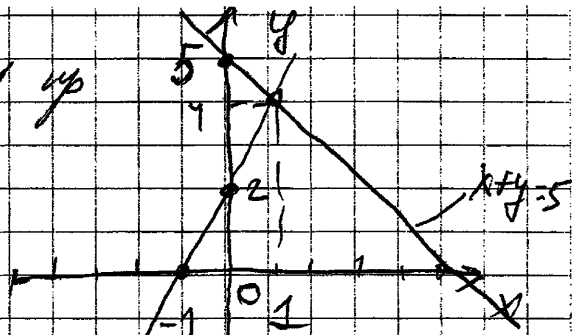
④ $(x-2)^2 = (5+x)^2 \Rightarrow x^2 - 4x + 4 = x^2 + 10x + 25$

$14x = -21 \quad x = -\frac{21}{14} = -\frac{3}{2} = -1\frac{1}{2}$ в ответе! ошибка!

⑤ $y = \frac{x^3(1+x)}{x(1+x^2)} = x^2 \quad x \neq 0 \quad x \neq -1$



KP N 30 B 1 7 up



① a) $x = 1 \quad y = 4$

②
$$\begin{cases} 15x - 4y = 8 & (2) \\ y = 1 + 3x & (1) \end{cases}$$
 через (1) в (2)

$$15x - 4(1 + 3x) = 8 \quad 3x = 12 \quad x = 4 \rightarrow y = 13$$

③
$$\begin{cases} x + y = 45 \\ x - y = 13 \end{cases} \quad (+) \rightarrow 2x = 58 \quad x = 29 \quad y = 16$$

④
$$\begin{cases} x - \text{трехместный нел.} \\ y - \text{двухместное} \end{cases} \quad x = ?$$

$$\begin{cases} x + y = 10 \\ 26 = 3x + 2y \end{cases} \quad \begin{aligned} 26 &= 3x + 2(10 - x) \\ 26 &= 3x + 20 - 2x \\ x &= 6 \end{aligned} \quad = 18 \text{ цел.}$$

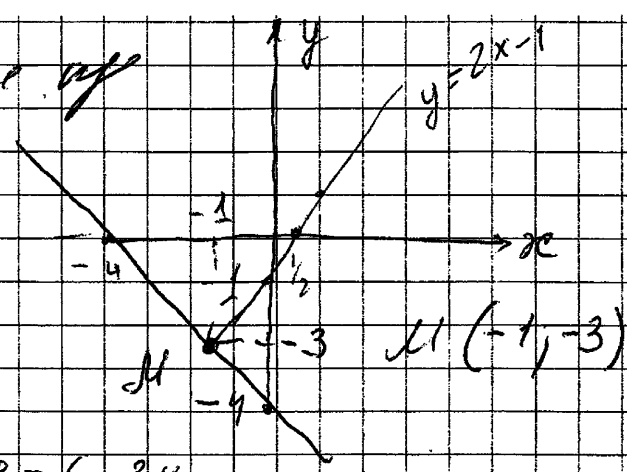
KP 10 B 1 7 up.

⑤
$$x^2 + 4xy + 4y^2 = 3(x + 2y) \Rightarrow (x + 2y)^2 = 3(x + 2y)$$

$$\begin{cases} 5x - 4y = 1 \\ x + 2y = 3 \end{cases} \quad \text{a) } \begin{cases} x + 2y = 3 \\ 5x - 4y = 1 \end{cases} \Rightarrow \begin{cases} x = 1 \\ y = 1 \end{cases}$$

$$\begin{cases} 5x - 4y = 1 \\ x + 2y = 0 \end{cases} \quad \text{б) } \begin{cases} x + 2y = 0 \\ 5x - 4y = 1 \end{cases} \Rightarrow \begin{cases} x = \frac{1}{7} \\ y = -\frac{1}{14} \end{cases}$$

KP 10 B2 Full up



① a)
$$\begin{cases} y = 2x - 1 \\ x + y = -4 \end{cases}$$

$$\begin{cases} 4x - 9y = 3 \\ x + 3y = 6 \rightarrow x = 6 - 3y \end{cases}$$

②
$$4(6 - 3y) - 9y = 3 \quad 24 - 12y - 9y = 3 \quad 8 - 4y - 3y = 1$$

$$4y = 7 \quad y = 1 \quad x = 6 - 3 \cdot 1 = 3 \quad \underline{y = 1, x = 3}$$

③
$$\begin{cases} x + y = 49 \\ -x + y = 17 \end{cases} \quad \textcircled{+} \quad 2y = 66 \quad y = 33 \quad x = 16$$

④
$$\begin{cases} x - y = 4 \\ y - 4 = x \end{cases}$$

$$2x + y = 28 \quad 2(2x + y) = 56$$

$$3x = 24 \quad x = 8 \quad y = 12$$

KP 10 B2 Full up

⑤
$$\begin{cases} (2x - y) / 2 = 5(2x - y) \\ 3x + 4y = 13 \end{cases} \Rightarrow \begin{cases} 2x - y = 5 \quad \textcircled{1} \times 4 \\ 3x + 4y = 13 \quad \textcircled{2} \end{cases}$$

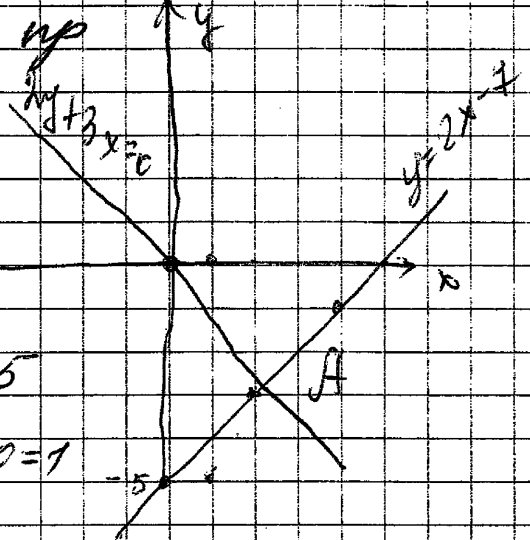
$$\begin{cases} 2x - y = 0 \quad \textcircled{2} \times 4 \\ 3x + 4y = 13 \quad \textcircled{+} \end{cases} \Rightarrow 11x = 33 \quad x = 3 \quad y = 1$$

$$\begin{cases} 11x = 33 \quad x = 3 \\ 11x = 13 \quad x = \frac{13}{11}, y = \frac{26}{11} \end{cases}$$

Kp10 B3 7 нр

$$\begin{cases} y = 2x - 7 \\ 2y + 3x = 0 \end{cases}$$

(1) A (2; -3) $x = 2$ $y = -3$



$$\begin{cases} 3x - y = 5 \Rightarrow y = 3x + 5 \\ -5x + 2y = 1 \Rightarrow -5x + 6x + 10 = 1 \\ x = -9 \quad y = -22 \end{cases}$$

$$\begin{cases} 3x + 2y = -27 \\ -5x + 2y = 13 \end{cases} \quad \ominus \quad \begin{matrix} 8x = -27 - 13 & 8x = -40 \\ x = -5 & y = -6 \end{matrix}$$

(4) x — 1 шаг влево
 y — 2 шаг — 1 —————
 2 шага влево

$$\begin{cases} 2x + 2y = 48 \\ x + y = 24 \end{cases} \Rightarrow 2(2x + y - 6) = 64 \Rightarrow 2x + y - 6 = 32$$

$$\begin{cases} x + y = 24 \quad (1) \\ 2x + y = 38 \quad (2) \end{cases} \quad \ominus \quad \text{из (2) (1)} \quad x = 38 - 24 = 14$$

$y = 10$

(5) Kp10 B3 7 нр.

$$\begin{cases} 9x^2 + 2y - 6xy = 6x - y^2 \\ 2x + 5y = 7 \end{cases} \quad (3x - y)^2 = 3(3x - y)$$

$$\begin{cases} 3x - y = 2 \quad \times 5 \quad \oplus \\ 2x + 5y = 7 \quad \oplus \end{cases}$$

$$14x = 14$$

$x = 1$
 $y = 1$

$$\begin{cases} 3x - y = 0 \quad \times 5 \quad \oplus \\ 2x + 5y = 7 \quad \oplus \end{cases}$$

$$14x = 4 \quad x = \frac{4}{14}$$

$$y = \frac{2}{7}$$

KP 10 B 4 7 kor 4A

11

$$\textcircled{1} \begin{cases} 3y - 2x = 0 \\ y = -3x + 11 \end{cases}$$

A(3;2) x=3 y=2

$$\textcircled{2} \begin{cases} -x + 2y = 4 & x = 2y - 4 \\ 4x + 3y = 5 \end{cases}$$

$$4x + 3y = 5 \rightarrow 4(2y - 4) + 3y = 5$$

$$11y = 33 \quad y = 3 \quad x = 2$$

$$\textcircled{3} \begin{cases} 3x - 2y = 64 \\ 3x + 7y = -8 \end{cases} \quad \ominus \quad \begin{cases} -2y - 7y = 64 + 8 \end{cases}$$

$$9y = -72 \quad y = -8 \quad 3x - 56 = -8 \quad x = 16$$

④ x - kor 60 5 / 148
y - kor 60 2 / 148

$$a) x \cdot 5 + 2y = 178$$

$$b) x + 12 = y$$

$$x + 12 = 8$$

$$5x + 2y = 178$$

$$2(x + 12) + 5x = 178 \quad 2x + 24 + 5x = 178 \quad 7x = 154$$

$$x = 22 \quad y = 34 \quad 5 / \text{kor} \cdot \text{kor} \quad 22, \quad 2 / \text{kor} - 34$$

010/132/1010

KP 10 B 4 4 kor

$$\textcircled{5} \begin{cases} x^2 + 5x = 6xy + 15y - 9y^2 \Rightarrow x^2 - 6xy + 9y^2 = \\ 3x + 2y = 4 \end{cases} \Rightarrow 15y - 5x \Rightarrow$$

$$(x - 3y)^2 = 5(3y - x)$$

$$\begin{cases} 3y - x = 0 \quad \times 2 \quad (+) \\ 3x + 2y = 4 \end{cases}$$

$$\begin{cases} x - 3y = -5 \quad \times 3 \quad (-) \\ 3x + 2y = 4 \end{cases}$$

$$11y = 4 \quad y = \frac{4}{11}$$

$$x = \frac{21}{11}$$

$$-9y - 2y = -15 - 4$$

$$11y = 22 \quad y = 2$$

$$x = 2$$