

Шифр 42

Внесите в таблицу номера правильных ответов. В заданиях, в которых отсутствуют варианты ответов, внесите правильный ответ.

1	2	3	4	5	6	7	8	9	10
2	1	4	2	4	2	2	3	3	2

+ - - + + + - + + -

11	12	13	14	15	16	17	18	19	20
5	3	1	3	1	4	3	2	2	5

- + - - - + - - + +

$$\begin{cases} xy(x+y)=0 & ① \\ xy(x-y)=2 & ② \end{cases}$$

$$① \quad xy = \frac{6}{x+y}$$

$$② \quad \left(\frac{6}{x+y}\right)(x-y)=2$$

$$\frac{6(x-y)}{x+y}=2$$

$$\frac{6(x-y)}{x+y} - \frac{2(x+y)}{x+y} = 0$$

$$4 \cdot \frac{2(3(x-y)-(x+y))}{x+y} = 0$$

$$\frac{2(3(x-y)-(x+y))}{x+y} = 0$$

$$2(3(x-y)-(x+y)) = 0$$

$$2(3x-3y-x-y) = 0$$

$$2(2x-4y) = 0$$

$$4x-8y=0$$

$$4x=8y$$

$$x=2y$$

$$\boxed{x=2y}$$

$$2y \cdot y(2y-y)=2$$

$$2y^2 \cdot y = 2$$

$$2y^3 = 2$$

$$y^3 = 1$$

$$\boxed{y=1} \Rightarrow x=2$$

$$\Rightarrow 1 \cdot 2 = 2 \quad \text{ok: } 2$$

②

Решу: ③

Решу численно:

$$(x+1)^2 - 2x - 17 = 0$$

$$x^2 + 2x + 1 - 2x - 17 = 0$$

$$x^2 - 16 = 0$$

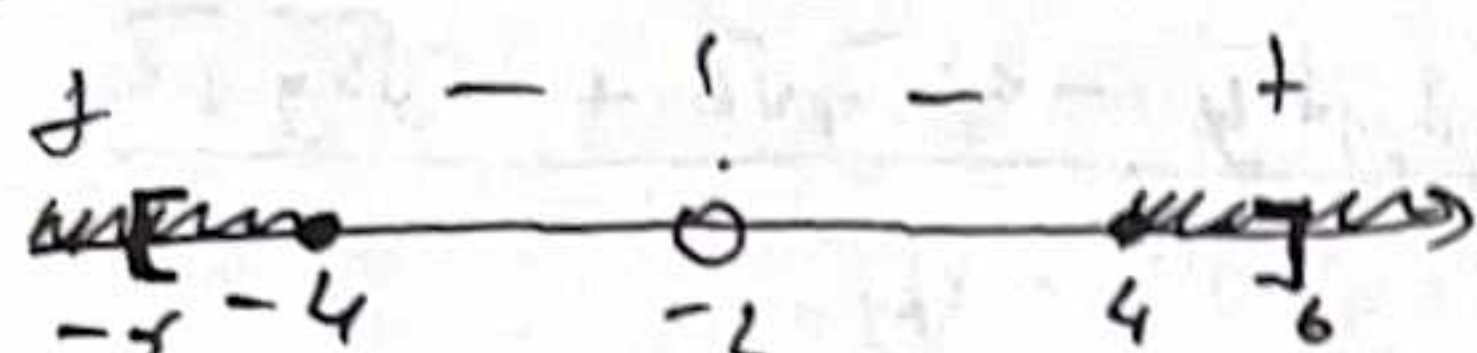
$$x^2 = 16$$

$$x = \pm 4$$

Решу графически:

$$(x+1)^2 \neq 0$$

$$x \neq -2$$



-5; -4; -2; 4; 6. 0, 1, 5

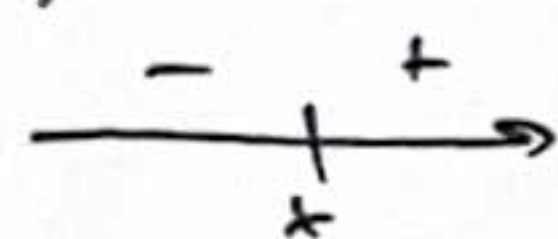
$$① \quad \frac{20\sqrt{31+8\sqrt{5}} - 5\sqrt{5}\sqrt{31+8\sqrt{5}}}{20\sqrt{31+8\sqrt{5}} - 5\sqrt{525}}$$

$$\frac{15}{15} \cdot \frac{15}{15} = \frac{15}{15}$$

$$\frac{15}{15} \cdot \frac{15}{15} = \frac{15}{15}$$

$$⑦ \quad x^2 + |x| = 3$$

$$x=0$$



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

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

$$\begin{cases} x_1 + x_2 = 1 \\ x_1 \cdot x_2 = -3 \end{cases}$$

$$D = 1 + 12 = 13$$

$$\boxed{x_1 = \frac{1+\sqrt{13}}{2}}$$

$$x_2 = \frac{1-\sqrt{13}}{2}$$

$$D = 1 + 12 = 13$$

$$x_1 = \frac{-1+\sqrt{13}}{2}$$

$$\boxed{x_2 = \frac{-1-\sqrt{13}}{2}}$$

$$\text{Решение: } \frac{1+\sqrt{13}}{2} - \frac{-1-\sqrt{13}}{2}$$

$$\frac{1+\sqrt{13}}{2} + \frac{1+\sqrt{13}}{2}$$

$$\frac{1+\sqrt{13}+1+\sqrt{13}}{2} = \frac{2+2\sqrt{13}}{2} = 1+\sqrt{13}$$

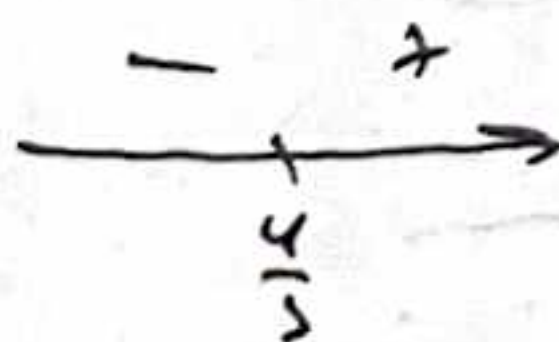
$$\frac{1+\sqrt{13}-(-1-\sqrt{13})}{2} = \frac{1+\sqrt{13}+1+\sqrt{13}}{2} = \frac{2+2\sqrt{13}}{2} = 1+\sqrt{13}$$

$$= 1+\sqrt{13} \quad \frac{2(1+\sqrt{13})}{2} = 1+\sqrt{13}$$

$$⑧ \quad |3x-4| + 6 \leq 8$$

$$3x-4 \geq 0$$

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



$$3x-4 \leq 6-6 \leq 0$$

$$-3x+4+6-1 \leq 0$$

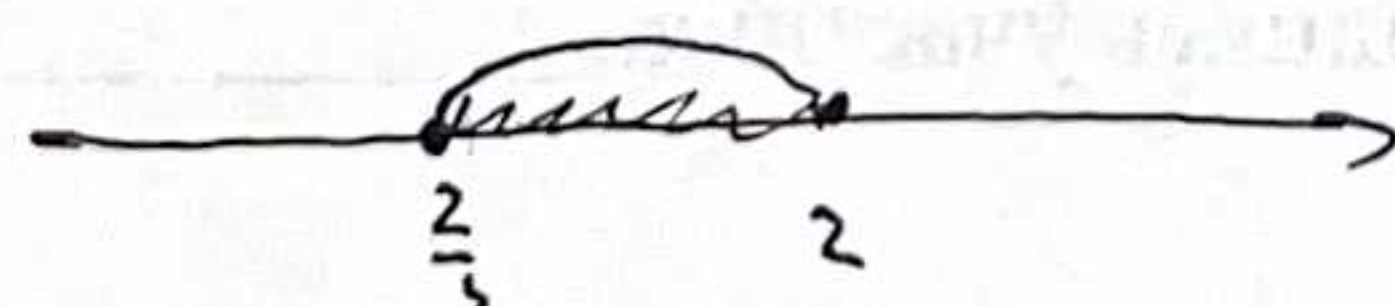
$$3x-6 \leq 0$$

$$3x \geq 2$$

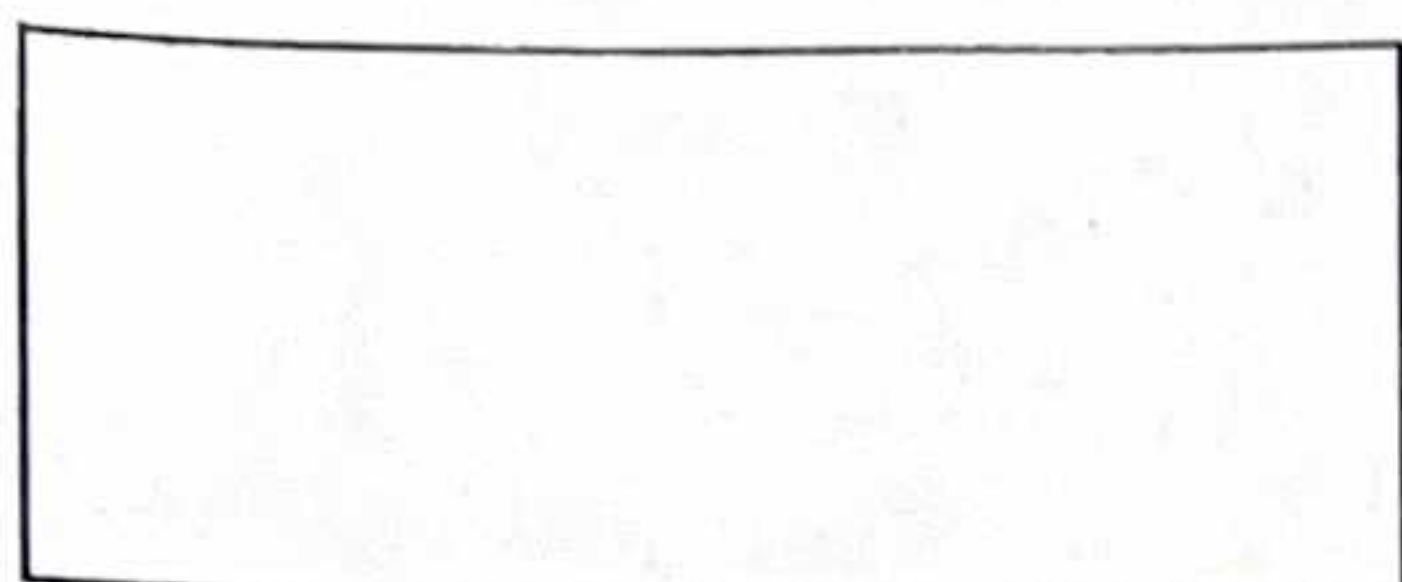
$$x \leq \frac{6}{3}$$

$$x \geq \frac{2}{3}$$

$$x \leq 2$$



Используем ①, ②, ⑤.



ЛИСТ ОТВЕТА

$$\begin{array}{r} 20 \\ \times 15 \\ \hline 300 \end{array}$$

$$\begin{array}{r} 25 \\ \times 15 \\ \hline 375 \end{array}$$

① $\sqrt{31 + 8\sqrt{5}} (20 - 5\sqrt{5})$

$$\begin{aligned} & (31 + 8\sqrt{5}) (20 - 5\sqrt{5})^2 = (31 + 8\sqrt{5}) (400 - 200\sqrt{5} + 375) = \\ & = 31 \cdot 400 - 200 \cdot 31\sqrt{5} + 375 \cdot 31 + 8\sqrt{5} \cdot 400 - 200 \sqrt{5}\sqrt{5} + 8 \cdot 375\sqrt{5} \\ & \rightarrow (ab)^2 = a^2 \cdot b^2 \end{aligned}$$

② $\frac{x\sqrt{x} - 8y\sqrt{y} - 6\sqrt{xy}(\sqrt{6} - 2\sqrt{5})}{\sqrt{x} - 2\sqrt{y}} = \frac{x\sqrt{x} - 8y\sqrt{y} - 6\sqrt{xy}\sqrt{6} + 12\sqrt{xy}\sqrt{5}}{\sqrt{x} - 2\sqrt{y}}$

$$= \frac{x\sqrt{x} - 8y\sqrt{y} - 6\sqrt{6xy} + 12\sqrt{5xy}}{\sqrt{x} - 2\sqrt{y}} = \frac{x\sqrt{x} - 8y\sqrt{y} + 6\sqrt{6xy}}{\sqrt{x} - 2\sqrt{y}} + \frac{x\sqrt{x} - 8y\sqrt{y} + 6\sqrt{5xy}}{\sqrt{x} - 2\sqrt{y}}$$

$$= \frac{\sqrt{x}(x + 6\sqrt{6y}) - 8y\sqrt{y}}{\sqrt{x} - 2\sqrt{y}} \quad \left| \quad \frac{\sqrt{6}(6\sqrt{xy} - 8y) + x\sqrt{x}}{\sqrt{x} - 2\sqrt{y}} = \frac{2\sqrt{6}(3\sqrt{xy} - 4y) + x\sqrt{x}}{\sqrt{x} - 2\sqrt{y}} \right.$$

③ $\frac{x(x-5)}{2(k-11) - 1(k-14)} = \frac{24}{\frac{2(11-x) + x-14}{(11-x)(x-14)}}$

$$x(x-5) = \frac{24}{\frac{2(11-x) + x-14}{(11-x)(x-14)}}$$

$$\frac{x(x-5)(x-14)(x-11)}{2(k-11) - (k-14)} = \frac{24(11-x)(x-14)}{2(11-x) + (x-14)}$$

$$\frac{x(x-5)(x-14)(x-11)}{2(k-11) - (k-14)} + \frac{24(11-x)(x-14)}{2(k-11) - (k-14)} = 0$$

$$\frac{x(x-5)(x-14)(x-11) + 24(11-x)(x-14)}{2(k-11) - (k-14)} = 0$$

$$2(k-11) - (k-14)$$

$$x(x-5)(x-14)(x-11) + 24(11-x)(x-14) = 0$$

$$\text{Сумма корней: } 11 + 14 + 8 = 33$$

$$x(x-5)(x-14)(x-11) - 24(x-11)(x-14) = 0$$

$$(x-11)(x-14)(x(x-5) - 24) = 0$$

$$\begin{aligned} x-11=0 & \quad x-14=0 \\ x=11 & \quad x=14 \end{aligned}$$

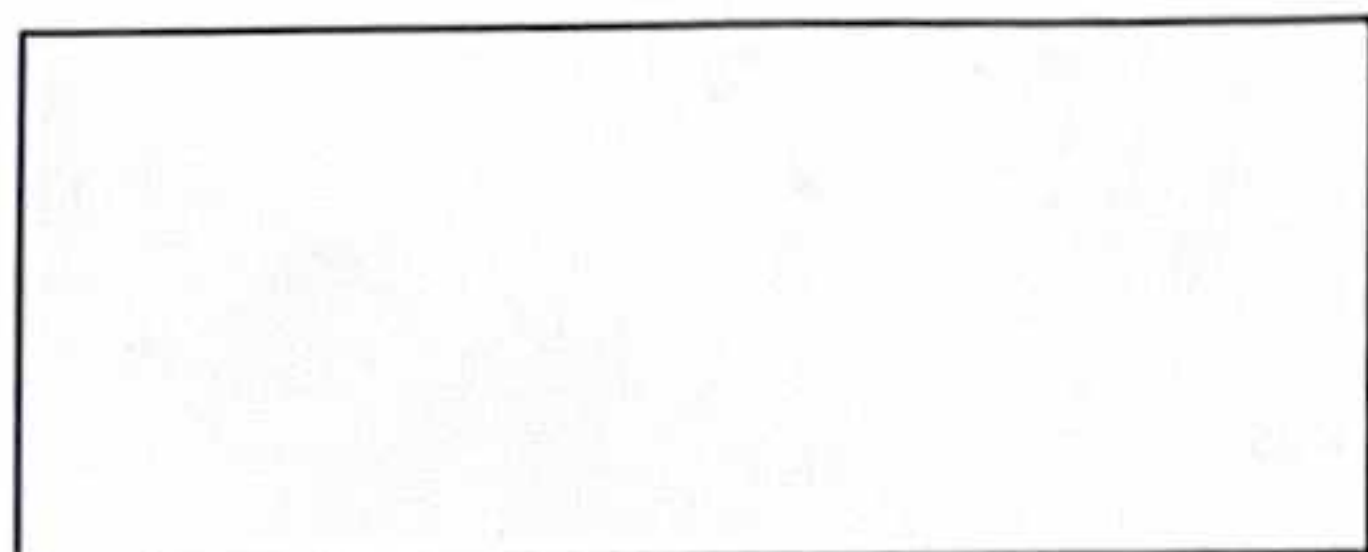
$$x(x-5) - 24 = 0$$

$$x^2 - 5x - 24 = 0$$

$$\begin{aligned} & \begin{cases} x_1 = 8 \\ x_2 = -3 \end{cases} \quad \begin{cases} x_1 = 8 \\ x_2 = -3 \end{cases} \end{aligned}$$

$$\begin{array}{r} 11 \\ + 14 \\ \hline 25 \\ \times 3 \\ \hline 75 \end{array}$$

$$0, 1, 2, 3$$



$$\frac{36}{216} = \frac{1}{6}$$

$$\log_a b = c$$

$$\log_a b = \frac{c}{\log_a a}$$

ЛИСТ ОТВЕТА

$$\frac{\log_6 324}{\log_4 6}$$

$$\log_4 6 = \frac{1}{\log_6 4}$$

$$\frac{16}{4} = 4$$

$$18^2$$

$$\frac{12}{144} = \frac{1}{12}$$

$$\frac{14}{127} = \frac{1}{9}$$

$$4 \cdot 4 = \frac{16}{16}$$

$$16 \cdot 16 = 256$$

$$\textcircled{10} \log_6 9 = \frac{\log_6 324}{\log_4 6} : (\log_6 9 + \log_6 324 \cdot \log_4 6)$$

$$2 \log_6 9 + \log_6 324 \cdot \log_4 6$$

$$2 \log_6 3^2$$

$$\log_6 3 + \log_6 324 \cdot \log_4 6$$

$$\log_6 3 + \log_6 18^2 \cdot \log_4 6$$

$$\log_6 3 + \frac{1}{2} \log_6 18 \cdot \log_4 6$$

$$\log_6 3 + \frac{1}{2} (\log_6 9 + \log_6 2) \cdot \log_4 6$$

$$\log_6 3 + \frac{1}{2} (2 \log_6 3 + \log_6 2) \cdot \frac{1}{2} \log_6 2$$

$$\log_6 3 + \log_6 3 + \frac{1}{4} \log_6 2$$

$$\log_6 3 + \frac{1}{2} \log_6 3 \cdot \log_6 2 + \frac{1}{4} \log_6^2 2$$

$$\log_6 3 + \frac{1}{2} \log_6 3 \cdot \log_6 2 + \frac{1}{4} \log_6^2 2$$

$$\log_6^2 (\frac{1}{2} \log_6 3 + \frac{1}{4} \log_6 2) + \log_6 3$$

$$\log_6 (\log_6 9 + \log_6 18) + \log_6 3$$

$$\log_6 \frac{1}{2} (\log_6 3 + \log_6 2) + \log_6 3$$

$$\frac{1}{2} \log_6^2 (\log_6 6) + \log_6 3$$

$$\frac{1}{2} \log_6 2 + \log_6 3$$

$$\log_6 4 + \log_6 3 = \log_6 12$$

$$\textcircled{11} (\frac{6}{10})^{x^2} \cdot (\frac{15}{10})^{-x^2} = (\frac{4}{10})^{2x+1}$$

$$(\frac{6}{10})^{x^2} \cdot (\frac{15}{10})^{-x^2} = (\frac{4}{10})^2 \cdot (\frac{4}{10})^{2x+1}$$

$$(\frac{6}{10})^{x^2} \cdot (\frac{15}{10})^{-x^2}$$

$$(\frac{6}{10})^{x^2} \cdot (\frac{10}{15})^{x^2} = (\frac{4}{10})^2 (\frac{4}{10})$$

$$(\frac{6}{10})^{x^2} \cdot (\frac{10}{15})^{x^2}$$

$$(\frac{3}{5})^{x^2} \cdot (\frac{2}{3})^{x^2}$$

$$(\frac{3}{5})^{x^2+x^2} = ((\frac{2}{3})^2)^x + (\frac{2}{3})$$

$$(\frac{3}{5})^{2x^2} = (\frac{4}{25})^x + (\frac{2}{3})$$

$$(\frac{3}{5})^{2x^2} = (\frac{4}{10})^{2x+1}$$

$$(\frac{3}{5})^{2x^2} = (\frac{2}{5})^{2x+1}$$

$$(\frac{3}{5})^{2x^2} = (\frac{2}{5})^{2x} - \frac{2}{5} = 0$$

$$\log_a b = c$$

$$a^c = b$$

$$4 \leq x^4$$

$$4 \leq x^4$$

$$4 \leq x^4$$

$$\log$$

$$4^c = 4$$

$$\textcircled{12} 2 \log_4 x^2 - \log_4 (-x) = 4$$

$$4 \log_4 x - \frac{1}{2} \log_4 (-x) = 4$$

$$\log_4 x^4 - \frac{1}{2} \log_4 (-x) = 4$$

$$4 \log_4 x^4 - \frac{1}{2} \log_4 (-x) - \log_4 1 = 0$$

$$\textcircled{13} \frac{2x-3}{x-1} \geq \frac{9}{3-x}$$

$$\frac{2x-3}{x-1} - \frac{9}{3-x} \geq 0$$

$$\frac{(2x-3)(3-x) - 9(x-1)}{(x-1)(3-x)} \geq 0$$

$$(x-1)(3-x) \neq 0$$

$$x-1 \neq 0 \quad 3-x \neq 0$$

$$x \neq 1 \quad x \neq 3$$

$$(2x-3)(3-x) - 9(x-1) = 0$$

$$6x - 2x^2 - 9x + 3x^2 - 9x + 9 = 0$$

$$-2x^2 = 0$$

$$x^2 = 0$$

$$\begin{matrix} + & !+ & - & + \\ \hline 0 & 1 & 3 \end{matrix}$$

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

$$\begin{cases} x^2 + x - 3 = 0 \\ x \geq 0 \end{cases}$$

$$\frac{50}{450} \quad \frac{150}{300}$$

$$16 = 2 \cdot \frac{b}{3}$$

$$(9) \quad \frac{0,6}{50} + \frac{100}{x} = \frac{0,5}{50+x}$$

$$0,6 \cdot 50 + x = 0,5(50+x)$$

$$30 + x = 25 + 0,5x$$

$$0,5x = 15$$

$$x = \frac{15}{0,5}$$

$$x = 150$$

$$f(x) = kx + b$$

$$4 = k(-3) + b$$

$$(10) \quad (x-3)(x-1)^3 - (x-3)(x-2)^2 - 7(x-3)$$

$$(x-3)((x-1)^3 - (x-2)^2 - 7) = 0$$

$$x-3=0 \quad (x-1)^3 - (x-2)^2 - 7 = 0$$

$$x = 3$$

$$(11) \quad \sqrt{2}x^2 - 16x + 19 = 0$$

$$(\sqrt{2}x - 3)^2$$

$$8x^2 -$$

$$25(x-3) = 0$$

$$\sqrt{8}$$

$$\sqrt{2}$$

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

$$(x-1)^2(x-1) - (x-2)^2 - 7 = 0$$

$$a^3 - 3a^2b + 3ab^2 - b^3$$

$$x^3 - 3x^2 + 3x - 1 - (x^2 - 4x + 4) - 7 = 0$$

$$x^3 - 3x^2 + 3x - 1 - x^2 + 4x - 4 - 7 = 0$$

$$x^3 - 4x^2 + 7x - 12 = 0$$

$$\begin{cases} x > 0 \\ x^2 + x - 3 = 0 \end{cases}$$

$$\begin{cases} x < 0 \\ x^2 - x - 3 = 0 \end{cases}$$

$$\begin{cases} x > 0 \\ x = \frac{-1 \pm \sqrt{13}}{2} \end{cases}$$

$$\begin{cases} x < 0 \\ x = \frac{1 \pm \sqrt{13}}{2} \end{cases}$$

$$\frac{1+\sqrt{13}}{2}$$

$$\frac{-1+\sqrt{13}}{2}$$

$$\frac{1+\sqrt{13}}{2}$$

$$\frac{1+\sqrt{13} + 1-\sqrt{13}}{2} = 1$$

$$2 > 0, \text{ then } 2$$

$$2 \log_6 9 + 2 \log_6 4 \cdot \log_6 5 + 2 \log_6 4$$

$$\log_6 9^2 + 2 \log_6 4 \cdot \log_6 9 + \log_6 4^2$$

$$(\log_6 9 + \log_6 4)^2$$

$$\log_6 4 (2 \log_6 9 + 1) + \log_6 5$$

$$2 \log_6 4 (\log_6 9 + 1) + \log_6 5$$

$$2 \log_6 4 \log_6 9 + 2 \log_6 4 \cdot \log_6 5$$

17 -



$$2\sqrt{2}x^2 - 16x + 9 = 0$$

$$\sqrt{2}x^2 - 16x + 9 = 0$$

$$\frac{16}{\sqrt{2}} \cdot \frac{3}{3}$$

$$2 \cdot 3x \cdot \frac{3}{3}$$

$$\frac{2x^2}{\sqrt{2}}$$

$$2x^2 - 16x + 9 = 0$$

$$(\sqrt{2}x - 3)^2 = 0$$

$$x\sqrt{2} \cdot 2 \cdot 3$$

$$x\sqrt{2} \cdot 6$$

$$(18) y = \frac{-27 - 4ax}{3} \leftarrow \text{прямая}$$

$$y = \frac{16a^2 - 4ax}{4a}$$

$$y = \frac{16a^2 - 4ax}{4a} \leftarrow \text{прямая}$$

$$(x-1)^3 - (x-2)^3 - 7 = 0$$

$$x^3 - 3x^2 + 3x - 1 - (x^3 - 3x^2 \cdot 2 + 3x \cdot 4 - 4) - 7 = 0$$

$$\cancel{x^3} - \cancel{3x^2} + 3x - 1 - \cancel{x^3} + 6x^2 - 12x + 4 - 7 = 0$$

$$-3x^2 + 3x - 1 + 6x^2 - 12x + 4 - 7 = 0$$

$$3x^2 - 9x - 4 = 0$$

$$D = 81 + 48$$

$$\cancel{x^3} - 3x^2 + 3x - 1 - \cancel{x^3} + 6x^2 - 12x + 4 - 7 = 0$$

$$3x^2 - 9x - 4 = 0$$

$$D = 81 + 48$$

$$D = \sqrt{129}$$

$$x_1 = \frac{9 + \sqrt{129}}{6}$$

$$x_2 = \frac{9 - \sqrt{129}}{6}$$

$$\frac{9 + \sqrt{129} + 9 - \sqrt{129}}{6} = \frac{18}{6} = \frac{3+3}{5} = \frac{6}{5} = 2$$

$$\frac{16}{3} \cdot 1$$

$$\frac{16}{3}$$

$$\frac{16}{3}$$

$$\frac{16}{3}$$

$$\frac{16}{3}$$

$$x_1 = 48$$

$$\frac{129}{3} = 43$$

$$x_1 = 320$$

$$x_2 = 3$$

1 2 3 4 5 6 7 8 9 10
11 12 13 14 15 16 17 18 19 20

$$\sqrt{x-1} \sqrt{3x+1} = x+3$$

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

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

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

$$3x^2 - 2x - 1 = x^2 + 6x + 9$$

$$2x^2 - 8x - 10 = 0$$

$$x^2 - 4x - 5 = 0$$

$$x_1 =$$

$$D = 16 + 20 = 36$$

$$x+3 > 0$$

$$x > -3$$

$$x_1 = \frac{4+6}{2} = 5$$

$$x_2 = \frac{4-6}{2} = -1$$

$$\frac{2 \cdot 5(5-1)}{5^2 + 5} = \frac{10 \cdot 4}{25 + 5} = \frac{40}{30} = \frac{4}{3}$$