

Распределите уравнения по группам и запишите каждую группу в отдельный столбик.

1) $2x - 1 = 3$ 8) $x^2 + 2\sqrt{3}x + 3 = 0$

2) $2\sqrt{x} - 4 = 0$ 9) $\sqrt{2x - 5} = \sqrt{4x - 7}$

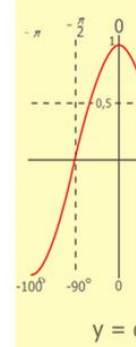
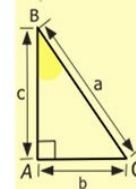
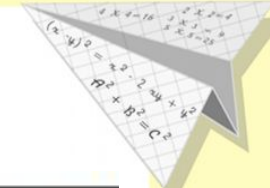
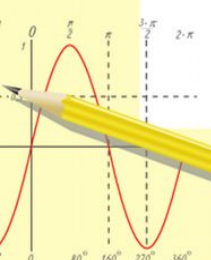
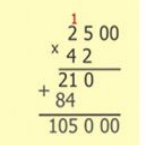
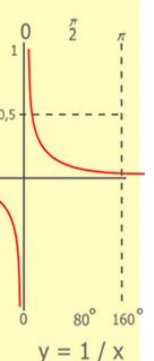
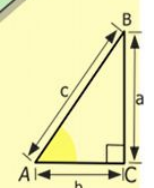
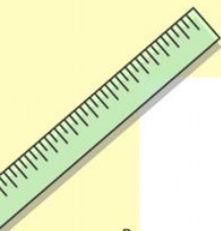
3) $19x - 3x + 4x = 80$ 10) $\sqrt{5x - 16} = x - 2$

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

5) $\sqrt{2x + 1} = 3$

6)

7) $\frac{x - 3 - 1}{2} = 8$



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

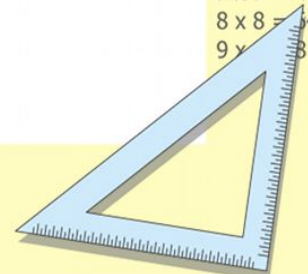
$\sin 90^\circ = 1$



$$\begin{cases} y = \sin 90 \\ x = 25y + 45 \end{cases}$$

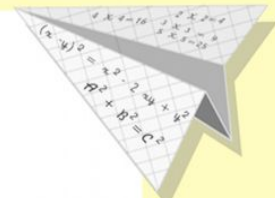
$$\begin{cases} y = 1 \\ x = 25 + 45 \\ \hline x = 70 \end{cases}$$

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



Линейные

Квадратны



I группа

$$2x - 1 = 3$$

$$19x - 3x + 4x = 80$$

$$\frac{x - 3}{2} = 4$$

II группа

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

$$(x - 1)(x + 1) = 8$$

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

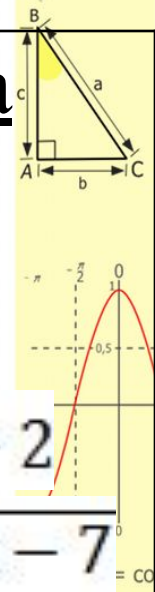
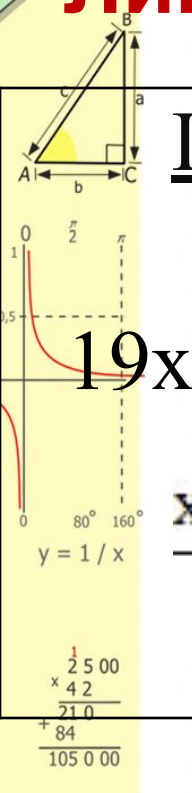
III группа

$$2\sqrt{x} - 4 = 0$$

$$\sqrt{2x + 1} = 3$$

$$\sqrt{5x - 16} = x - 2$$

$$\sqrt{2x - 5} = \sqrt{4x - 7}$$



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$$\sin 90^\circ = 1$$

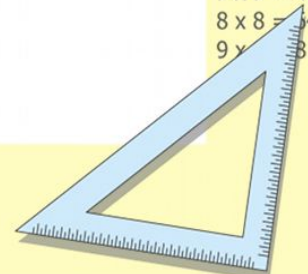


$$\begin{cases} y = \sin 90 \\ x = 25y + 45 \end{cases}$$

$$\begin{cases} y = 1 \\ x = 25 + 45 \end{cases}$$

$$x = 70$$

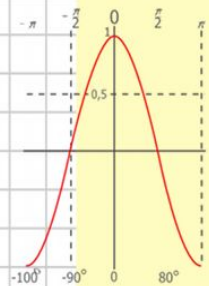
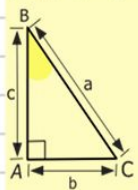
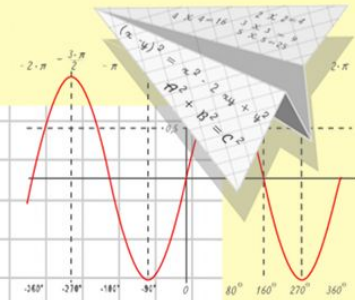
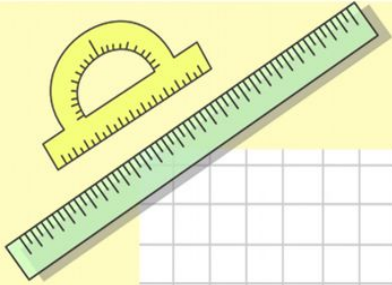
$$(x+y)(x-y) = x^2 - y^2$$



Математик

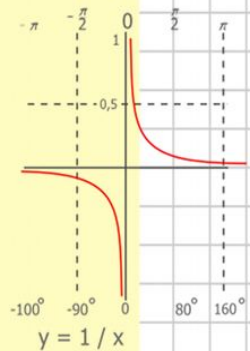
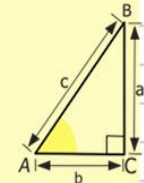
а

Иррациональные уравнения



$y = \cos x$

- $2 \times 2 = 4$
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- $6 \times 6 = 36$
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$$\begin{array}{r} 2500 \\ \times 42 \\ \hline 210 \\ + 84 \\ \hline 10500 \end{array}$$

$$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$

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$$\sin 90^\circ = 1$$

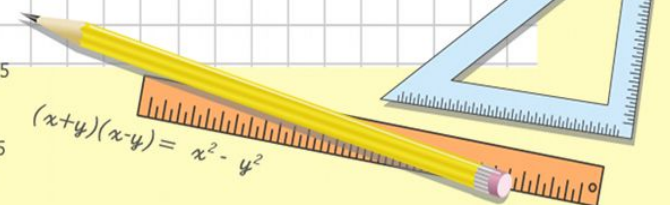


$$\begin{cases} y = \sin 90 \\ x = 25 + 45 \end{cases}$$

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$$\frac{x = 70}{}$$

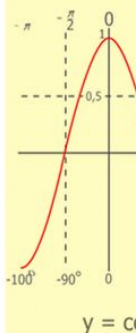
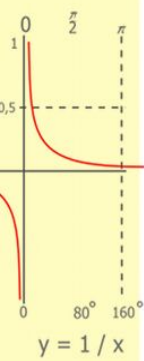
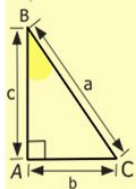
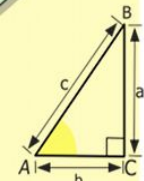
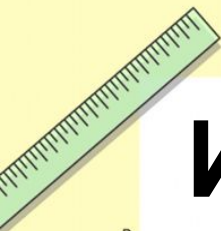
$$(x+y)(x-y) = x^2 - y^2$$



Иррациональные уравнения

Иррациональными называются уравнения, в которых переменная содержится под знаком корня

$$\sqrt{f(x)} = g(x)$$



$\begin{array}{r} 1 \\ 2500 \\ \times 42 \\ \hline 210 \\ + 84 \\ \hline 105000 \end{array}$

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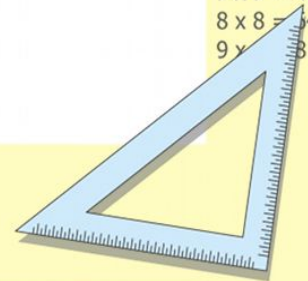
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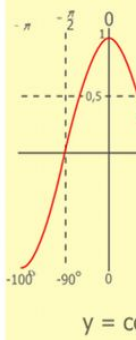
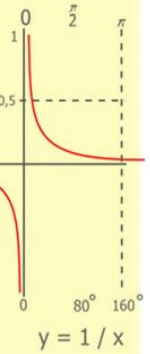
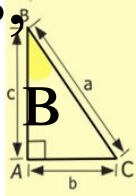
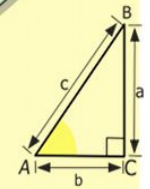
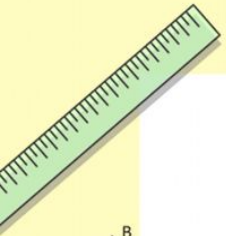
$$\begin{cases} y = \sin 90 \\ x = 25y + 45 \end{cases}$$

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Иррациональные уравнения содержат радикалы. Чтобы избавиться от радикалов, необходимо возвести обе части уравнения в одну и ту же степень с натуральным показателем.



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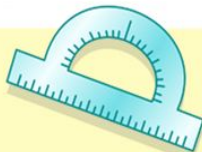
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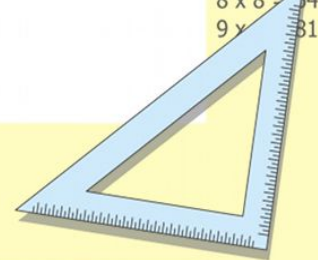
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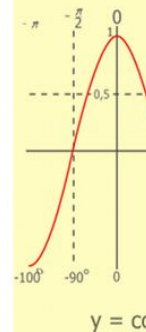
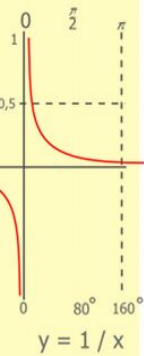
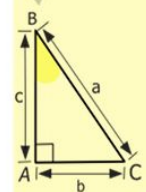
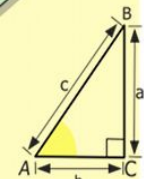
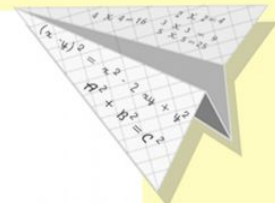
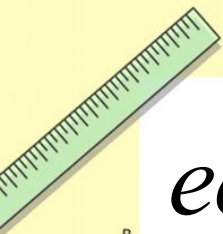
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$$(x+y)(x-y) = x^2 - y^2$$



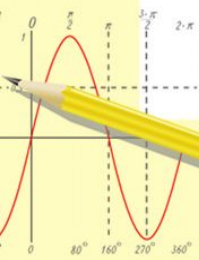
если:

- Возводим в нечетную степень, то получаем равносильное уравнение;
- Возводим в четную степень, то можем получить посторонние корни. В этом случае делаем проверку.



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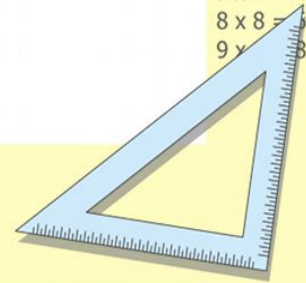
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$$\sin 90^\circ = 1$$



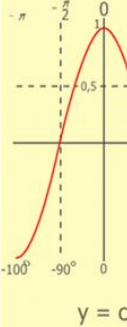
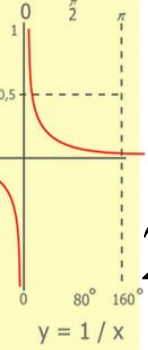
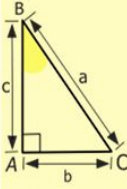
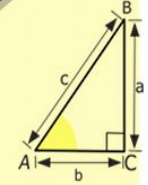
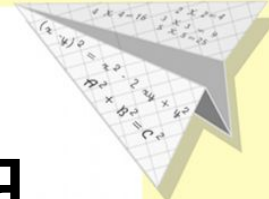
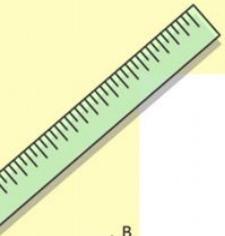
$$\begin{cases} y = \sin 90 \\ x = 25y + 45 \end{cases}$$
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$$(x+y)(x-y) = x^2 - y^2$$



Алгоритм решения иррационального уравнения

1. Возвести обе части уравнения в квадрат.
2. Решить полученное рациональное уравнение.
3. Проверить полученные корни подстановкой в исходное уравнение.
4. Выписать ответ.



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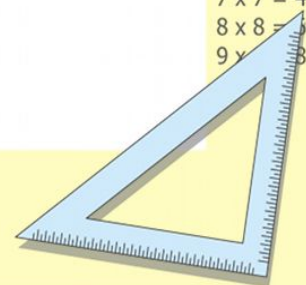
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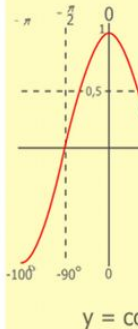
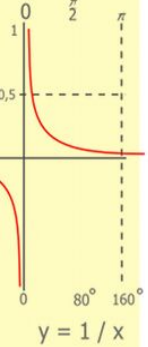
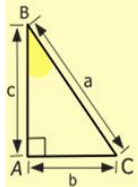
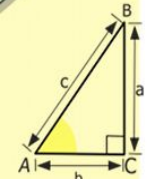
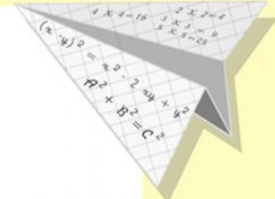
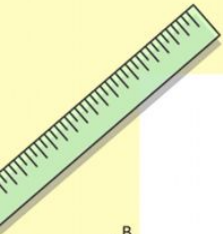
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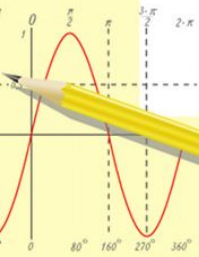
Решить иррациональное уравнение

$$\sqrt{x^2 - x - 2} = 2$$



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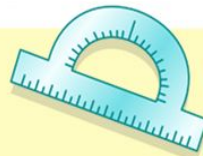
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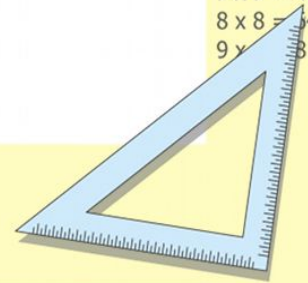
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$$(\sqrt{x^2 - x - 2})^2 = (2)^2$$

$$x^2 - x - 2 = 4$$

$$x^2 - x - 6 = 0$$

$$x_1 = 3$$

$$x_2 = -2$$

Проверка

$$\sqrt{3^2 - 3 - 2} = 2$$

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

Ответ: 3; -2

$$2 = 2$$

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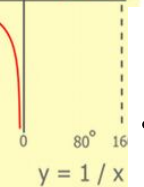
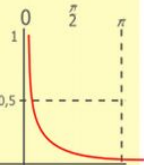
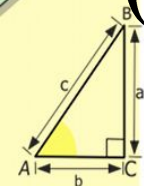
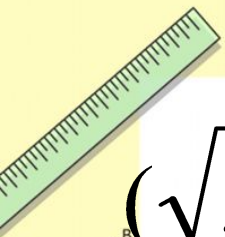
$$\sin 90^\circ = 1$$

$$\begin{cases} y = \sin 90 \\ x = 25y + 45 \end{cases}$$

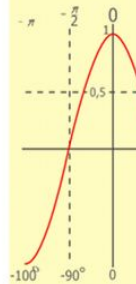
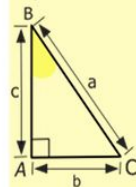
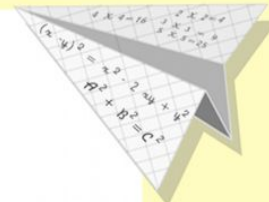
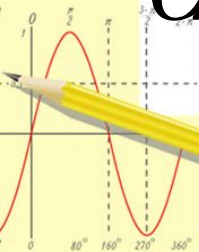
$$\begin{cases} y = 1 \\ x = 25 + 45 \end{cases}$$

$$x = 70$$

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

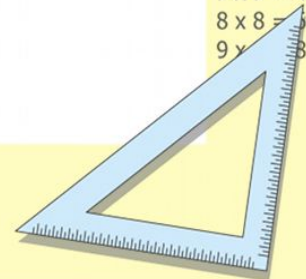


$$\begin{array}{r} 1 \\ 2500 \\ \times 42 \\ \hline 210 \\ + 84 \\ \hline 10500 \end{array}$$



$$y = \cos$$

$$\begin{array}{l} 2 \times 2 = 4 \\ 3 \times 3 = 9 \\ 4 \times 4 = 16 \\ 5 \times 5 = 25 \\ 6 \times 6 = 36 \\ 7 \times 7 = 49 \\ 8 \times 8 = 64 \\ 9 \times 9 = 81 \end{array}$$



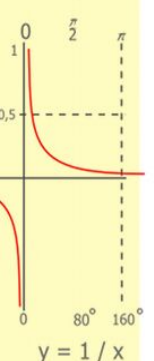
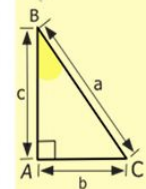
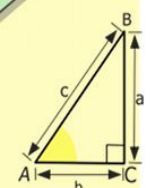
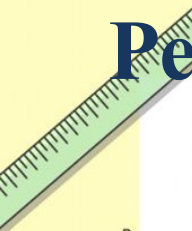
Решите уравнение, если оно имеет корни:

$$2\sqrt{x} - 4 = 0$$

$$\sqrt{2x + 1} = 3$$

$$\sqrt{5x - 16} = x - 2$$

$$\sqrt{2x - 5} = \sqrt{4x - 7}$$



$$\begin{array}{r} 2500 \\ \times 42 \\ \hline 210 \\ + 84 \\ \hline 10500 \end{array}$$

- 2 x 2 = 4
- 3 x 3 = 9
- 4 x 4 = 16
- 5 x 5 = 25
- 6 x 6 = 36
- 7 x 7 = 49
- 8 x 8 = 64
- 9 x 9 = 81



$$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$

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

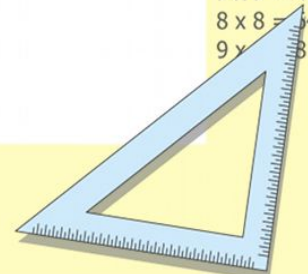
$\sin 90^\circ = 1$



$$\begin{cases} y = \sin 90 \\ x = 25y + 45 \end{cases}$$

$$\begin{cases} y = 1 \\ x = 25 + 45 \\ \hline x = 70 \end{cases}$$

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



Приложение 1. Условия заданий (На правой части доски.)

Группа А

1. Решить уравнение $\sqrt[5]{x^3 - 5} + 2 = 0$.
2. Решить уравнение $x^2 - 6x + \sqrt[4]{x-3} = \sqrt[4]{x-3} - 8$.
3. Решить уравнение $\sqrt{x-2} \cdot \sqrt{x-5} = 2$.
4. Решить уравнение $\sqrt{2x^2 - 10x - 3} = x - 2$.
5. Решить неравенство $\sqrt{x+1} > \sqrt{x-1}$.
6. Решить неравенство $\sqrt{x^2 - 3x + 1} \geq \sqrt{3x - 4}$.
7. Решить неравенство $\sqrt{x^2 - 3x + 2} > x + 3$.

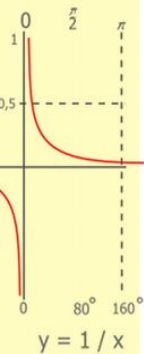
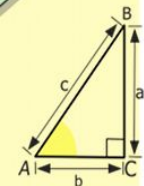
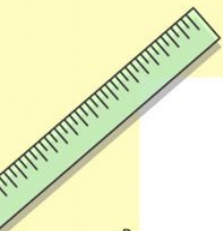
Группа В

1. Найти сумму корней уравнения $x^2 + x = \sqrt{18 - x - x^2} - 2$.
2. Решить уравнение $\sqrt{x+5} + 4\sqrt{x+1} + \sqrt{x+2} + 2\sqrt{x+1} = 7$.
3. Найти сумму корней уравнения $\sqrt[3]{2-x} = 1 - \sqrt{x-1}$.
4. Решить неравенство $\sqrt{7x - 3x^2 + 6} \geq -1$.
5. Решить неравенство $\sqrt{4x^2 - 12x + 9} \geq 2$.

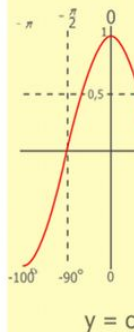
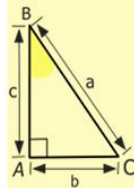
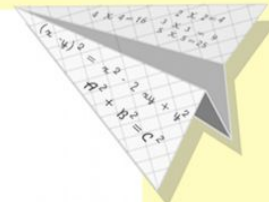
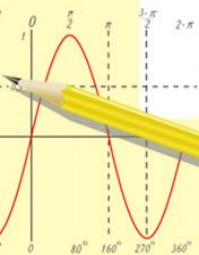
Группа С

1. Найти меньший корень уравнения $\sqrt[3]{x+45} - \sqrt[3]{x-16} = 1$.
2. Найти сумму корней (или корень, если он единственный) урав-

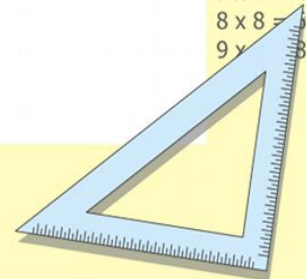
нения $\frac{x^2 - 2x - 2}{\sqrt{x-2}} - 3\sqrt{x-2} + 2\sqrt{x^2 - 2x - 2} = 0$.



$$\begin{array}{r} 2500 \\ \times 42 \\ \hline 2100 \\ + 840 \\ \hline 105000 \end{array}$$



$$\begin{array}{l} 2 \times 2 = 4 \\ 3 \times 3 = 9 \\ 4 \times 4 = 16 \\ 5 \times 5 = 25 \\ 6 \times 6 = 36 \\ 7 \times 7 = 49 \\ 8 \times 8 = 64 \\ 9 \times 9 = 81 \end{array}$$



Домашнее задание

1) Решите уравнения:

a) $\sqrt{x^2 - 4x} = \sqrt{6 - 3x}$;

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

a) $\sqrt{x^2 - 10} = \sqrt{-3x}$;

b) $\sqrt{2x + 4} = x - 2$

2) Определите, при каких значениях x :

Функция
принимает значение, равное 2.

$$y = \sqrt[3]{x^2 - 1}$$

Функция
принимает значение, равное 3.

$$y = \sqrt[3]{x^2 + 2}$$