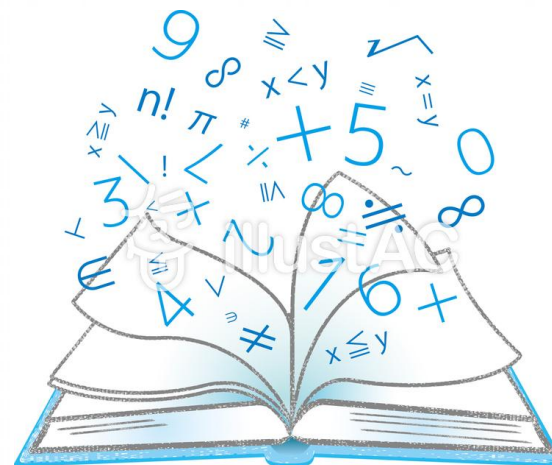
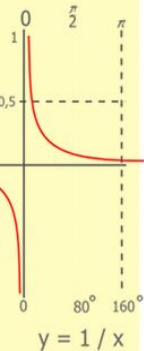
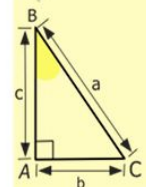
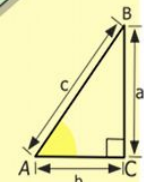
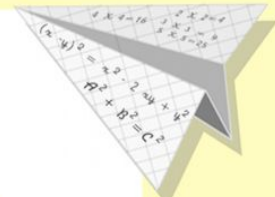
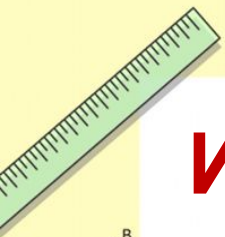


# Иррациональные уравнения



$$\begin{array}{r} 2500 \\ \times 42 \\ \hline 2100 \\ + 8400 \\ \hline 105000 \end{array}$$

Основы школьного курса математики

2 курс, группа УМ-2-19

12.01.2021

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



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

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

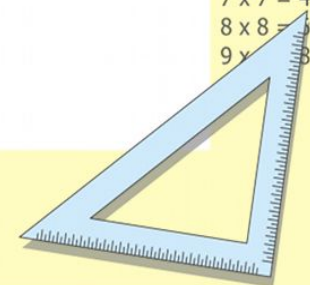
$$\sin 90^\circ = 1$$



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

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

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



# Повторение

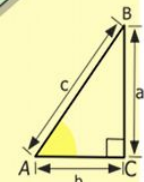
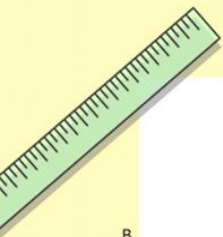
Среди пар уравнений найдите пары равносильных:

а)  $5x + 10 = 0$  и  $x + 2 = 0$ ;

б)  $x = 5$  и  $x^2 = 25$ ;

в)  $\sqrt{x^2 - 2x + 1} = 3$  и  $|x - 1| = 3$ ;

г)  $\sqrt{x} = -4$  и  $x^2 + 1 = 0$ .



$$\begin{array}{r} 2500 \\ \times 42 \\ \hline 2100 \\ + 8400 \\ \hline 105000 \end{array}$$



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

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

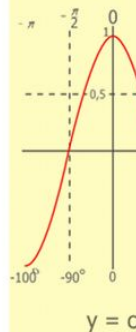
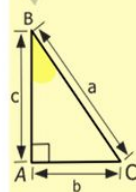
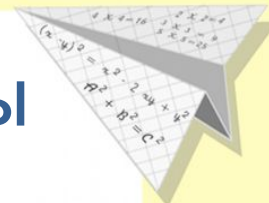
$$\sin 90^\circ = 1$$



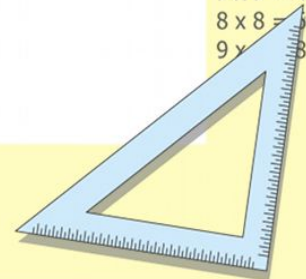
$$\begin{cases} y = \sin 90 \\ x = 25y + 45 \end{cases}$$

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

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



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



# Повторение

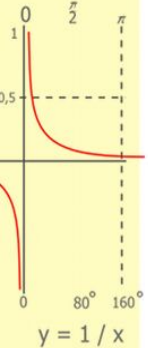
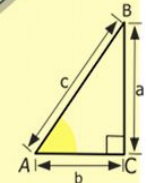
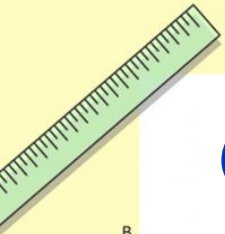
Определите, какое из двух уравнений является следствием другого:

а)  $x - 5 = 0$  и  $x(x - 5) = 0$ ;

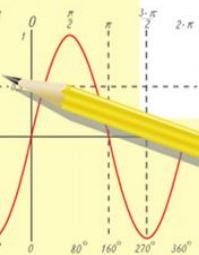
б)  $x = -3$  и  $x^2 = 25$ ;

в)  $\frac{x^2 - 3x}{x} = 0$  и  $x^2 - 3x = 0$ ;

г)  $\frac{x - 7}{x} = 0$  и  $x - 7 = 0$ .



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



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

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

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

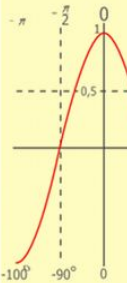
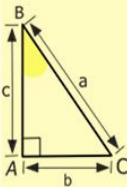
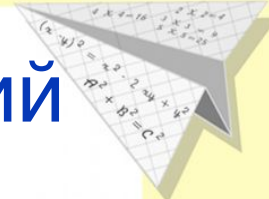


$$\begin{cases} y = \sin 90 \\ x = 25y + 45 \end{cases}$$

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

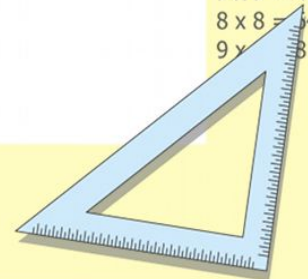
$$x = 70$$

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



$$y = \cos$$

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

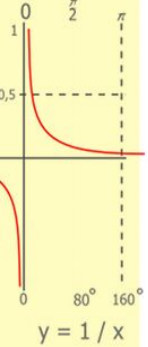
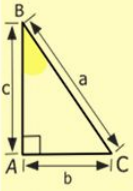
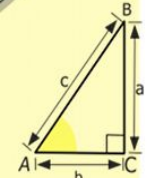
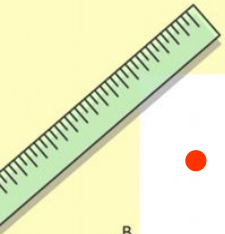


# Повторение

- Арифметическим квадратным корнем из числа **a** называется неотрицательное число **b**, квадрат которого равен **a**

$$\sqrt{a} = b$$

, где  $b \geq 0$ , если  $a = b^2$



$$\begin{array}{r} 2500 \\ \times 42 \\ \hline 2100 \\ + 8400 \\ \hline 105000 \end{array}$$

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



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

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

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

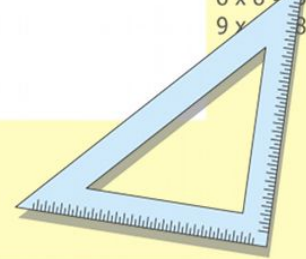


$$\begin{cases} y = \sin 90 \\ x = 25y + 45 \end{cases}$$

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

$$x = 70$$

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

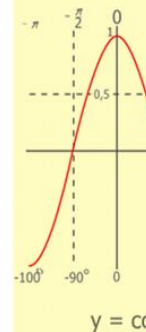
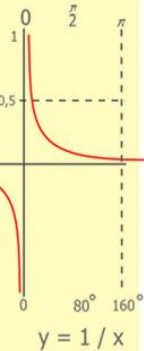
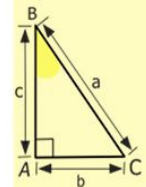
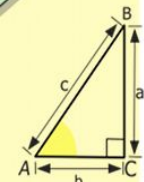
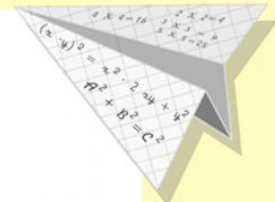
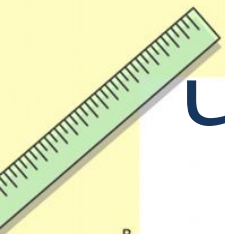


# Что общего в этих уравнениях?

$$y + \sqrt{y^2 + 9} = 2$$

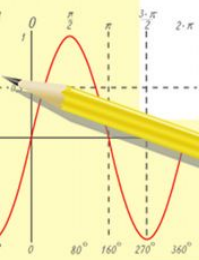
$$\sqrt{x + 1} = x - 1$$

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



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

- $2 \times 2 = 4$
- $3 \times 3 = 9$
- $4 \times 4 = 16$
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$$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$

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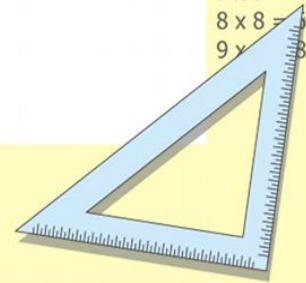
$$\sin 90^\circ = 1$$



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

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

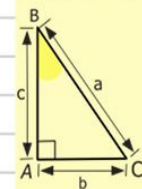
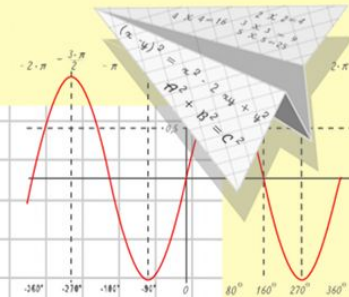
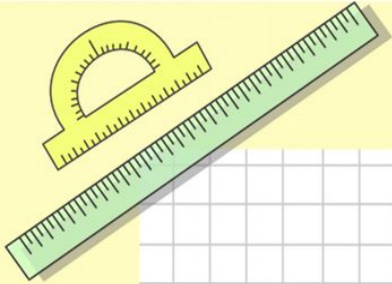
$$(x+y)(x-y) = x^2 - y^2$$



# Математик

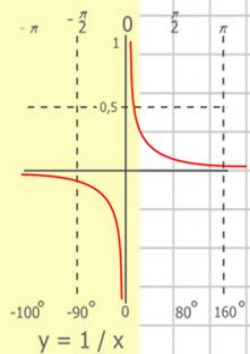
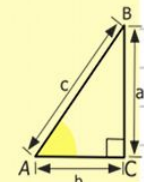
## а

# Иррациональные уравнения



$y = \cos x$

- $2 \times 2 = 4$
- $3 \times 3 = 9$
- $4 \times 4 = 16$
- $5 \times 5 = 25$
- $6 \times 6 = 36$
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- $8 \times 8 = 64$



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



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

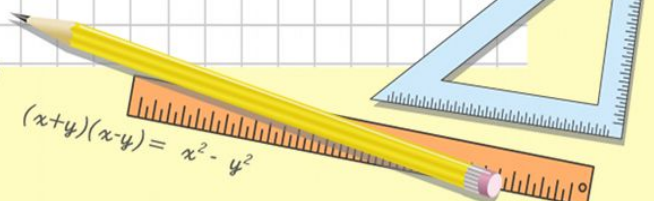
$$\frac{a}{c} + \frac{b}{c} = \frac{a+b}{c}$$



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



$$\begin{cases} y = \sin 90 \\ x = 25y + 45 \\ y = 1 \\ x = 25 + 45 \\ \hline x = 70 \end{cases}$$



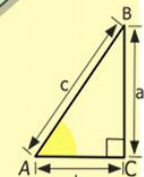
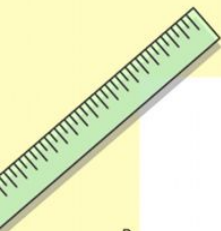
$$(x+y)(x-y) = x^2 - y^2$$

# Определение

Иррациональными называются уравнения, в которых переменная содержится под знаком корня (радикала).

Примеры:

$$\sqrt{x + 12} - x = 0, \quad \sqrt[3]{x - 1} = x.$$



$$\begin{array}{r} 2500 \\ \times 42 \\ \hline 2100 \\ + 8400 \\ \hline 105000 \end{array}$$



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

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

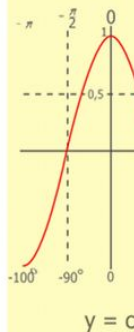
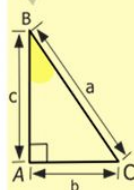
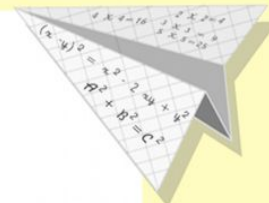
$$\sin 90^\circ = 1$$



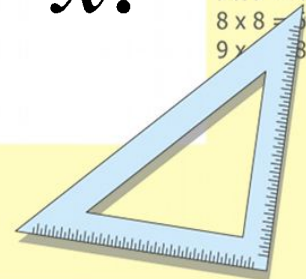
$$\begin{cases} y = \sin 90 \\ x = 25y + 45 \end{cases}$$

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

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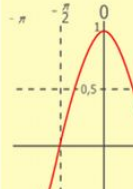
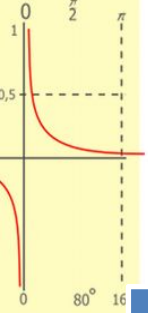
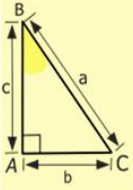
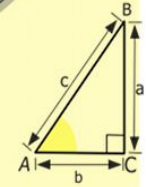
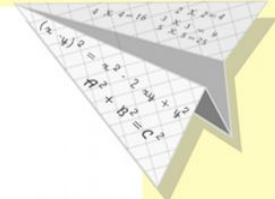
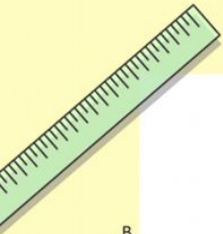
# План изучения темы

## Иррациональные уравнения

Определение

Простейшие уравнения

Сложные уравнения

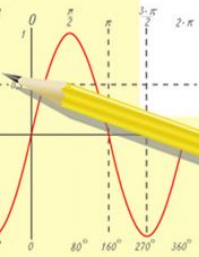


$$y = 1/x$$

$$y = \cos x$$

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

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



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

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

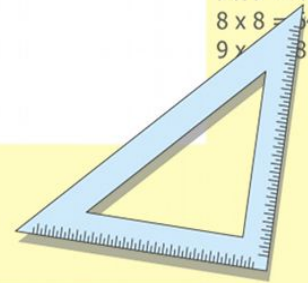
$$\sin 90^\circ = 1$$



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

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

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





# Какие из уравнений не являются иррациональными?

$$a) 5 + \sqrt{x - 3} = x$$

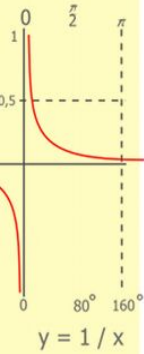
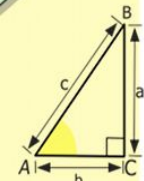
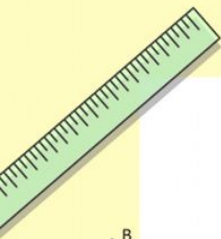
$$б) \sqrt{2x + 7} = 2x$$

$$в) \sqrt{x - 1} + \sqrt{x + 2} = 4$$

$$г) \sqrt{5x^2 + x} - \sqrt{2} = 0$$

$$д) \sqrt{x - 7} + \sqrt{8} = 0$$

$$е) \sqrt[3]{3x + 6} = -6$$



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



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

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

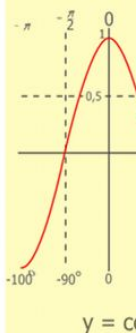
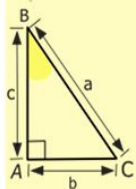
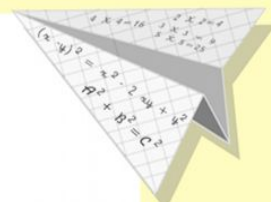
$$\sin 90^\circ = 1$$



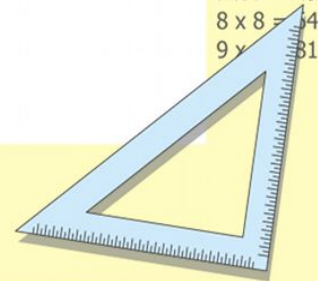
$$\begin{cases} y = \sin 90 \\ x = 25y + 45 \end{cases}$$

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

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



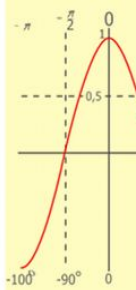
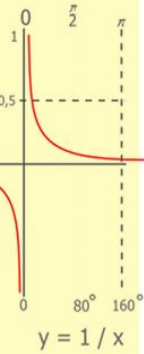
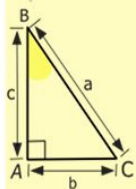
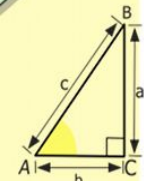
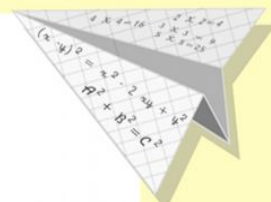
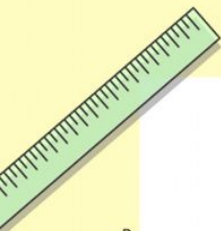
- 2 x 2 = 4
- 3 x 3 = 9
- 4 x 4 = 16
- 5 x 5 = 25
- 6 x 6 = 36
- 7 x 7 = 49
- 8 x 8 = 64
- 9 x 9 = 81



# Идея решения

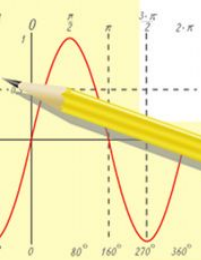
Основная идея решения иррационального уравнения состоит в сведении его к рациональному алгебраическому уравнению, которое либо равносильно исходному иррациональному уравнению, либо является его следствием.

Главный способ избавиться от корня и получить рациональное уравнение – возведение обеих частей уравнения в одну и ту же степень, которую имеет корень, содержащий неизвестное.



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

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



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

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

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



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

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

$$x = 70$$

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

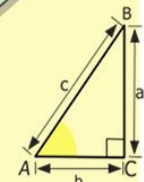
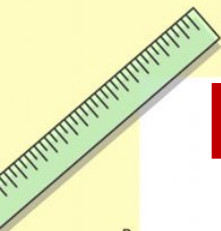


# Простейшие иррациональные уравнения

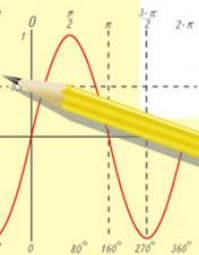
$$\sqrt{f(x)} = a$$

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

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



$$\begin{array}{r} \frac{1}{2} 500 \\ \times 42 \\ \hline 210 \\ + 84 \\ \hline 10500 \end{array}$$



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

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

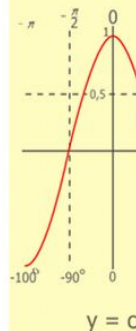
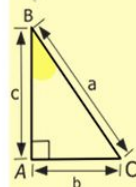
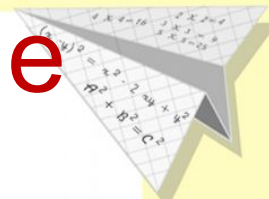
$$\sin 90^\circ = 1$$



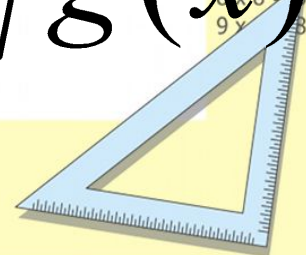
$$\begin{cases} y = \sin 90 \\ x = 25y + 45 \end{cases}$$

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

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



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

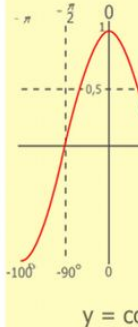
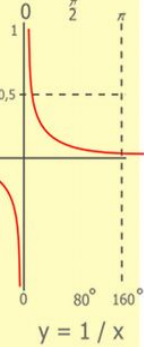
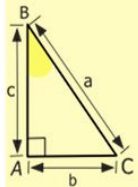
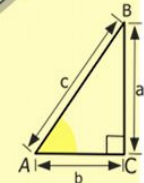
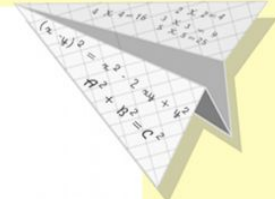
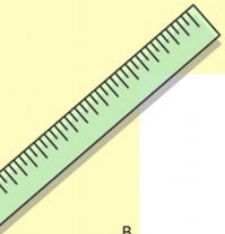


# Запомни!

## При возведении обеих частей уравнения

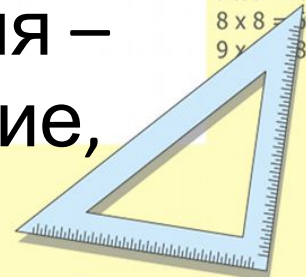
• в **четную** степень (показатель корня – **четное** число) – возможно появление постороннего корня (проверка необходима)

• в **нечетную** степень (показатель корня – **нечетное** число) – получается уравнение, равносильное исходному (проверка не



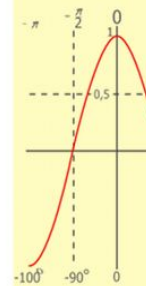
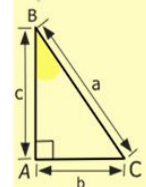
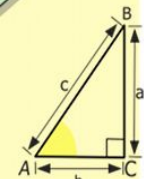
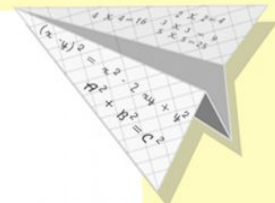
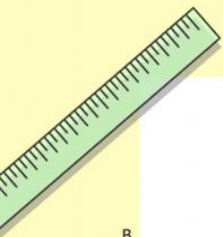
$$\begin{array}{r} 1\ 2\ 5\ 00 \\ \times 42 \\ \hline 210 \\ + 84 \\ \hline 105\ 000 \end{array}$$

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



# Запомни!

Решая иррациональные уравнения с помощью **равносильных преобразований** (проверка не нужна)



$$\begin{array}{r} \frac{1}{2} 500 \\ \times 42 \\ \hline 210 \\ + 84 \\ \hline 10500 \end{array}$$

- $2 \times 2 = 4$
- $3 \times 3 = 9$
- $4 \times 4 = 16$
- $5 \times 5 = 25$
- $6 \times 6 = 36$
- $7 \times 7 = 49$
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$$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$

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

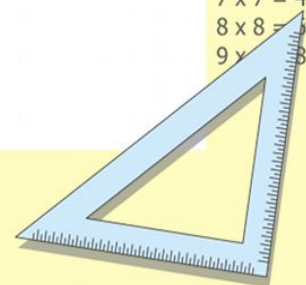
$$\sin 90^\circ = 1$$



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

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

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



# Решение уравнения

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

1)  $a < 0$ , то  $\sqrt{f(x)} = a$  уравнение корней не имеет

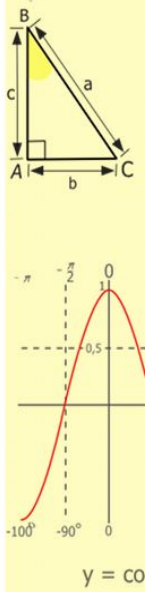
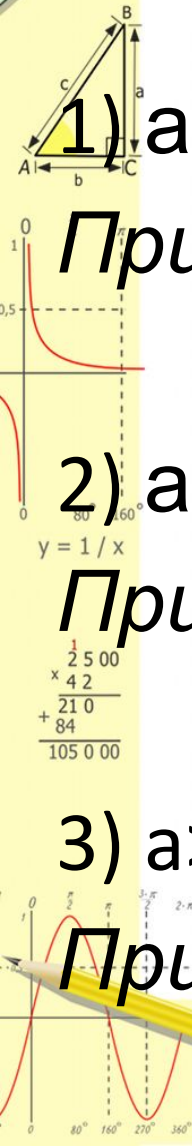
Пример:  $\sqrt{2x - 5} = -3$

2)  $a = 0$ , то  $\sqrt{f(x)} = 0 \Leftrightarrow f(x) = 0$

Пример:  $\sqrt{x - 7} = 0 \Leftrightarrow x - 7 = 0 \Leftrightarrow x = 7$

3)  $a > 0$ , то  $\sqrt{f(x)} = a \Leftrightarrow (\sqrt{f(x)})^2 = a^2 \Leftrightarrow f(x) = a^2$

Пример:  $\sqrt{9 - x} = 10 \Leftrightarrow 9 - x = 100 \Leftrightarrow x = -91$

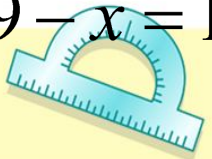


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- 6 x 6 = 36
- 7 x 7 = 49
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$$\frac{a}{A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$

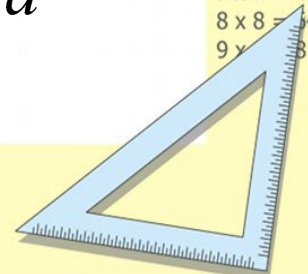
$$\frac{a}{c} + \frac{b}{c} = \frac{a+b}{c}$$

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



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

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



# Решение уравнения

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

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

**1 способ**

**2 способ**

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

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

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

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

$$x_1 = -1$$

$$x_2 = 2$$

**проверка**

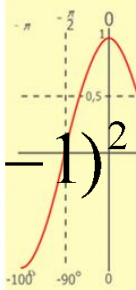
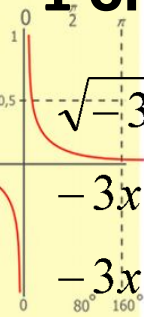
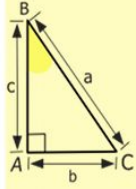
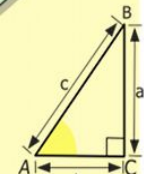
при  $x = -1$   $\sqrt{-3 \cdot (-1) + 3} \neq -1 - 1$

при  $x = 2$   $\sqrt{-3 \cdot 2 + 3} = 2 - 1$

**ответ : 2**

$$\sqrt{-3x + 3} = x - 1 \Leftrightarrow \begin{cases} x - 1 \geq 0 \\ -3x + 3 = (x - 1)^2 \end{cases}$$

$$\Leftrightarrow \begin{cases} x \geq 1 \\ x_1 = -1 \text{ ответ : 2} \\ x_2 = 2 \end{cases}$$



1	2	3	4	5
1	4	9	16	25
1	2	3	4	5
1	4	9	16	25
1	2	3	4	5
1	4	9	16	25

2 x 2 = 4
3 x 3 = 9
4 x 4 = 16
5 x 5 = 25
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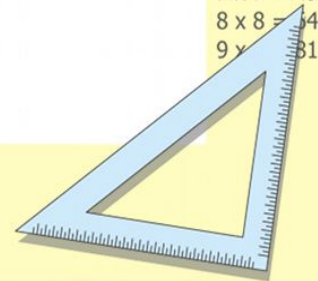
$\sin 90^\circ = 1$



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

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

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



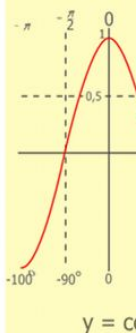
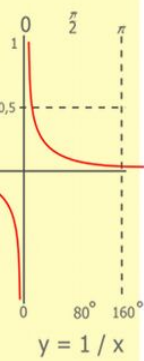
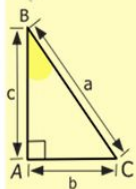
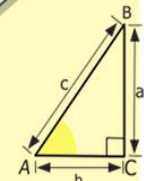
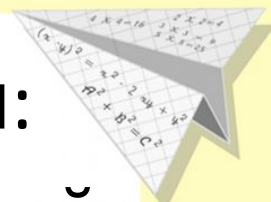
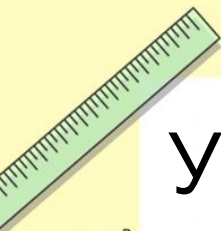
# Вывод

Уравнение вида \_\_\_\_\_ решается:

1) Возведением  $\sqrt{f(x)} = \pm g(x)$  в квадрат обеих частей равенства с последующей проверкой;

1) Осуществляется переход к системе равносильной данному уравнению, т. е.

$$\sqrt{f(x)} = g(x) \Leftrightarrow \begin{cases} f(x) = g^2(x), \\ g(x) \geq 0. \end{cases}$$



$$\begin{array}{r} 12500 \\ \times 42 \\ \hline 210 \\ + 84 \\ \hline 105000 \end{array}$$

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



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

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

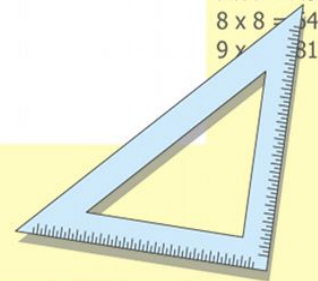
$$\sin 90^\circ = 1$$



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

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

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





# Решение уравнения

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

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

**1 способ**

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

$$x+3 = 5-x$$

$$2x = 2$$

$$x = 1$$

**проверка**

при  $x = 1$   $\sqrt{1+3} = \sqrt{5-1}$

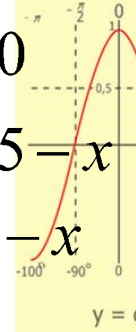
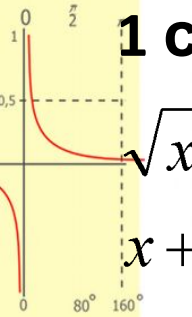
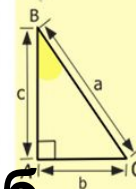
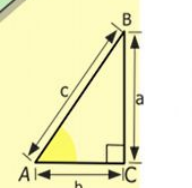
**ответ: 1**

**2 способ**

$$\sqrt{x+3} = \sqrt{5-x} \Leftrightarrow \begin{cases} x+3 \geq 0 \\ x+3 = 5-x \end{cases}$$

$$\Leftrightarrow \begin{cases} x \geq -3 \\ x = 1 \end{cases} \text{ ответ: } 1.$$

$$\Leftrightarrow \begin{cases} x \leq 5 \\ x = 1 \end{cases} \text{ ответ: } 1.$$



$\frac{1}{2} \begin{array}{r} 2500 \\ \times 42 \\ \hline 210 \\ + 84 \\ \hline 105000 \end{array}$

- 2 x 2 = 4
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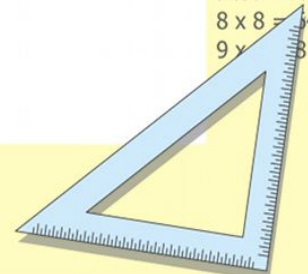
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$$(x+y)(x-y) = x^2 - y^2$$



# Вывод

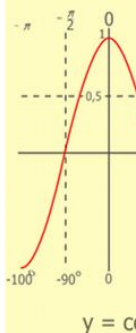
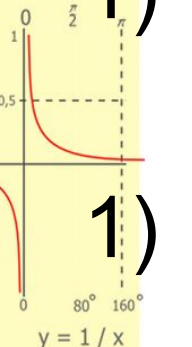
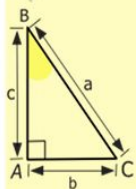
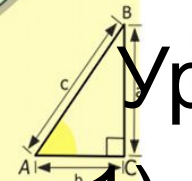
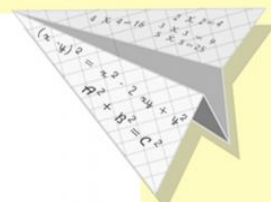
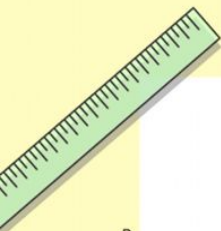
Уравнение вида  $\sqrt{f(x)} = \sqrt{g(x)}$  решается:

1) Возведением в квадрат обеих частей равенства с последующей проверкой;

1) Осуществляется переход к системе равносильной данному уравнению, т.е.

$$\sqrt{f(x)} = \sqrt{g(x)} \Leftrightarrow \begin{cases} f(x) = g(x), \\ f(x) \geq 0, \end{cases}$$

$$\sqrt{f(x)} = \sqrt{g(x)} \Leftrightarrow \begin{cases} f(x) = g(x), \\ g(x) \geq 0. \end{cases}$$



$\begin{array}{r} 2500 \\ \times 42 \\ \hline 2100 \\ + 8400 \\ \hline 105000 \end{array}$

$2 \times 2 = 4$   
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$$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$

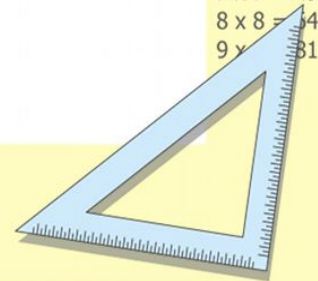
$$\frac{a}{c} + \frac{b}{c} = \frac{a+b}{c}$$

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



$$\begin{cases} y = \sin 90 \\ y = 25y + 45 \\ y = 1 \\ x = 25 + 45 \\ \hline x = 70 \end{cases}$$

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



# Домашнее задание

I

$$\sqrt{x+1} = x-5$$

$$\sqrt[3]{x^2-28} = 2$$

II

$$\sqrt{x-6} = \sqrt{4-x}$$

$$\sqrt[3]{x^2-8} = 2$$

III

$$\sqrt{x-2} = x-8$$

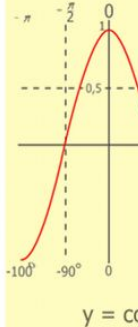
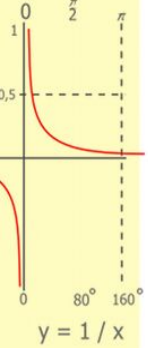
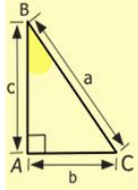
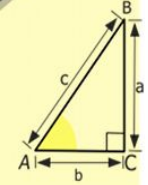
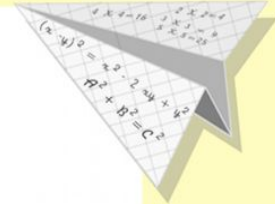
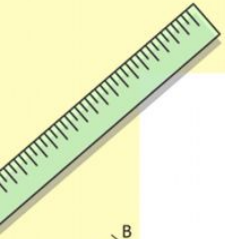
$$\sqrt[3]{x+12} = 4$$

IV

$$\sqrt{x^4+19} = 10$$

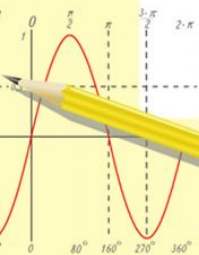
$$\sqrt[3]{x-1} = -1$$

# Домашнее задание



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

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



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

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

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



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

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

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

