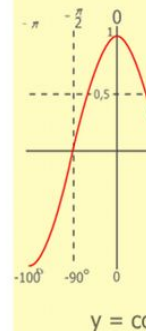
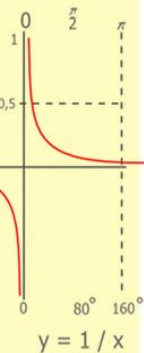
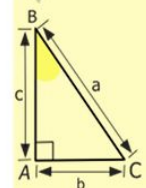
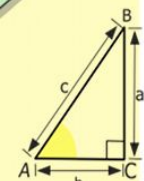
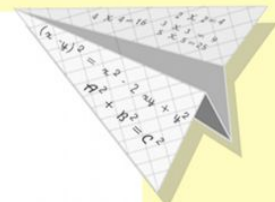
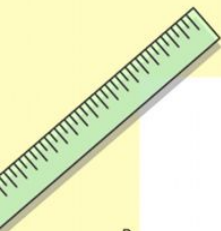


МЕТОДЫ РЕШЕНИЯ ТРИГОНОМЕТРИЧЕСКИХ УРАВНЕНИЙ

Учитель математики
МБОУ СОШ №9 г. Уфы
В.М.Хабибуллина



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

- 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



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

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

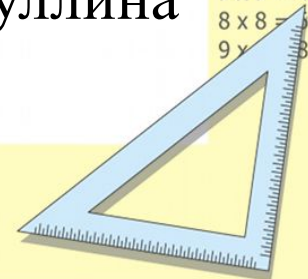
$$\sin 90^\circ = 1$$



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

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

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





МЕТОДЫ

• сведения уравнения к квадратному




РЕШЕНИЯ

• разложения на множители



УРАВНЕНИЙ

• решение однородных уравнений



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

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

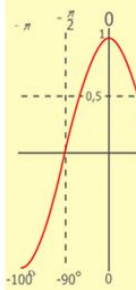
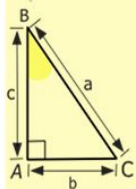
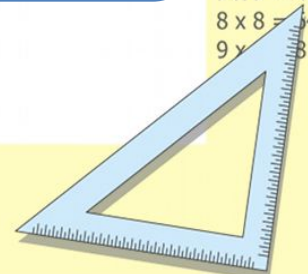
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$(x+y)(x-y) = x^2 - y^2$



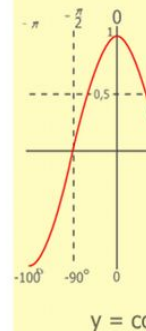
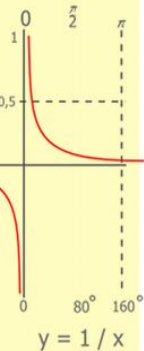
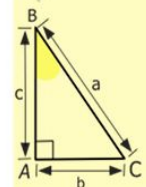
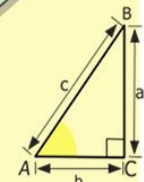
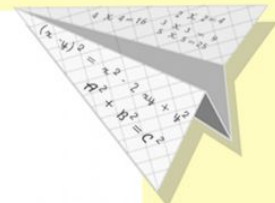
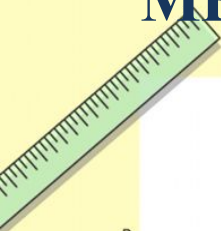
$y = \cos$

$2 \times 2 = 4$
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МЕТОД СВЕДЕНИЯ УРАВНЕНИЯ К КВАДРАТНОМУ

$$\underline{3\sin^2 x - 5\sin x - 2 = 0}$$

$$\underline{2\sin^2 x + 3\cos x = 0}$$



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

- $2 \times 2 = 4$
- $3 \times 3 = 9$
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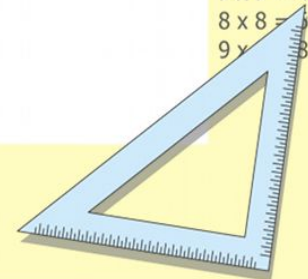
$$\sin 90^\circ = 1$$



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

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

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



МЕТОД СВЕДЕНИЯ УРАВНЕНИЯ К КВАДРАТНОМУ

$$3 \sin^2 x - 5 \sin x - 2 = 0$$

$$\sin x = t$$

$$\sin x = -\frac{1}{3}$$

$$3t^2 - 5t - 2 = 0$$

$$x = (-1)^{n+1} \arcsin \frac{1}{3} + \pi n, n \in \mathbb{Z}$$

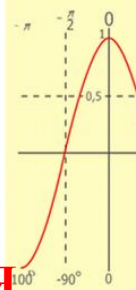
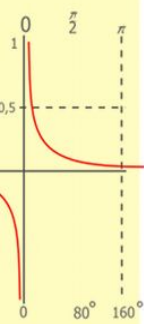
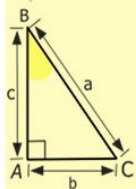
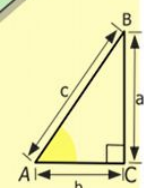
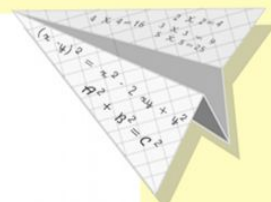
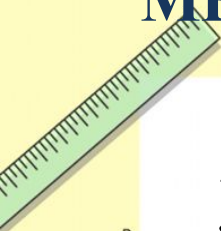
$$D = 25 + 24 = 49$$

$$t = -\frac{1}{3}$$

$$\sin x = 2 \rightarrow \text{НЕ ИМЕЕТ РЕШЕНИЯ}$$

$$t = 2$$

ОТВЕТ: $x = (-1)^{n+1} \arcsin \frac{1}{3} + \pi n, n \in \mathbb{Z}$



$\frac{1}{2} 5 00$
 $\times 4 2$
 \hline
 $21 0$
 $+ 84$
 \hline
 $105 0 00$

$2 \times 2 = 4$
 $3 \times 3 = 9$
 $4 \times 4 = 16$
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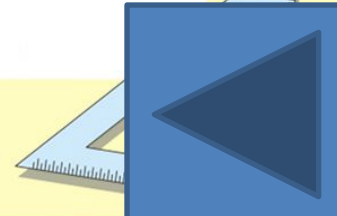
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$$\begin{cases} y = \sin 90 \\ x = 25y + 45 \end{cases}$$

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

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



МЕТОД СВЕДЕНИЯ УРАВНЕНИЯ К КВАДРАТНОМУ

$$2 \sin^2 x + 3 \cos x = 0$$

$$D = 9 + 16 = 25$$

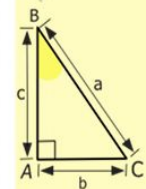
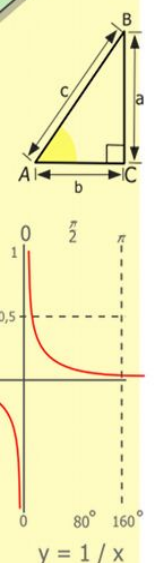
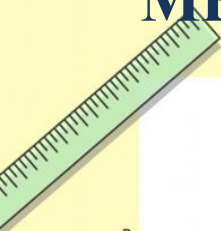
$$2(1 - \cos^2 x) + 3 \cos x = 0 \quad t = -\frac{1}{2}$$

$$2 - 2 \cos^2 x + 3 \cos x = 0 \quad t = 2$$

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

$$\cos x = t$$

$$2t^2 - 3t - 2 = 0$$



$\frac{1}{2} 5 00$
 $\times 4 2$
 $\hline 21 0$
 $+ 84$
 $\hline 105 0 00$

- 2 x 2 = 4
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$$\frac{a}{c} + \frac{b}{c} = \frac{a+b}{c}$$

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

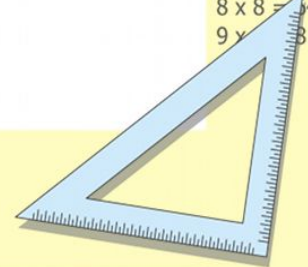


$$\begin{cases} y = \sin 90 \\ x = 25y + 45 \end{cases}$$

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

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

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



МЕТОД СВЕДЕНИЯ УРАВНЕНИЯ К КВАДРАТНОМУ

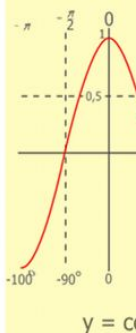
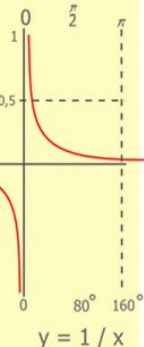
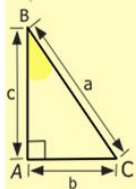
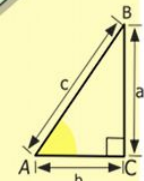
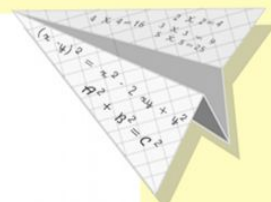
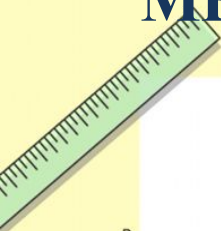
$$\cos x = 2 \rightarrow \text{НЕ ИМЕЕТ РЕШЕНИЯ}$$

$$\cos x = -\frac{1}{2}$$

$$x = \pm \left(\pi - \frac{\pi}{3} \right) + 2\pi n, n \in \mathbb{Z}$$

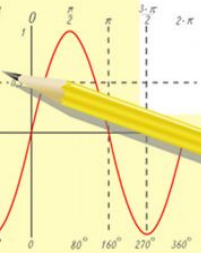
$$x = \pm \frac{2\pi}{3} + 2\pi n, n \in \mathbb{Z}$$

$$\text{ОТВЕТ: } x = \pm \frac{2\pi}{3} + 2\pi n, n \in \mathbb{Z}$$



$\frac{1}{2} 5 00$
 $\times 4 2$
 \hline
 $2 1 0$
 $+ 8 4$
 \hline
 $1 0 5 0 0 0$

$2 \times 2 = 4$
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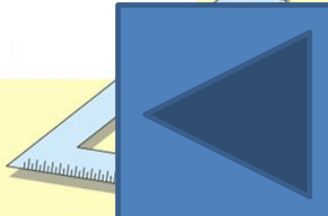
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$$\begin{cases} y = \sin 90 \\ x = 25y + 45 \end{cases}$$

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



МЕТОД РАЗЛОЖЕНИЯ НА МНОЖИТЕЛИ

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

$$\cos x (2 \cos x + \sqrt{3}) = 0$$

$$\cos x = 0$$

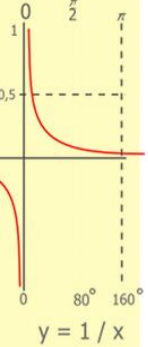
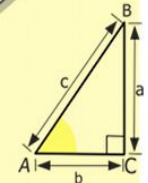
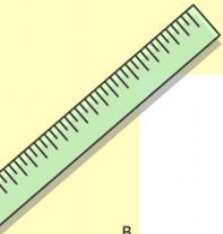
$$x_1 = \frac{\pi}{2} + \pi n, n \in \mathbb{Z}$$

$$2\cos x + \sqrt{3} = 0$$

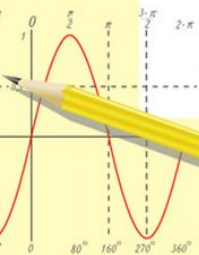
$$2\cos x + \sqrt{3} = 0$$

$$x_2 = \pm \left(\pi - \frac{\pi}{6} \right) + 2\pi k$$

$$x_2 = \pm \frac{5\pi}{6} + 2\pi k, k \in \mathbb{Z}$$



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



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

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

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

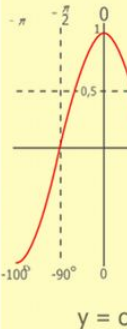
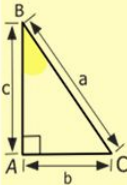
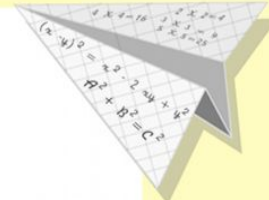


$$\begin{cases} y = \sin 90 \\ x = 25y + 45 \end{cases}$$

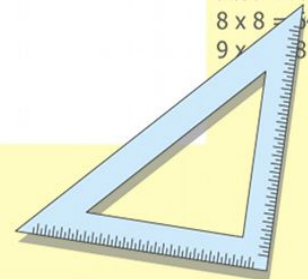
$$\begin{cases} y = 1 \\ x = 25 + 45 \end{cases}$$

$$x = 70$$

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



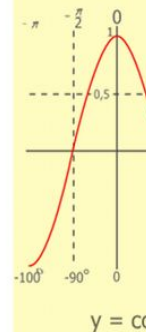
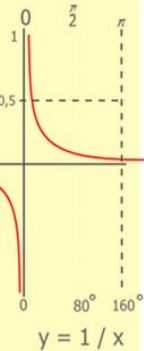
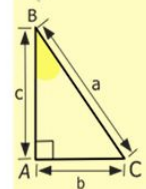
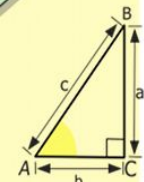
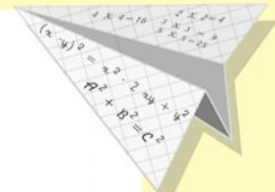
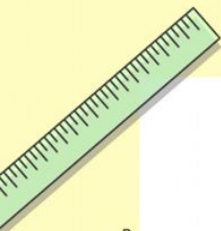
$$\begin{array}{l} 2 \times 2 = 4 \\ 3 \times 3 = 9 \\ 4 \times 4 = 16 \\ 5 \times 5 = 25 \\ 6 \times 6 = 36 \\ 7 \times 7 = 49 \\ 8 \times 8 = 64 \\ 9 \times 9 = 81 \end{array}$$



МЕТОД РАЗЛОЖЕНИЯ НА МНОЖИТЕЛИ

ОТВЕТ: $x_1 = \frac{\pi}{2} + \pi n, n \in \mathbb{Z}$

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

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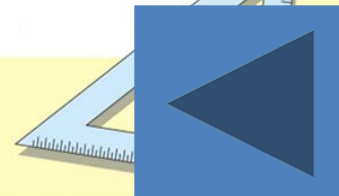
$$\sin 90^\circ = 1$$



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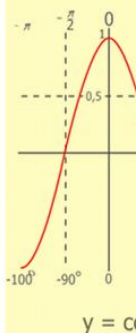
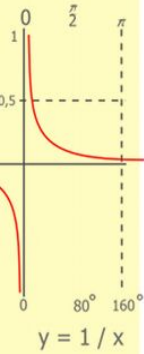
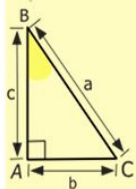
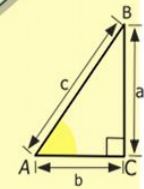
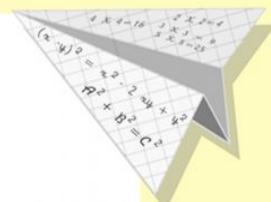
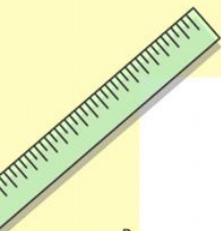
ОПРЕДЕЛЕНИЕ:

$$\text{Уравнение вида } a\sin x + b\cos x = 0$$

называют *однородным* тригонометрическим уравнением *первой* степени.

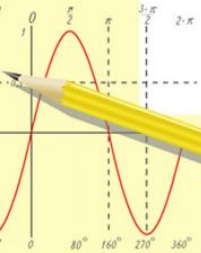
Алгоритм решения однородного тригонометрического уравнения первой степени:

Деление обеих частей уравнения на $\cos x$, $\cos x \neq 0$.



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

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 $5 \times 5 = 25$
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 $7 \times 7 = 49$
 $8 \times 8 = 64$
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$$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$

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

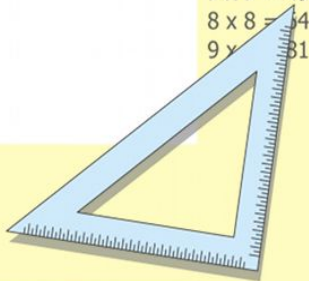
$$\sin 90^\circ = 1$$



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

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

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

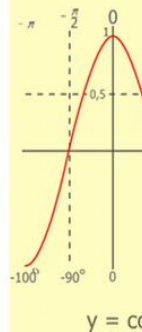
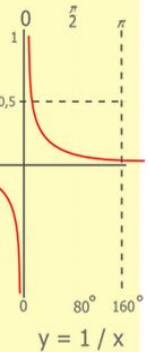
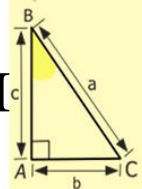
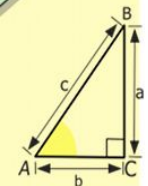
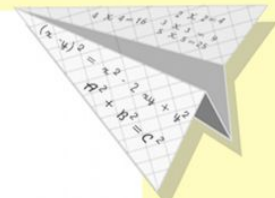
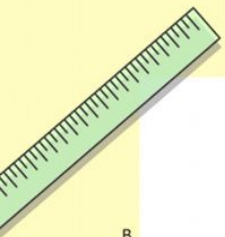


ОПРЕДЕЛЕНИЕ:

Уравнение вида

$$a \sin^2 x + b \sin x \cos x + c \cos^2 x = 0$$

называют *однородным* тригонометрическим уравнением *второй* степени.



$$\begin{array}{r} \frac{1}{2} 500 \\ \times 42 \\ \hline 210 \\ + 84 \\ \hline 105000 \end{array}$$

- 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



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

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

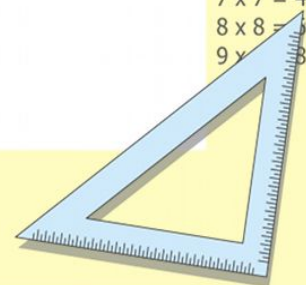
$$\sin 90^\circ = 1$$



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

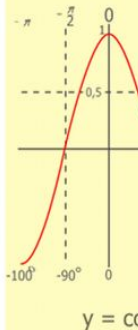
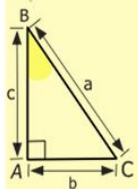
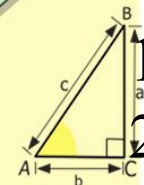
$$\begin{cases} y = 1 \\ x = 25 + 45 \\ \hline x = 70 \end{cases}$$

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



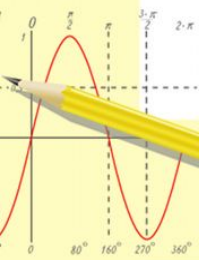
Алгоритм решения однородного тригонометрического уравнения второй степени:

1. Посмотреть, есть ли в уравнении член $a \sin^2 x$.
2. Если член $a \sin^2 x$ в уравнении содержится (т.е. $a \neq 0$), то уравнение решается делением обеих частей уравнения на $\cos^2 x$ и последующим введением новой переменной.
3. Если член $a \sin^2 x$ в уравнении не содержится (т.е. $a = 0$), то уравнение решается методом разложения на множители: за скобки выносят $\cos x$.



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

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



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

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

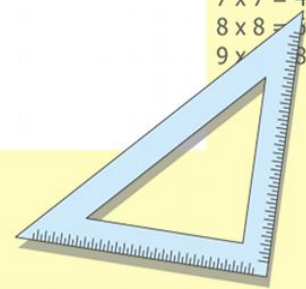
$$\sin 90^\circ = 1$$



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

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

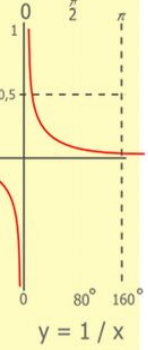
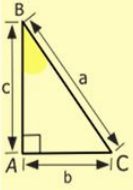
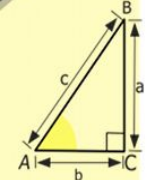
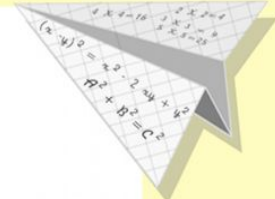
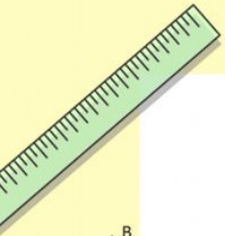
$$(x+y)(x-y) = x^2 - y^2$$



ОДНОРОДНЫЕ УРАВНЕНИЯ

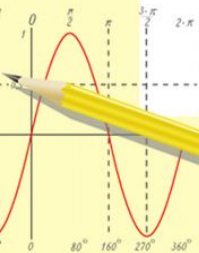
$$\underline{5\sin x + 6\cos x = 0}$$

$$\underline{3\sin^2 x + \sin x \cos x = 2\cos^2 x}$$



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

- $2 \times 2 = 4$
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$$\frac{a}{c} + \frac{b}{c} = \frac{a+b}{c}$$

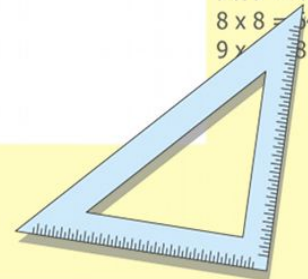
$$\sin 90^\circ = 1$$



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

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

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



ОДНОРОДНЫЕ УРАВНЕНИЯ

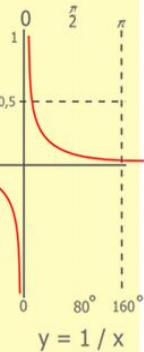
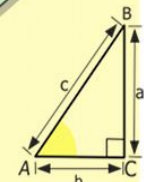
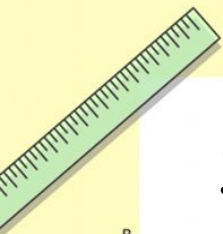
$$5 \sin x + 6 \cos x = 0$$

$$5 \frac{\sin x}{\cos x} + 6 \frac{\cos x}{\cos x} = \frac{0}{\cos x}$$

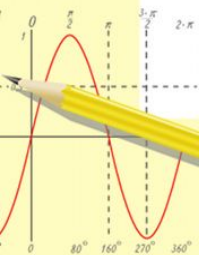
$$5 \operatorname{tg} x + 6 = 0$$

$$\operatorname{tg} x = -\frac{6}{5} \quad x = -\operatorname{arctg} \frac{6}{5} + \pi n, n \in \mathbb{Z}$$

$$\text{ОТВЕТ: } x = -\operatorname{arctg} \frac{6}{5} + \pi n, n \in \mathbb{Z}$$



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



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

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

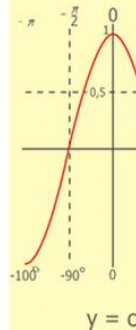
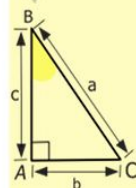
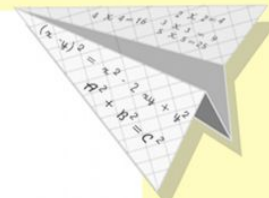
$$\sin 90^\circ = 1$$



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

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

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



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ОДНОРОДНЫЕ УРАВНЕНИЯ

$$3 \sin^2 x + \sin x \cos x = 2 \cos^2 x$$

$$3 \frac{\sin^2 x}{\cos^2 x} + \frac{\sin x \cdot \cos x}{\cos x} - 2 \frac{\cos^2 x}{\cos^2 x} = 0$$

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

$$\operatorname{tg} x = t$$

$$\operatorname{tg} x = -1$$

$$\operatorname{tg} x = \frac{2}{3}$$

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

$$x_1 = -\operatorname{arctg} 1 + \pi n$$

$$D = 1 + 24 = 25$$

$$x_1 = -\frac{\pi}{4} + \pi n, n \in \mathbb{Z}$$

$$x_2 = \operatorname{arctg} \frac{2}{3} + \pi k, k \in \mathbb{Z}$$

$$t = -1$$

$$t = \frac{2}{3}$$

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

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

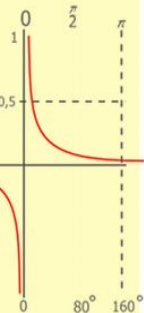
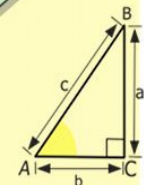
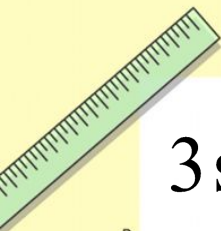
$$\sin 90^\circ = 1$$

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

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

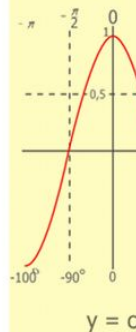
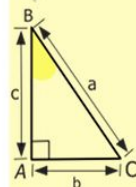
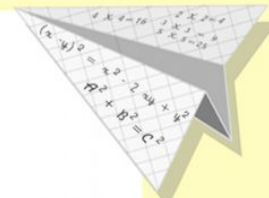
$$x = 70$$

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



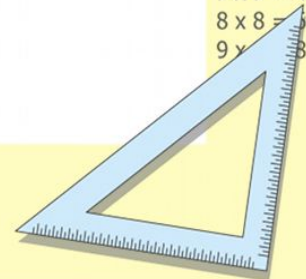
$$y = 1/x$$

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



$$y = \cos$$

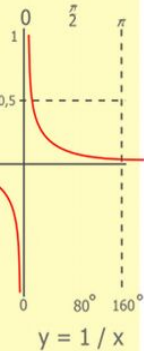
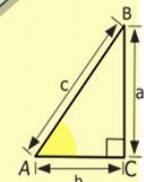
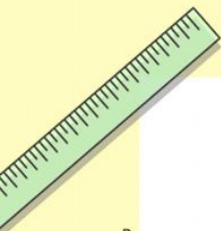
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ОДНОРОДНЫЕ УРАВНЕНИЯ

ОТВЕТ: $x_1 = -\frac{\pi}{4} + \pi n, n \in \mathbb{Z}$

$x_2 = \arctg \frac{2}{3} + \pi k, k \in \mathbb{Z}$



$$\begin{array}{r} \frac{1}{2} 500 \\ \times 42 \\ \hline 210 \\ + 84 \\ \hline 105000 \end{array}$$



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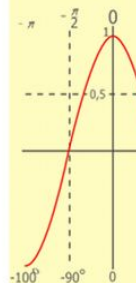
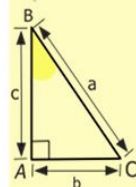
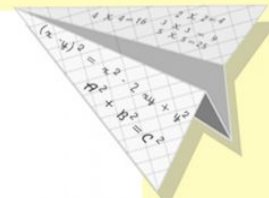
$$\sin 90^\circ = 1$$



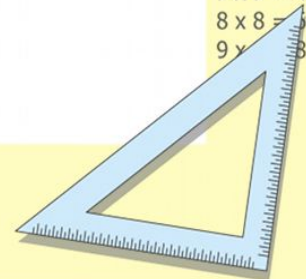
$$\begin{cases} y = \sin 90 \\ x = 25y + 45 \end{cases}$$

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УРАВНЕНИЯ ВИДА: $A \cos x + B \sin x = C$, $A, B, C \neq 0$

МЕТОДЫ:

1) Универсальная подстановка

$$\sin x = \frac{2 \operatorname{tg} \frac{x}{2}}{1 + \operatorname{tg}^2 \frac{x}{2}};$$

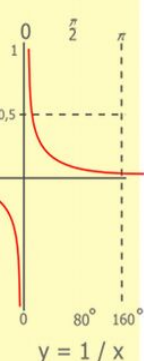
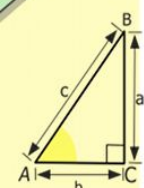
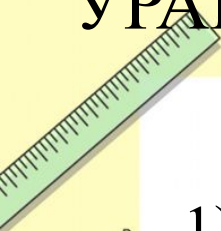
$$\cos x = \frac{1 - \operatorname{tg}^2 \frac{x}{2}}{1 + \operatorname{tg}^2 \frac{x}{2}};$$

$x \neq \pi + 2\pi n$;
Проверка обязательна!

2) Метод вспомогательного аргумента

$a \cos x + b \sin x$ заменим на $C \sin(x + \phi)$, где $C = \sqrt{a^2 + b^2}$;

$$\sin \phi = \frac{a}{C}; \quad \cos \phi = \frac{b}{C}; \quad \phi - \text{вспомогательный аргумент.}$$



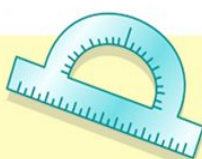
$$\begin{array}{r} 1 \\ 2500 \\ \times 42 \\ \hline 210 \\ + 84 \\ \hline 10500 \end{array}$$



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

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

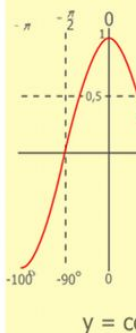
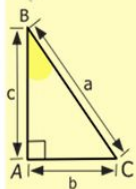
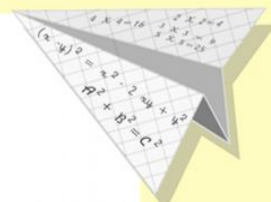
$\sin 90^\circ = 1$



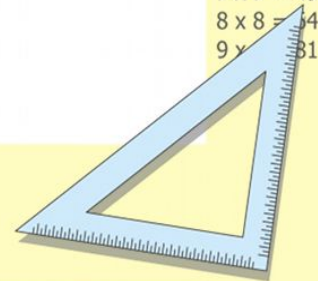
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$$(x+y)(x-y) = x^2 - y^2$$



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САМОСТОЯТЕЛЬНАЯ РАБОТА

Вариант 1

Вариант 2

На «3»

$$1) 3 \sin x + 5 \cos x = 0$$

$$2) 5 \sin^2 x - 3 \sin x \cos x - 2 \cos^2 x = 0$$

На «4»

$$1) 3 \cos^2 x + 2 \sin x \cos x = 0$$

$$2) 5 \sin^2 x + 2 \sin x \cos x - \cos^2 x = 1$$

На «5»

$$1) 2 \sin x - 5 \cos x = 3$$

$$2) 1 - 4 \sin 2x + 6 \cos^2 x = 0$$

На «3»

$$1) \cos x + 3 \sin x = 0$$

$$2) 6 \sin^2 x - 5 \sin x \cos x + \cos^2 x = 0$$

На «4»

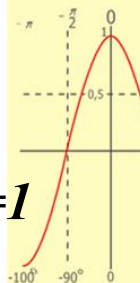
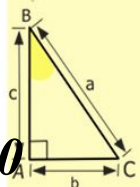
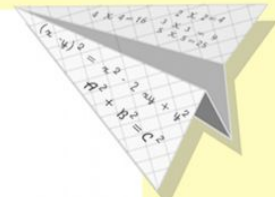
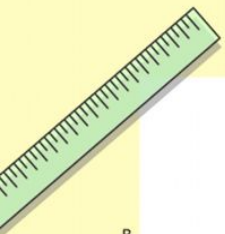
$$1) 2 \sin^2 x - \sin x \cos x = 0$$

$$2) 4 \sin^2 x - 2 \sin x \cos x - 4 \cos^2 x = 1$$

На «5»

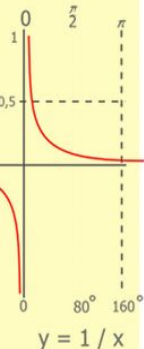
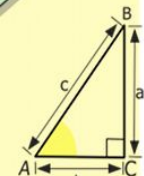
$$1) 2 \sin x - 3 \cos x = 2$$

$$2) 2 \sin^2 x - 2 \sin 2x + 1 = 0$$



$y = \cos$

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- $8 \times 8 = 64$
- $9 \times 9 = 81$



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



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

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

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

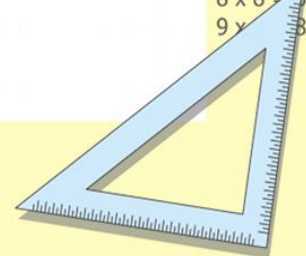


$$\begin{cases} y = \sin 90 \\ x = 25y + 45 \end{cases}$$

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

$$x = 70$$

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



ОТВЕТЫ

Вариант 1

$$1) -\arctg \frac{5}{3} + \pi k, k \in \mathbb{Z}$$

$$2) \frac{\pi}{4} + \pi k, -\arctg 0,4 + \pi n, k, n \in \mathbb{Z}$$

$$1) \frac{\pi}{2} + \pi k, -\arctg 1,5 + \pi n, k, n \in \mathbb{Z}$$

$$2) -\frac{\pi}{4} + \pi k, \arctg 0,5 + \pi n, k, n \in \mathbb{Z}$$

$$1) 2\arctg(-1 \pm \sqrt{5}) + 2\pi k, k \in \mathbb{Z}$$

$$2) \frac{\pi}{4} + \pi k, \arctg 7 + \pi n, k, n \in \mathbb{Z}$$

Вариант 2

$$1) -\arctg \frac{1}{3} + \pi k, k \in \mathbb{Z}$$

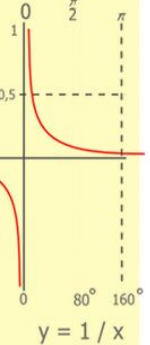
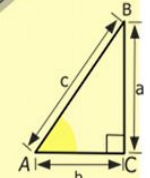
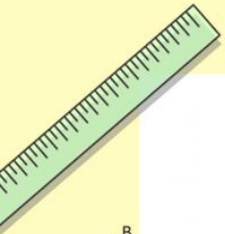
$$2) \arctg \frac{1}{3} + \pi k, \arctg \frac{1}{2} + \pi n, k, n \in \mathbb{Z}$$

$$1) \pi k, \arctg \frac{1}{2} + \pi n, k, n \in \mathbb{Z}$$

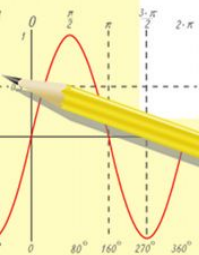
$$2) -\frac{\pi}{4} + \pi k, \arctg \frac{5}{3} + \pi n, k, n \in \mathbb{Z}$$

$$1) -2\arctg 5 + 2\pi k, \frac{\pi}{2} + 2\pi n, k, n \in \mathbb{Z}$$

$$2) \frac{\pi}{4} + \pi k, \arctg \frac{1}{3} + \pi n, k, n \in \mathbb{Z}$$



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



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

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

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

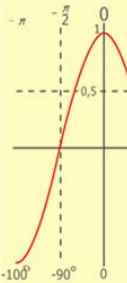
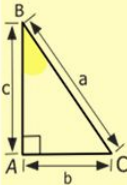
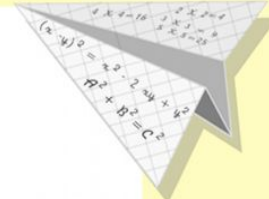


$$\begin{cases} y = \sin 90 \\ x = 25y + 45 \end{cases}$$

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

$$x = 70$$

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



$$y = \cos$$

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

