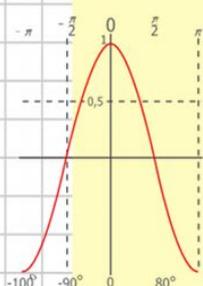
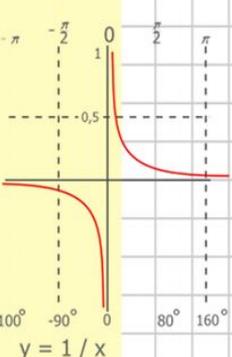
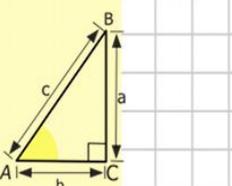
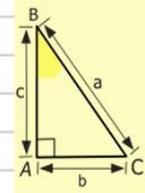
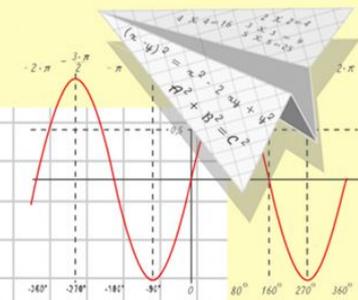
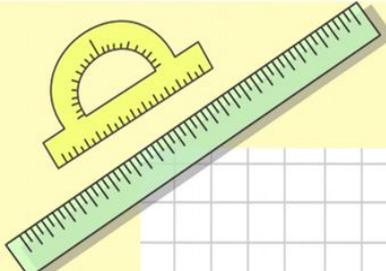


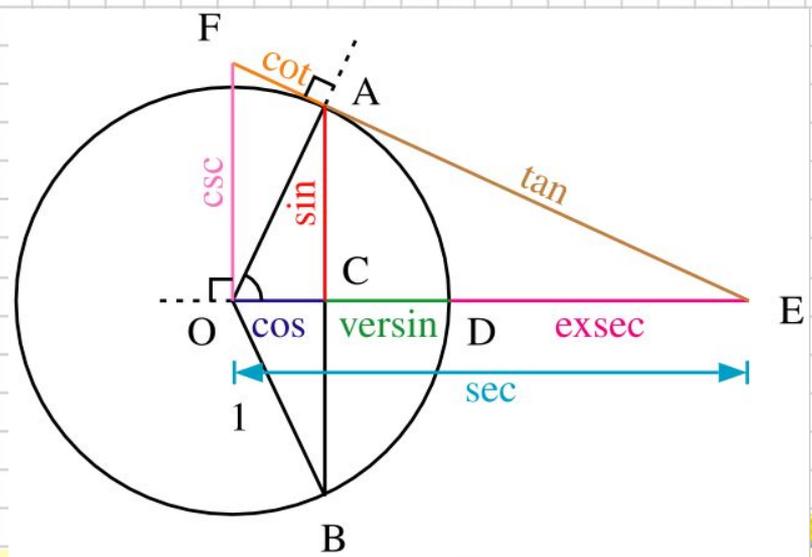
Математик

а

Решение тригонометрических уравнений



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



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



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

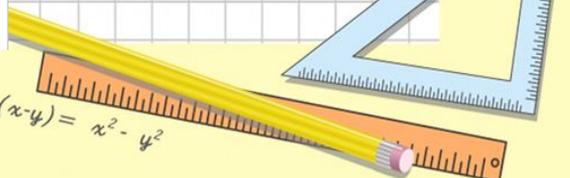
$$\frac{a}{c} + \frac{b}{c} = \frac{a+b}{c}$$

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



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

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



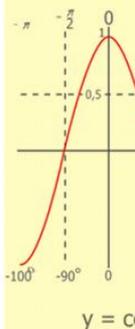
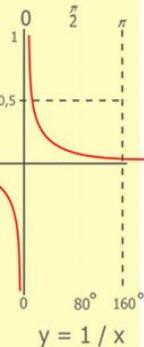
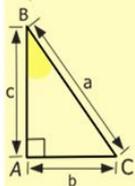
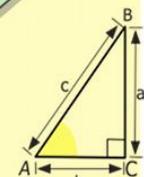
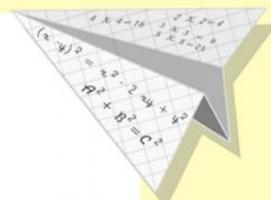
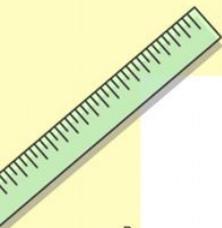
В

11

Найди значение выражений:

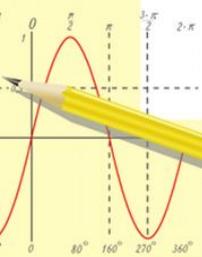
а) $\sqrt{6} \cos(2\pi + \alpha)$, если $\sin \alpha = \frac{1}{\sqrt{3}}$ $-\frac{\pi}{2} < \alpha < \frac{\pi}{2}$;

б) $2 - 5\sin^2 x + 5\cos^2 x$, если $\cos 2x = -0,2$.



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

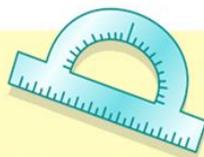
- 2 x 2 = 4
- 3 x 3 = 9
- 4 x 4 = 16
- 5 x 5 = 25
- 6 x 6 = 36
- 7 x 7 = 49
- 8 x 8 = 64
- 9 x 9 = 81



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

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

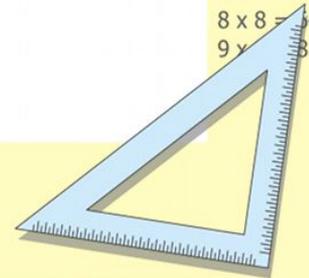
$$\sin 90^\circ = 1$$



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

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

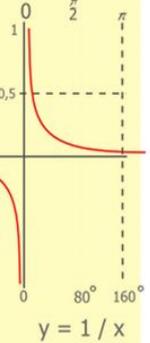
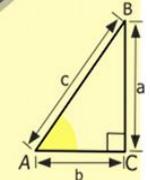
$$(x+y)(x-y) = x^2 - y^2$$



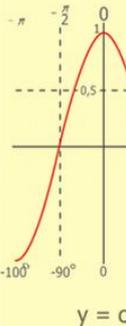
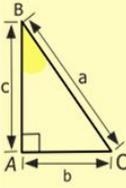
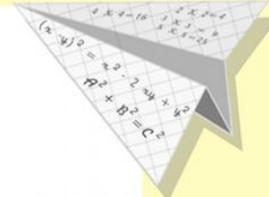
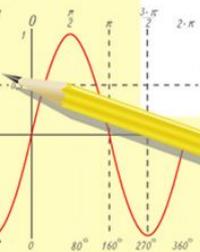
Сопоставьте следующие колонки

таблицы

$\sin x = 0$	$-\frac{\pi}{2} + 2\pi n$
$\sin x = 1$	$2\pi n$
$\sin x = -1$	πn
$\cos x = 0$	$\frac{\pi}{2} + \pi n$
$\cos x = 1$	$\frac{\pi}{4} + \pi n$
$\cos x = -1$	πn
$\operatorname{tg} x = 0$	$\frac{\pi}{2} + 2\pi n$
$\operatorname{ctg} x = 0$	$\pi + 2\pi n$
$\operatorname{tg} x = 1$	$\frac{3\pi}{4} + \pi n$
$\operatorname{ctg} x = -1$	$\frac{\pi}{2} + \pi n$

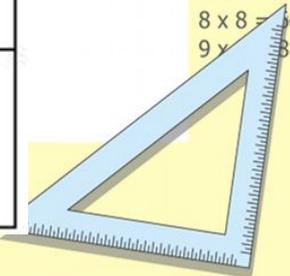


$$\begin{array}{r} 2500 \\ \times 42 \\ \hline 210 \\ + 84 \\ \hline 105000 \end{array}$$



$y = \cos$

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



Формулы корней простых тригонометрических уравнений

Частные случаи

$$\underline{\cos t = 0}$$

$$t = \pi/2 + \pi k, k \in \mathbb{Z}$$

$$\underline{\cos t = 1}$$

$$t = 0 + 2\pi k, k \in \mathbb{Z}$$

$$\underline{\cos t = -1}$$

$$t = \pi + 2\pi k, k \in \mathbb{Z}$$

$$\underline{\sin t = 0}$$

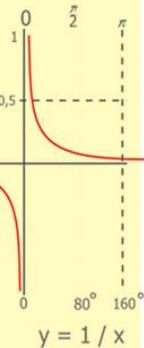
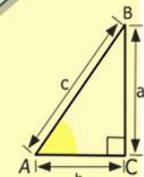
$$t = 0 + \pi k, k \in \mathbb{Z}$$

$$\underline{\sin t = 1}$$

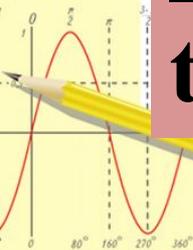
$$t = \pi/2 + 2\pi k, k \in \mathbb{Z}$$

$$\underline{\sin t = -1}$$

$$t = -\pi/2 + 2\pi k, k \in \mathbb{Z}$$



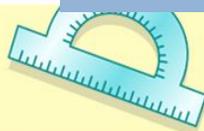
$$\begin{array}{r} 1\ 2\ 5\ 00 \\ \times 4\ 2 \\ \hline 21\ 0 \\ + 84 \\ \hline 105\ 0\ 00 \end{array}$$



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

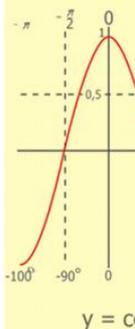
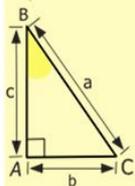
$$\frac{a}{c} + \frac{b}{c} = \frac{a+b}{c}$$

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

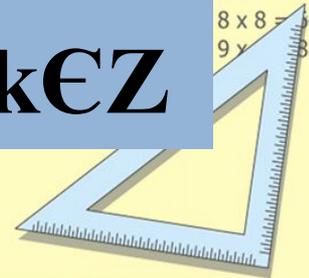


$$\begin{cases} y = 1 \\ x = 25 + 45 \end{cases}$$
$$x = 70$$

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



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



В

11

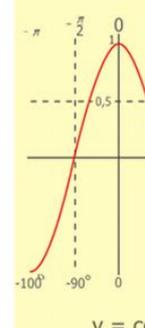
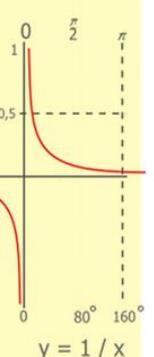
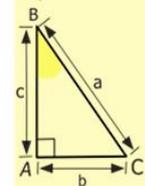
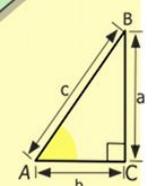
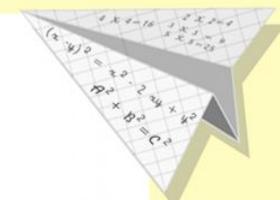
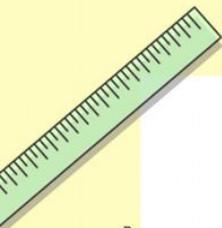
Найди значение выражений:

а) $\sqrt{6} \cos(2\pi + \alpha)$, если $\sin \alpha = \frac{1}{\sqrt{3}}$ $-\frac{\pi}{2} < \alpha < \frac{\pi}{2}$;

Ответ: **2**

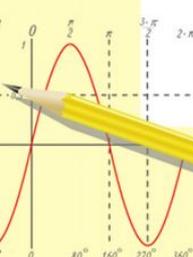
б) $2 - 5\sin^2 x + 5\cos^2 x$, если $\cos 2x = -0,2$.

Ответ: **1**



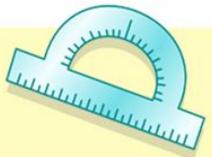
1	2500
x	42
+	210
84	
105000	

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



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

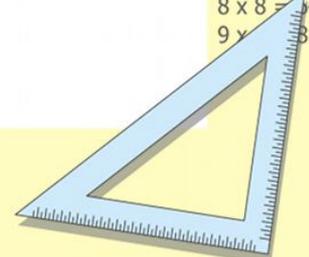
$$\sin 90^\circ = 1$$



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

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

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



Формулы корней простых тригонометрических уравнений

1. $\cos t = a$,
где $|a| \leq 1$

2. $\sin t = a$,
где $|a| \leq 1$

3. $\operatorname{tg} t = a, a \in \mathbb{R}$

$t = \operatorname{arctg} a + \pi k, k \in \mathbb{Z}$

$t = \arccos a + 2\pi k, k \in \mathbb{Z}$
 $t = -\arccos a + 2\pi k, k \in \mathbb{Z}$

$t = \arcsin a + 2\pi k, k \in \mathbb{Z}$
 $t = \pi - \arcsin a + 2\pi k, k \in \mathbb{Z}$

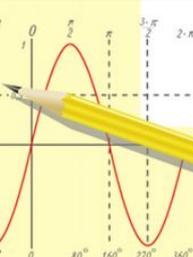
4. $\operatorname{ctg} t = a, a \in \mathbb{R}$

$t = \operatorname{arcctg} a + \pi k, k \in \mathbb{Z}$

ИЛИ

ИЛИ

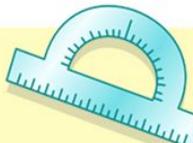
$t = \pm \arccos a + 2\pi k, k \in \mathbb{Z}$ $t = (-1)^k \arcsin a + \pi k, k \in \mathbb{Z}$



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

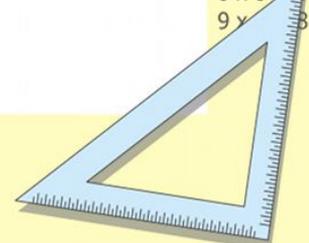
$\frac{a}{c} + \frac{b}{c} = \frac{a+b}{c}$

$\sin 90^\circ = 1$



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

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



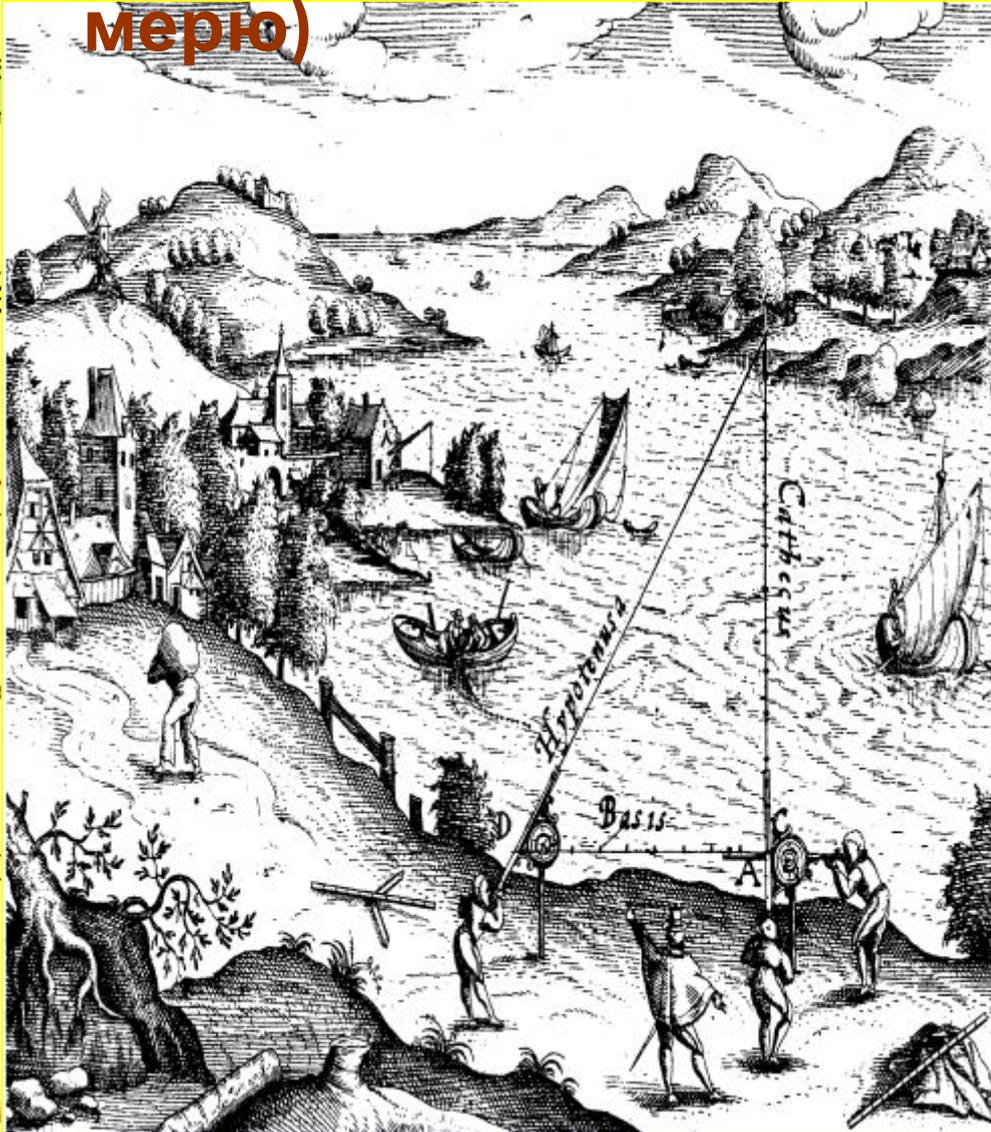
$y = 1/x$

1	2 5 00
x	4 2
	21 0
+	8 4
	105 0 00

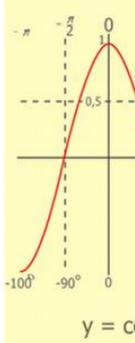
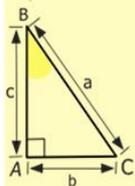


5 x 5 = 25
6 x 6 = 36
7 x 7 = 49
8 x 8 = 64
9 x 9 = 81

Тригонометрия (trigonos-треугольник и metriо-мерю)



Как и многие разделы математики, тригонометрия возникла в древние времена из потребностей людей при ведении расчетов, связанных с земельными работами (для определения расстояния до недоступных предметов, составления географических карт).



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

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

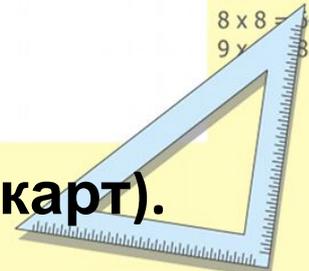
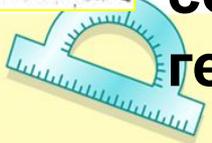
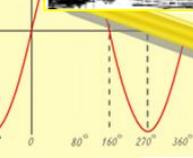
$$\frac{a}{c} + \frac{b}{c} = \frac{a+b}{c}$$

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

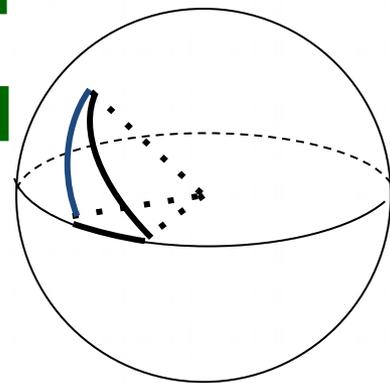
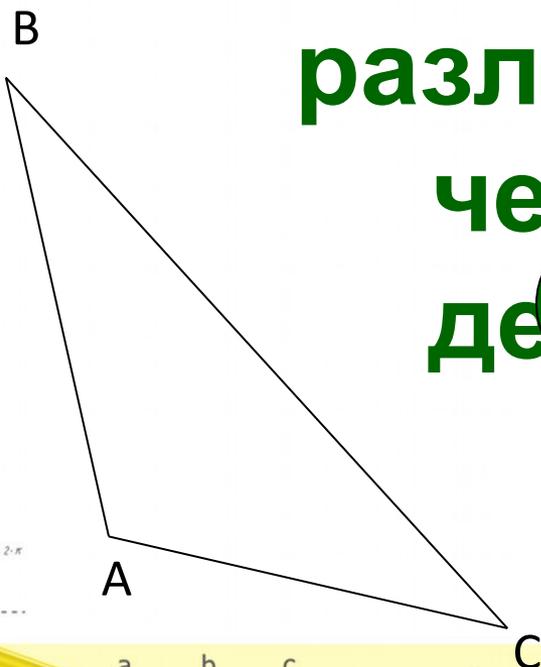
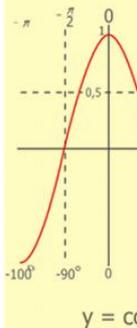
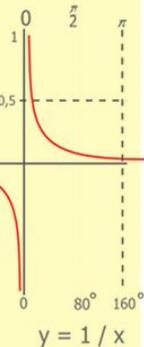
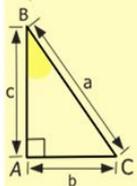
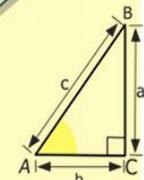
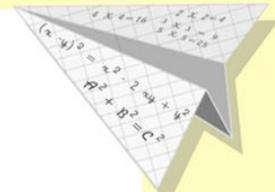
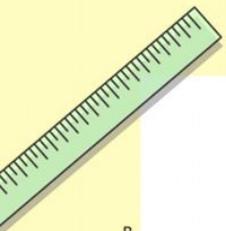
$$\begin{cases} x = 25y + 45 \\ x = 25 + 45 \end{cases}$$

$$x = 70$$

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

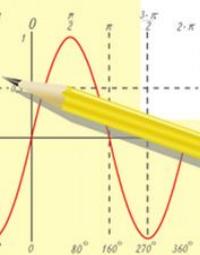


Тригонометрия - это прикладное знание, которое помогает в различных сферах человеческой деятельности



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

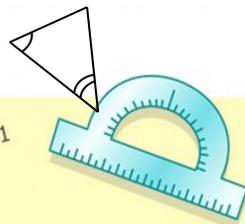
$$\begin{array}{l} 2 \times 2 = 4 \\ 3 \times 3 = 9 \\ 4 \times 4 = 16 \\ 5 \times 5 = 25 \\ 6 \times 6 = 36 \\ 7 \times 7 = 49 \\ 8 \times 8 = 64 \\ 9 \times 9 = 81 \end{array}$$



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

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

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

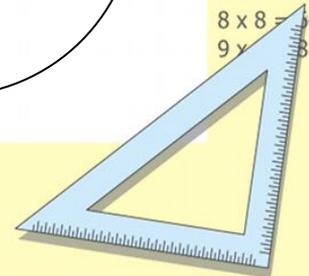


$$\begin{cases} y = \sin 90 \\ x = 25y + 45 \end{cases}$$

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

$$x = 70$$

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

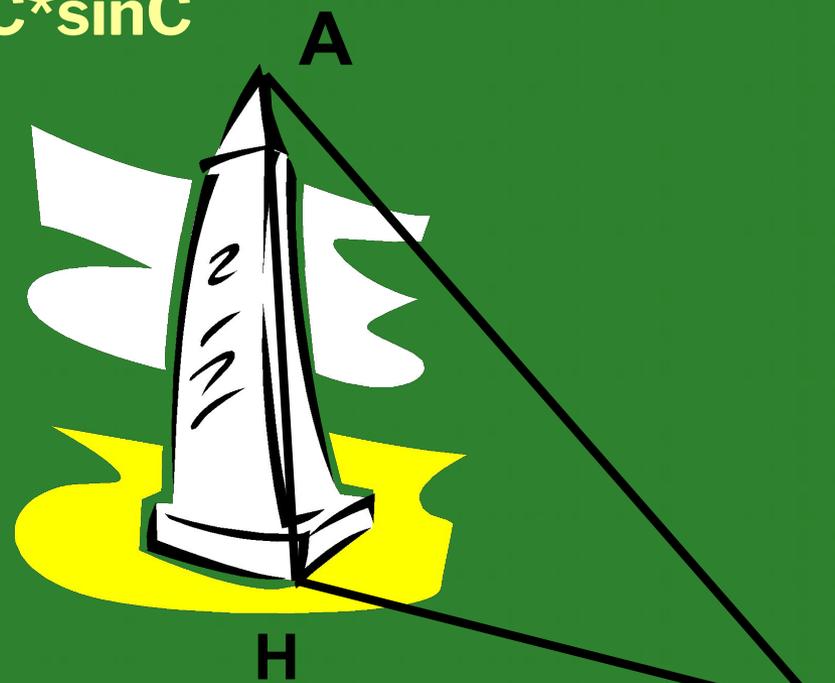
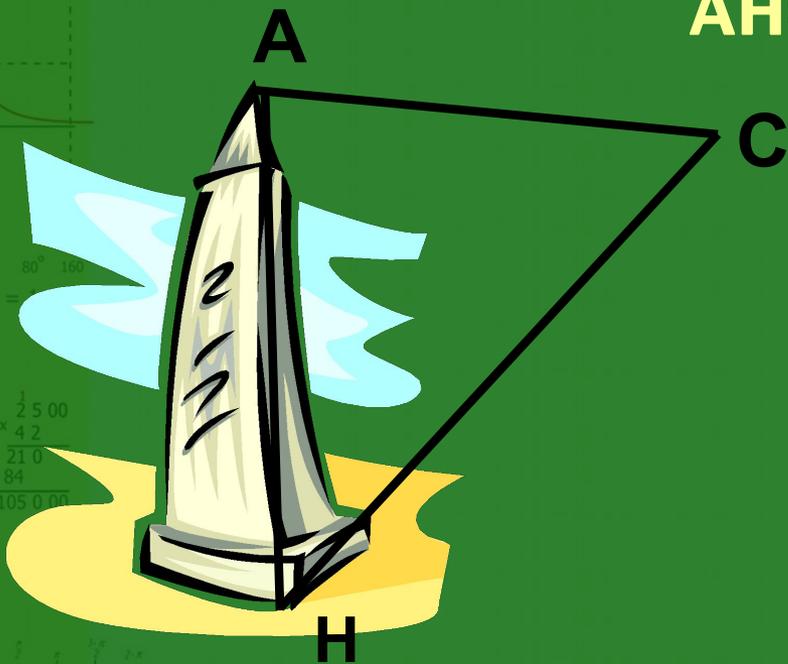


АС – расстояние от верха статуи до глаз
человека,

АН – высота статуи,

$\sin C$ - синус угла падения взгляда.

$$AH = AC \cdot \sin C$$



$$\frac{a}{\sin A} = \frac{b}{\sin B} \text{ РИС. 1}$$

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

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

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

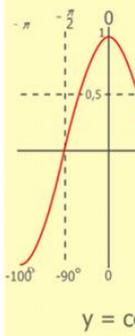
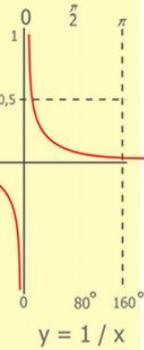
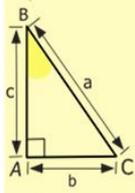
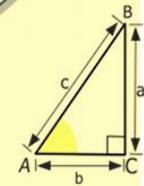
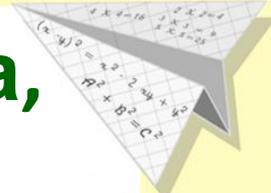
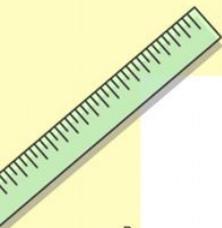
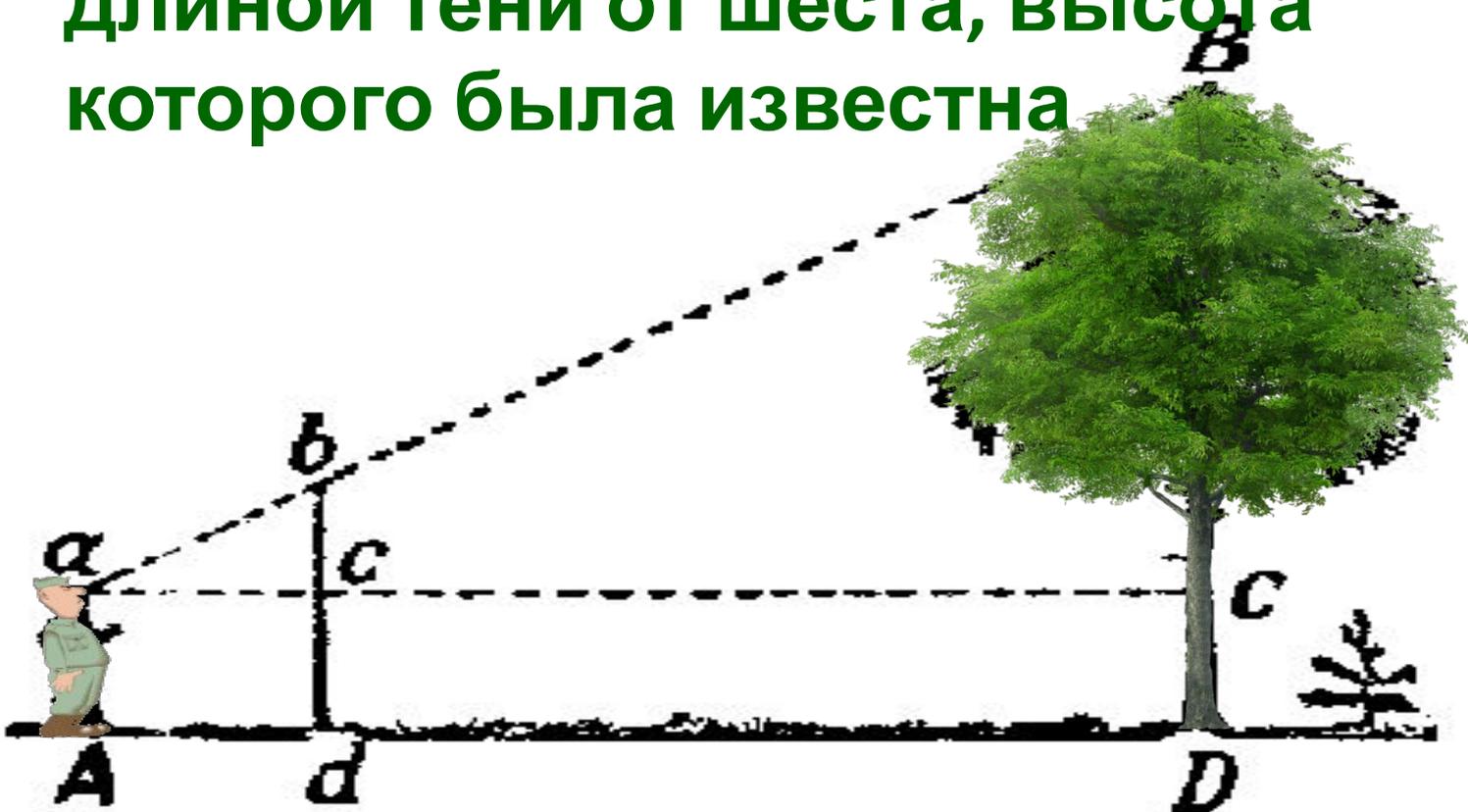
РИС. 2

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

A large, multi-masted sailing ship with white sails is shown sailing on a blue sea under a cloudy sky. The ship is the central focus, with its sails fully deployed. The water is dark blue with whitecaps, and the sky is a mix of blue and white clouds.

**По звездам вычисляли
местонахождение корабля
в море**

Можно вычислить высоту дерева, сравнивая длину его тени с длиной тени от шеста, высота которого была известна



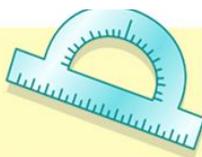
$$\begin{array}{r} 1 \\ \times 2500 \\ \hline 2500 \\ + 42 \\ \hline 210 \\ + 84 \\ \hline 10500 \end{array}$$

- 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

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

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

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



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

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

