

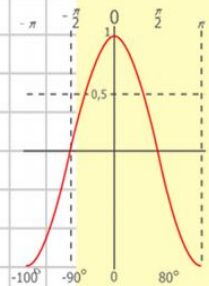
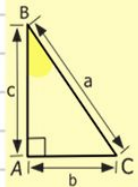
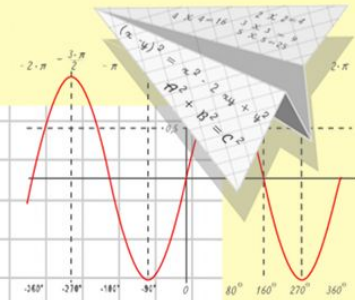
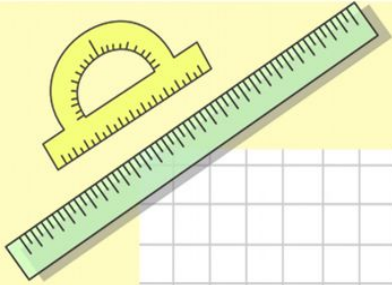
# Математик

а

## Четырехугольники Свойства четырехугольников.

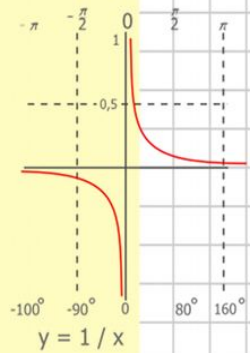
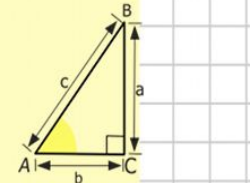
### Урок – проект

### Геометрия 8 класс



$y = \cos x$

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



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



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

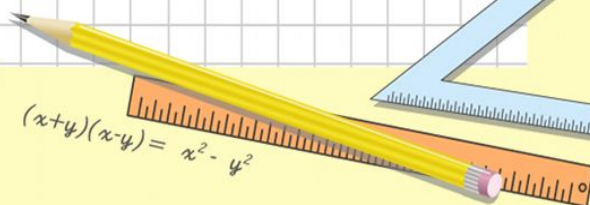
$$\frac{a}{c} + \frac{b}{c} = \frac{a+b}{c}$$



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



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

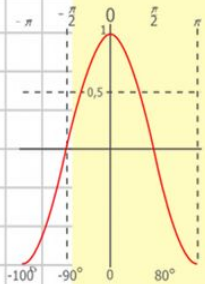
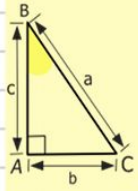
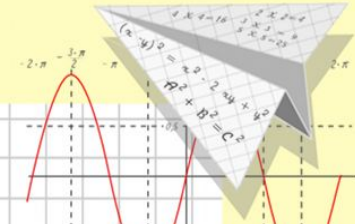
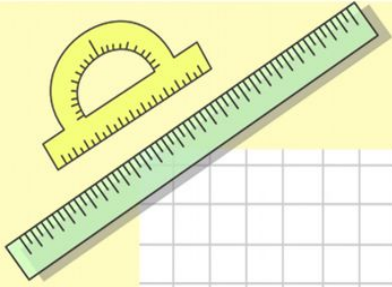


$$(x+y)(x-y) = x^2 - y^2$$

# Математик

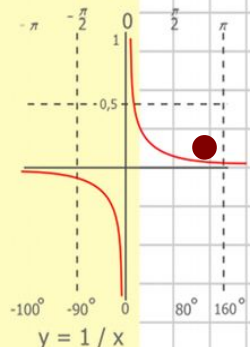
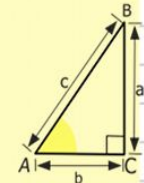
а

- Одной из основных и простейших фигур в геометрии является четырехугольник.
- За несколько тысячелетий геометры так подробно изучили четырехугольник, что иногда говорят о «геометрии четырехугольника» как о самостоятельном разделе геометрии.



$y = \cos x$

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- $7 \times 7 = 49$
- $8 \times 8 = 64$

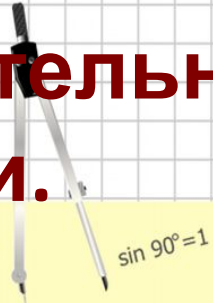


$$\begin{array}{r} 1 \\ 2500 \\ \times 42 \\ \hline 210 \\ + 84 \\ \hline 10500 \end{array}$$

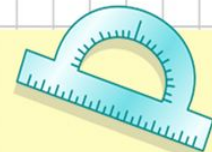


$$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$

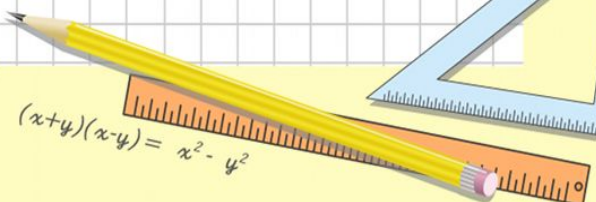
$$\frac{a}{c} + \frac{b}{c} = \frac{a+b}{c}$$



$\sin 90^\circ = 1$



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



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

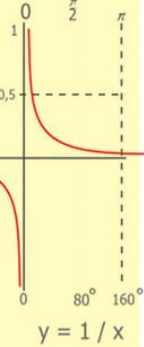
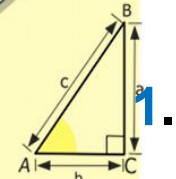
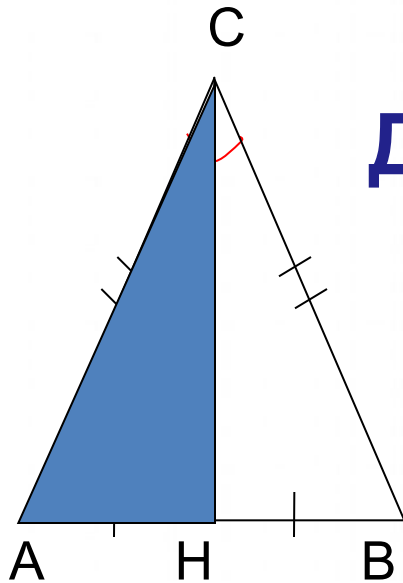
Устно решить задачу.

**Дано:**  $\triangle ABC$  - равнобедренный с основанием  $AB$ ,

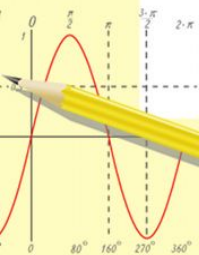
$CH$  – медиана,

$\angle ACB = 80^\circ$ .

**Найти:** углы  $\triangle ACH$ .



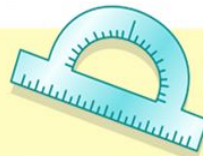
$$\begin{array}{r} 2500 \\ \times 42 \\ \hline 2100 \\ + 8400 \\ \hline 105000 \end{array}$$



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

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

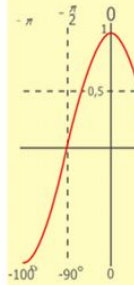
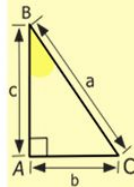
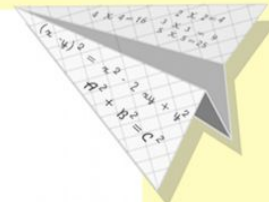
$$\sin 90^\circ = 1$$



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

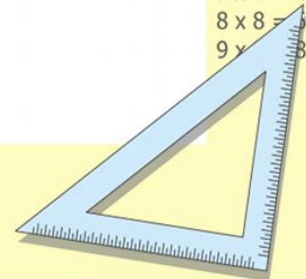
$$\begin{cases} y = 1 \\ x = 25 + 45 \\ \hline x = 70 \end{cases}$$

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

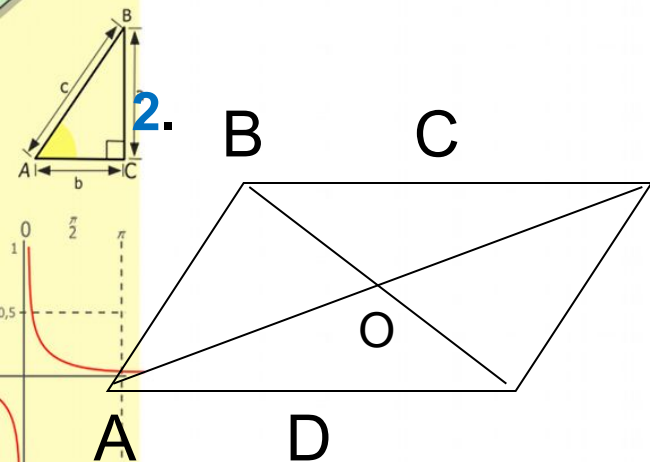


$$y = \cos$$

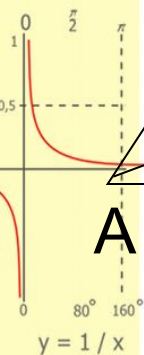
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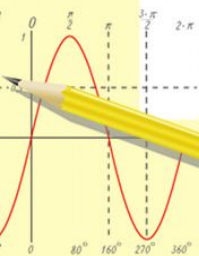
# Устно решить задачу.



- Дано: ABCD - параллелограмм,
- AB = 3 см, BC = 7 см,
- AC = 8 см, BD = 6 см.
- Найти : **P**  $\triangle AOD$  -?



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



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

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

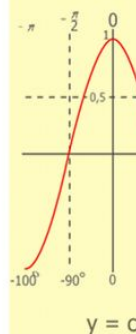
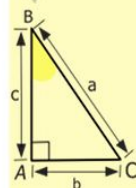
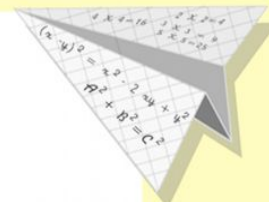
$$\sin 90^\circ = 1$$



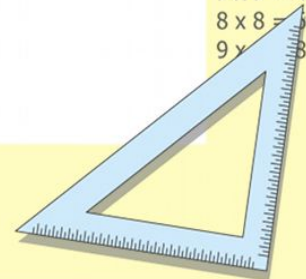
$$\begin{cases} y = \sin 90 \\ x = 25y + 45 \end{cases}$$

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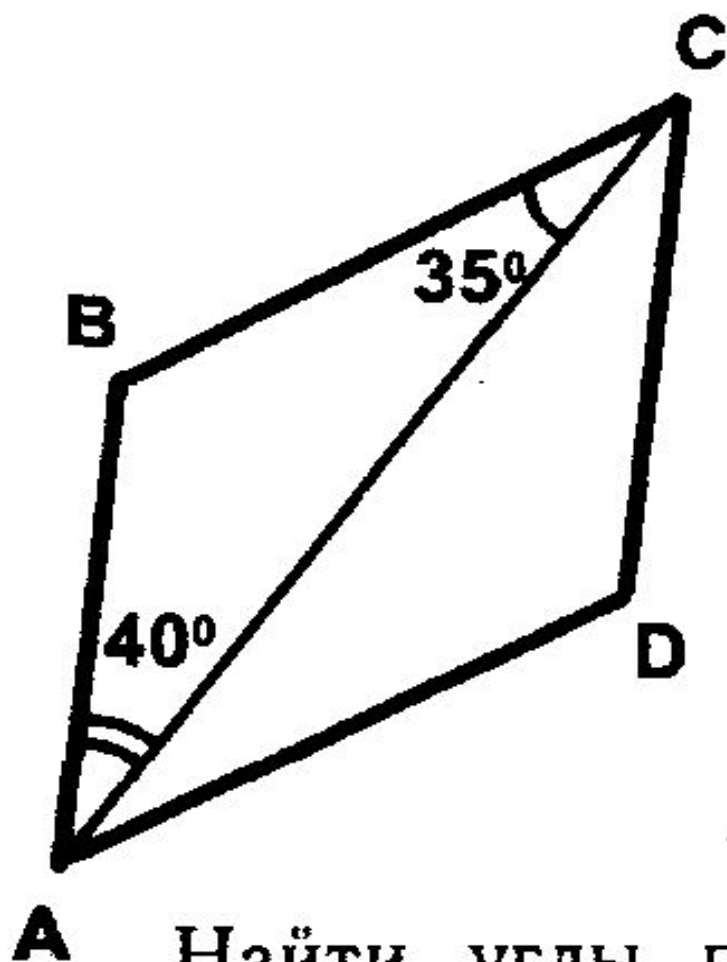
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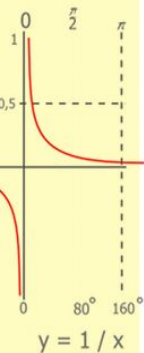
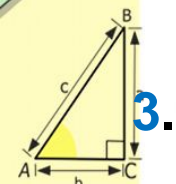
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Устно решить задачу.



Найти углы параллелограмма *ABCD*.



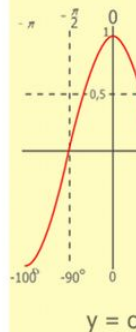
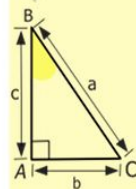
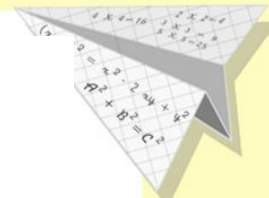
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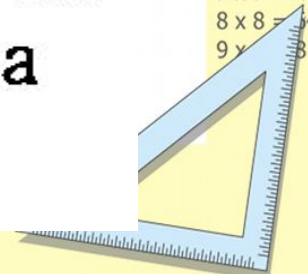
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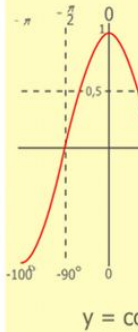
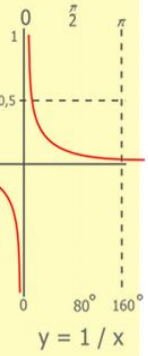
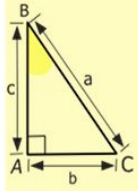
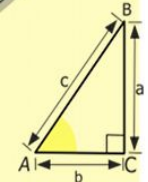
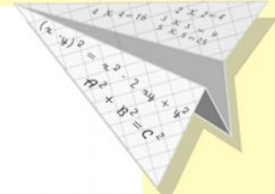
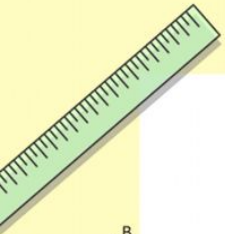
$$\sin 90^\circ =$$



- 2 x 2 = 4
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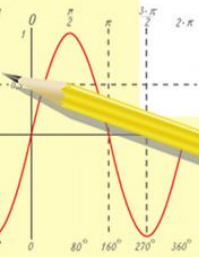


# Четырехугольники



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

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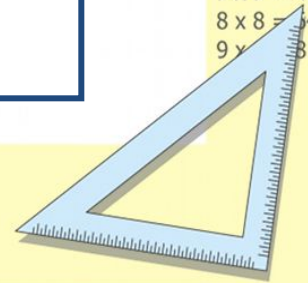
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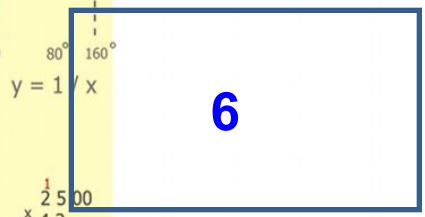
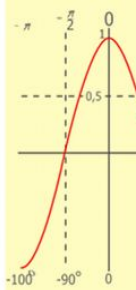
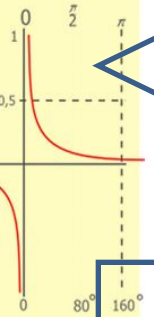
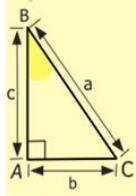
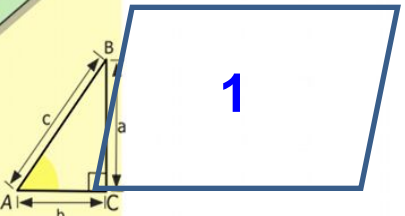
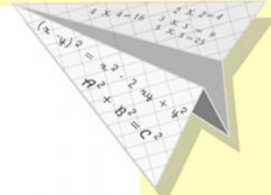
$$(x+y)(x-y) = x^2 - y^2$$



# Четырехугольники

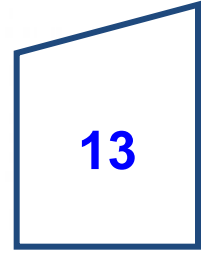
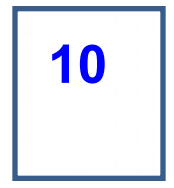
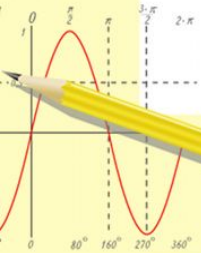
параллелограмм

трапеция



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

$2 \times 2 = 4$   
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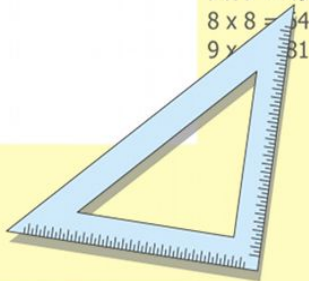
$$\sin 90^\circ = 1$$



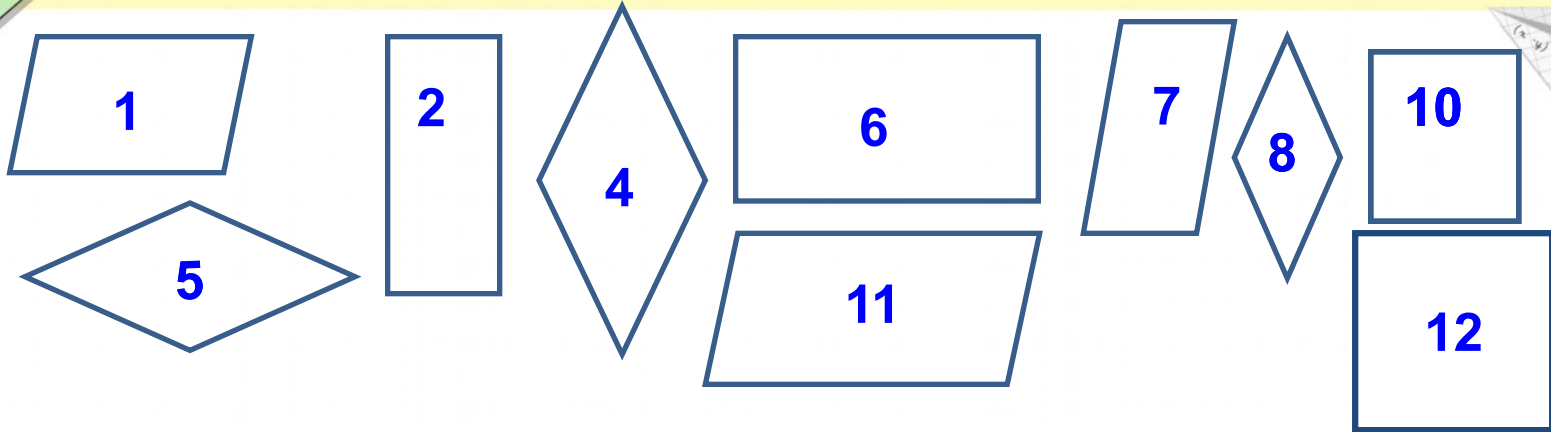
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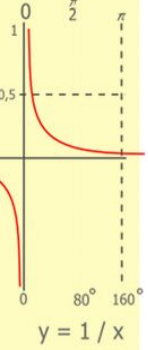
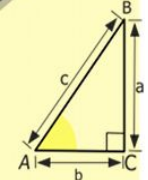
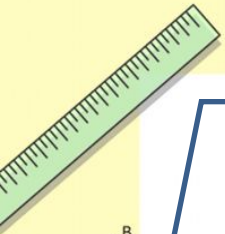
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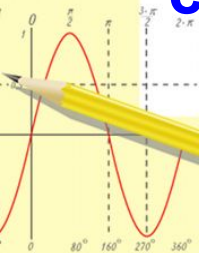
# параллелограмм



- Углы прямые:
- Стороны равны:
- Углы прямые и стороны равны:



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



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

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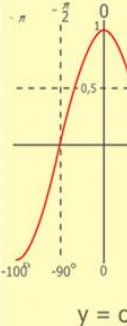
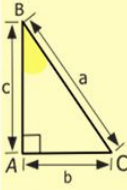
$$\sin 90^\circ = 1$$



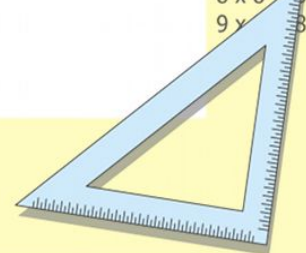
$$\begin{cases} y = \sin 90 \\ x = 25y + 45 \end{cases}$$

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

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

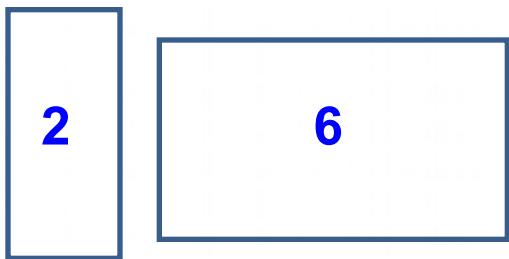


$$\begin{array}{l} 2 \times 2 = 4 \\ 3 \times 3 = 9 \\ 4 \times 4 = 16 \\ 5 \times 5 = 25 \\ 6 \times 6 = 36 \\ 7 \times 7 = 49 \\ 8 \times 8 = 64 \\ 9 \times 9 = 81 \end{array}$$



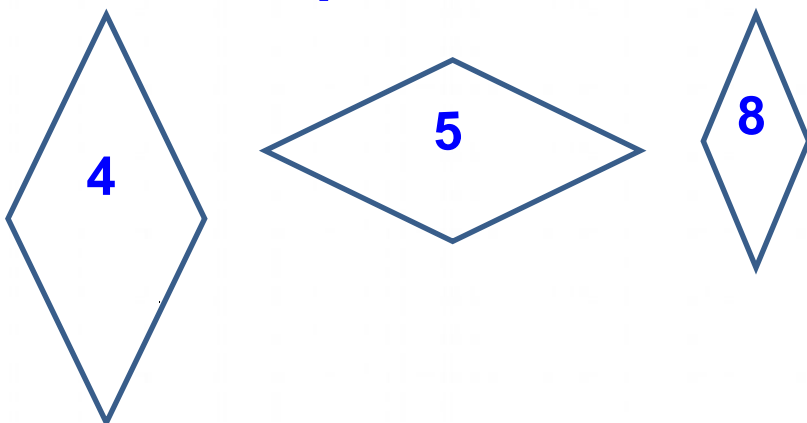


• Углы прямые:



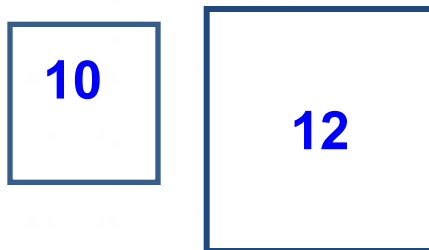
прямоугольник

• Равные стороны:



ромб

• Равные стороны и углы:



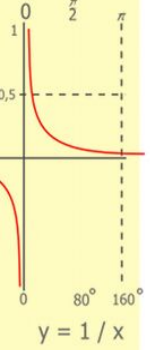
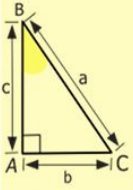
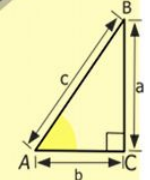
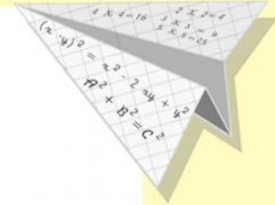
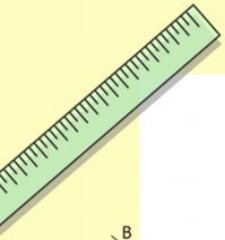
квадрат

Background elements include:

- A green ruler at the top left.
- A 3D paper airplane at the top right.
- A right-angled triangle with sides  $a$ ,  $b$ ,  $c$  and vertices  $A$ ,  $B$ ,  $C$  on the left.
- A right-angled triangle with sides  $a$ ,  $b$ ,  $c$  and vertices  $A$ ,  $B$ ,  $C$  on the right.
- A graph of the function  $y = 1/x$  on the left.
- A graph of the cosine function  $y = \cos x$  on the right.
- A vertical list of multiplication facts on the right:  $2 \times 2 = 4$ ,  $3 \times 3 = 9$ ,  $4 \times 4 = 16$ ,  $5 \times 5 = 25$ ,  $6 \times 6 = 36$ ,  $7 \times 7 = 49$ ,  $8 \times 8 = 64$ ,  $9 \times 9 = 81$ .
- A vertical list of arithmetic facts on the left:  $\frac{1}{2} \times 500 = 250$ ,  $\frac{1}{2} \times 42 = 21$ ,  $21 \times 0 = 0$ ,  $84 = 84$ ,  $105 \times 0 = 0$ .
- A yellow pencil at the bottom left.
- A blue protractor at the bottom center.
- A blue set square at the bottom right.
- Trigonometric formulas:  $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$ ,  $\frac{a}{c} + \frac{b}{c} = \frac{a+b}{c}$ ,  $\sin 90^\circ = 1$ ,  $\begin{cases} y = \sin 90 \\ x = 25y + 45 \end{cases}$ ,  $\begin{cases} y = 1 \\ x = 25 + 45 \end{cases}$ ,  $x = 70$ , and  $(x+y)(x-y) = x^2 - y^2$ .

# Тема урока:

- Прямоугольник
- Ромб
- Квадрат



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

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



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

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

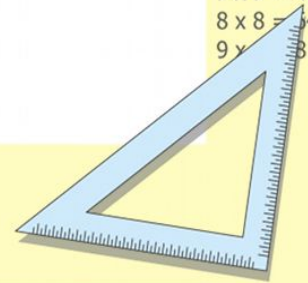
$\sin 90^\circ = 1$



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

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

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

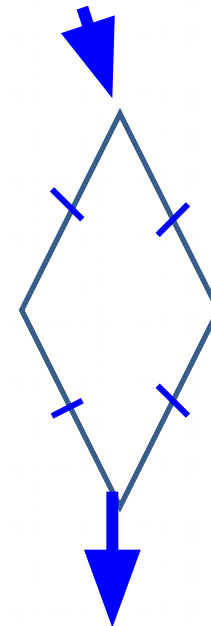
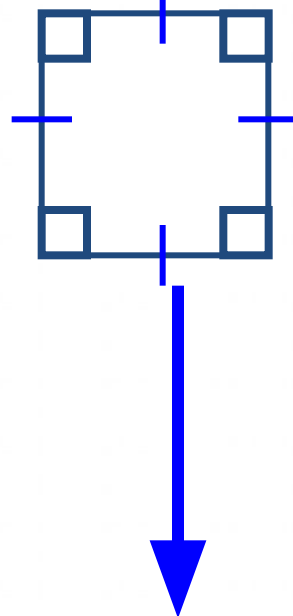
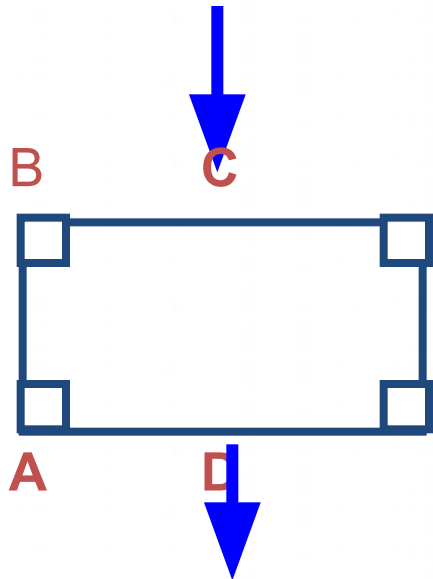


# параллелограмм

прямоугольник

квадрат

ромб

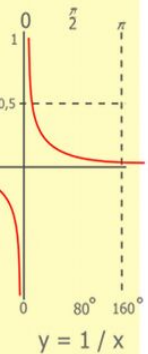
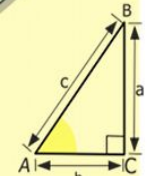
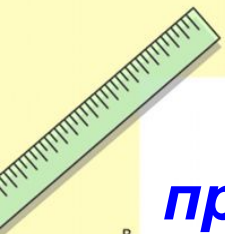


$$\angle A = \angle B = \angle C = \angle D$$

$$AB = BC = CD = DA$$

$$\angle A = \angle B = \angle C = \angle D$$

$$AB = BC = CD = DA$$



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



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

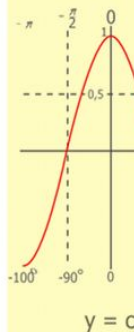
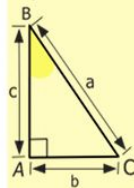
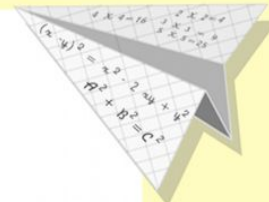
$$\frac{a}{c} + \frac{b}{c} = \frac{a+b}{c}$$

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



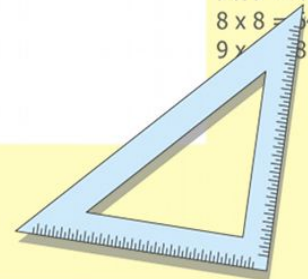
$$\begin{cases} \sin 90^\circ \\ x = 25y + 45 \\ y = 1 \\ x = 25 + 45 \\ x = 70 \end{cases}$$

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

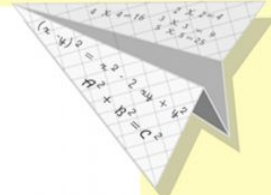


$$y = \cos$$

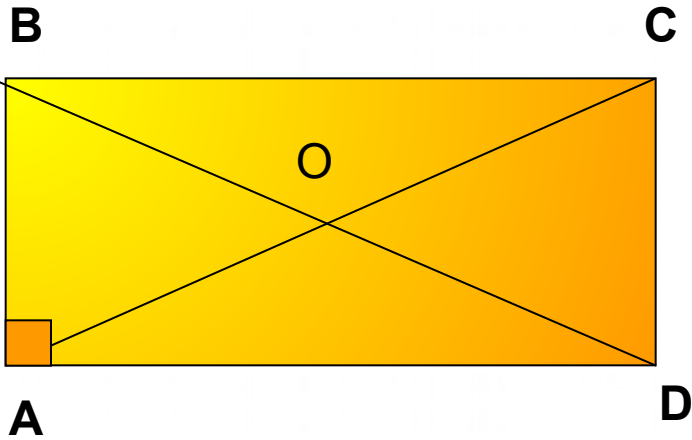
$$\begin{array}{l} 2 \times 2 = 4 \\ 3 \times 3 = 9 \\ 4 \times 4 = 16 \\ 5 \times 5 = 25 \\ 6 \times 6 = 36 \\ 7 \times 7 = 49 \\ 8 \times 8 = 64 \\ 9 \times 9 = 81 \end{array}$$



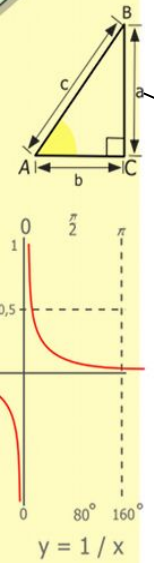
# Задача 1.



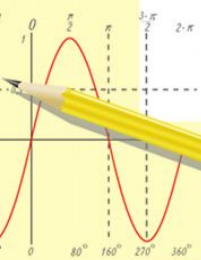
**Дано:**  
 ABCD - прямоугольник,  
 AB = 3 см, AD = 5 см, AC = 8 см  
**Найти:**  
 **$P \triangle AOB = ?$**



**Решение:**



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



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

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

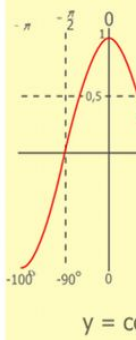
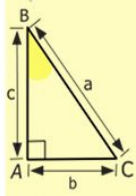
$\sin 90^\circ = 1$



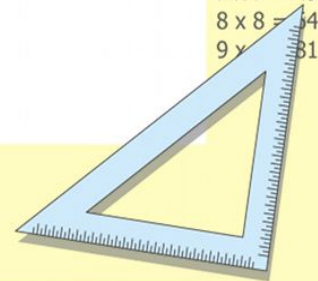
$$\begin{cases} y = \sin 90 \\ x = 25y + 45 \end{cases}$$

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

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



- 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



## Задача 2.

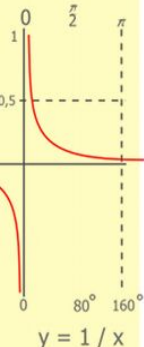
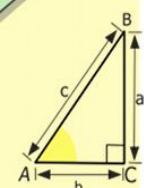
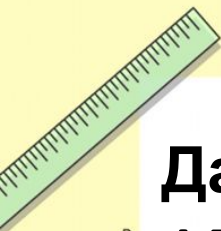
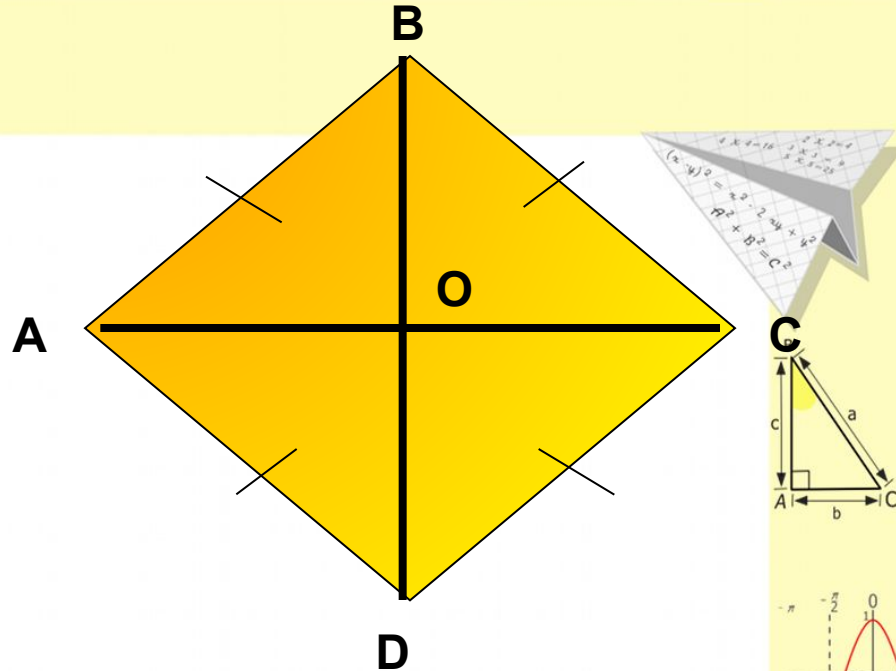
Дано:

ABCD- ромб,

$\angle A = 80^\circ$

Найти:

**углы  $\triangle AOB = ?$**



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



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

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

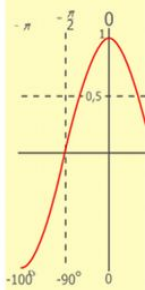
$$\sin 90^\circ = 1$$



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

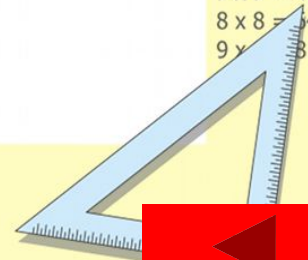
$$\begin{cases} y = 1 \\ x = 25 + 45 \\ \hline x = 70 \end{cases}$$

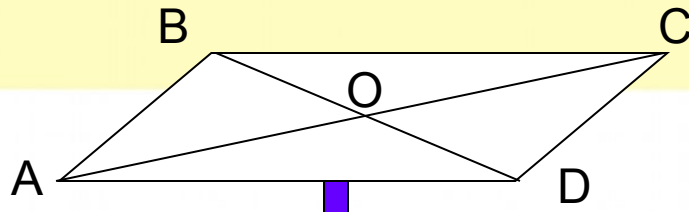
$$(x+y)(x-y) = x^2 - y^2$$



$$y = \cos$$

- 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



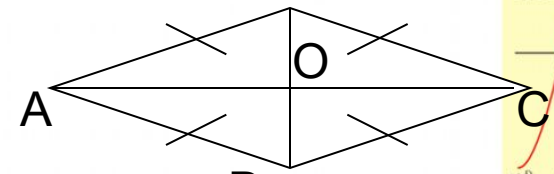
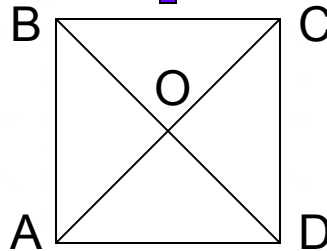
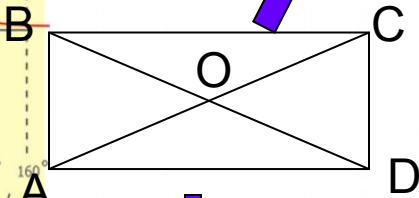


$AB \parallel CD$   
 $BC \parallel AD$

$AB = CD$   
 $BC = AD$

$\angle A = \angle C$   
 $\angle B = \angle D$

$AO = OC$   
 $BO = OD$



$\angle A = \angle B = \angle C = \angle D$

?

?

$AB = BC = CD = AD$

?



# Математик

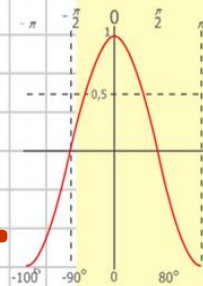
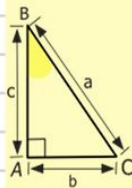
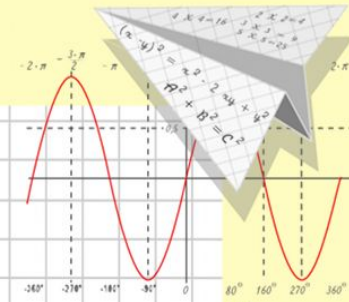
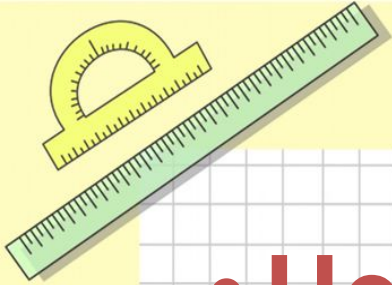
а

- Цели урока:

- дать определение,

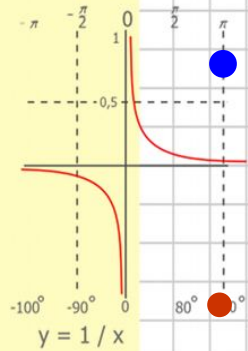
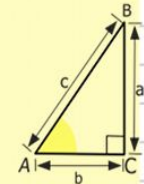
- и установить свойства и признаки:

- прямоугольника, ромба, квадрата.



$y = \cos x$

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



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



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

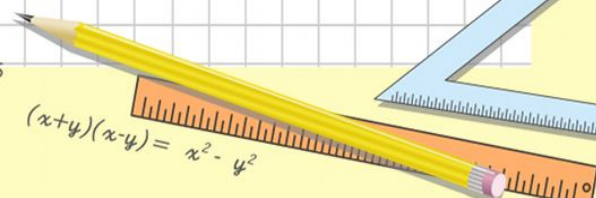
$$\frac{a}{c} + \frac{b}{c} = \frac{a+b}{c}$$



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



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



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

# Математик

## Исследовательская работа

А. Прямоугольник.

В. Ромб.

С. Квадрат.

определени

e

свойства

признаки

Исследование будем проводить по схеме.

Наблюдение

Гипотеза.

Доказательство

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

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

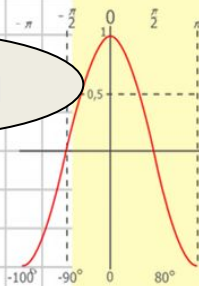
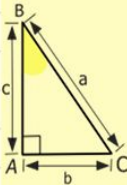
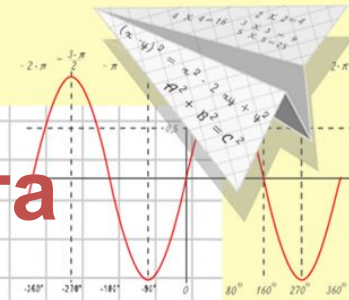
$$\sin 90^\circ = 1$$

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

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

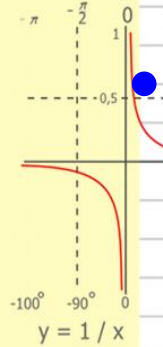
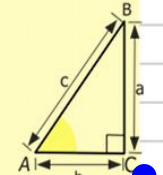
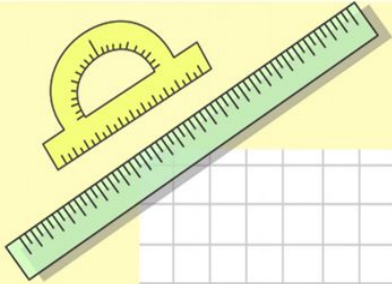
$$x = 70$$

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

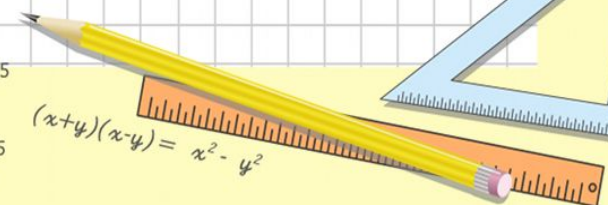
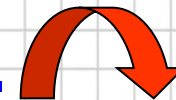
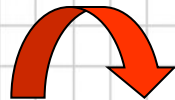


$$y = \cos x$$

- $2 \times 2 = 4$
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- $4 \times 4 = 16$
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- $6 \times 6 = 36$
- $7 \times 7 = 49$
- $8 \times 8 = 64$



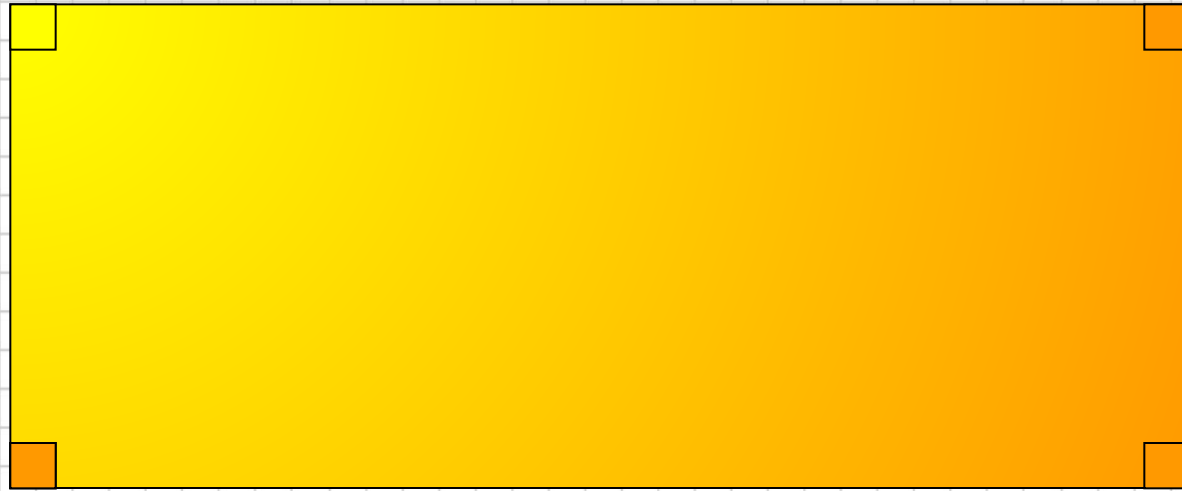
$$\begin{array}{r} 2500 \\ \times 42 \\ \hline 2100 \\ + 8400 \\ \hline 105000 \end{array}$$





# Математик

## а ПРЯМОУГОЛЬНИК



B

C

A

D

Прямоугольником называется параллелограмм, у которого все углы прямые

$$\angle A = \angle B = \angle C = \angle D = 90^\circ$$

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

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

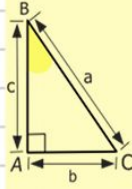
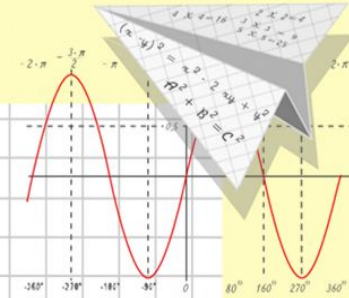
$$\sin 90^\circ = 1$$

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

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

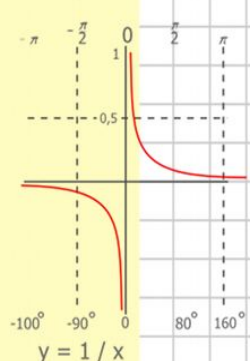
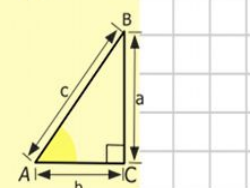
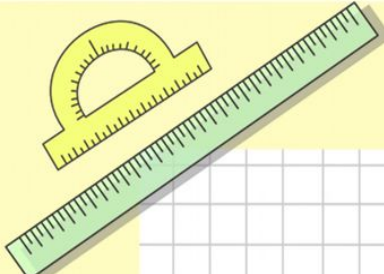
$$x = 70$$

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

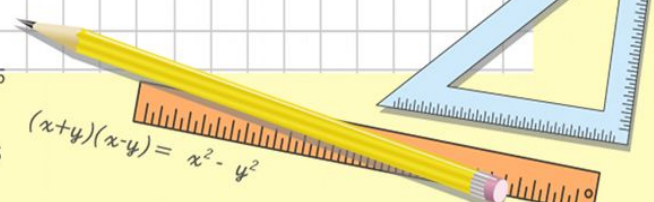


$$y = \cos x$$

- 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



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

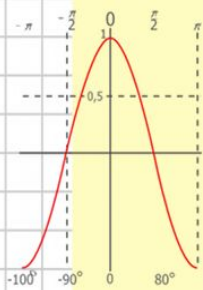
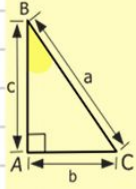
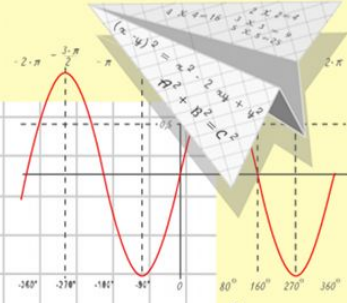


# Математик

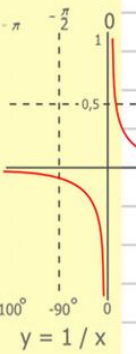
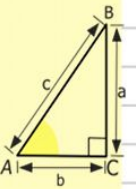
## Практическая работа №1.

### Прямоугольник.

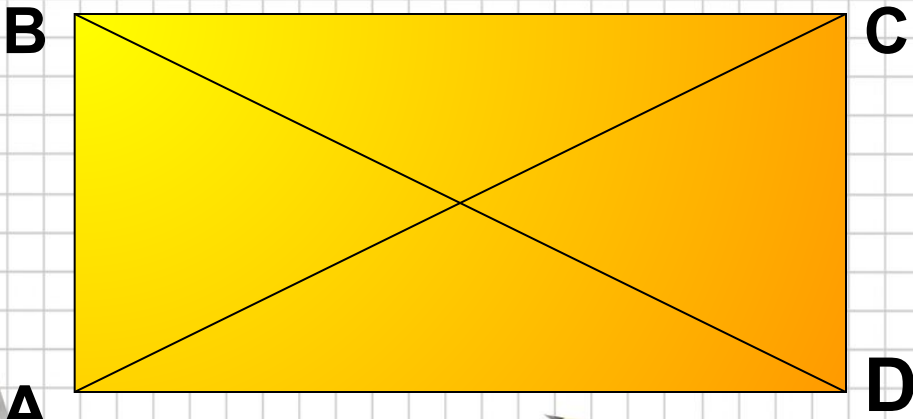
- 1. измерить диагонали,
- 2. данные занести в таблицу №1
- 3. сделать выводы.



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



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



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

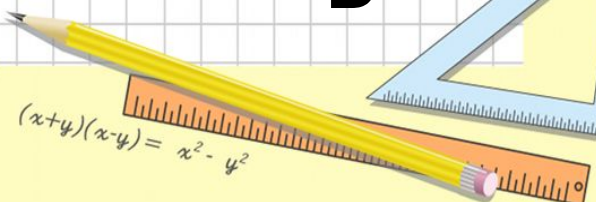
$$\frac{a}{c} + \frac{b}{c} = \frac{a+b}{c}$$



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



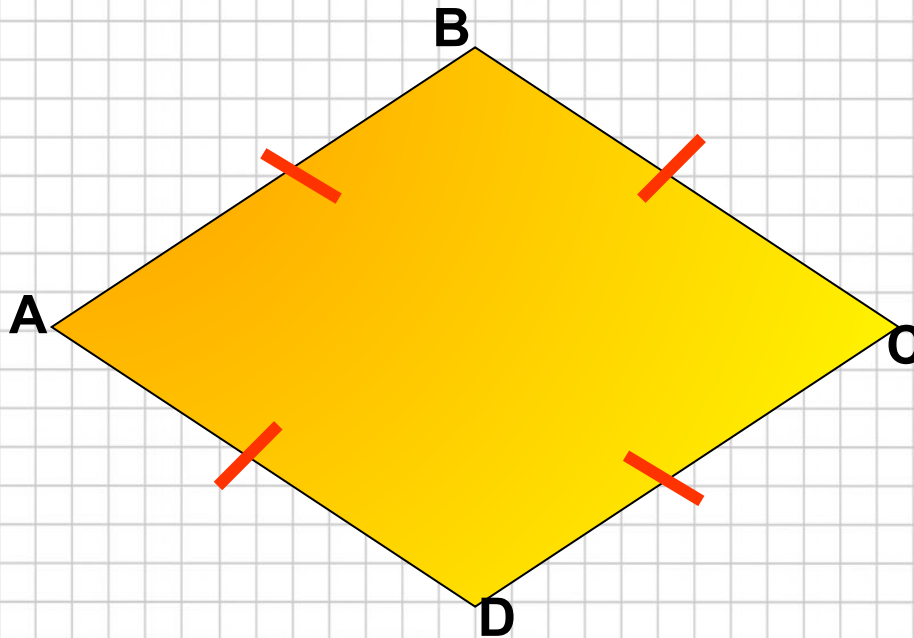
$$\begin{cases} y = \sin 90 \\ x = 25y + 45 \\ y = 1 \\ x = 25 + 45 \\ x = 70 \end{cases}$$



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

# Математик

## а РОМБ



Ромбом называется параллелограмм, у которого все стороны равны

$$AB=BC=CD=AD$$

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

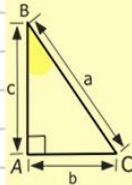
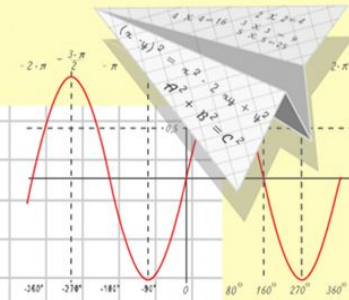
$$\frac{a}{c} + \frac{b}{c} = \frac{a+b}{c}$$

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

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

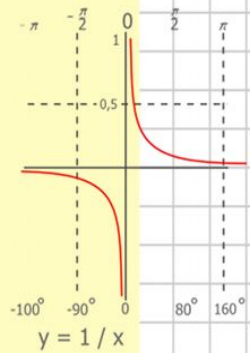
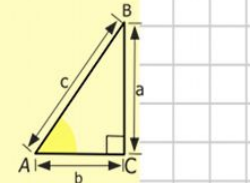
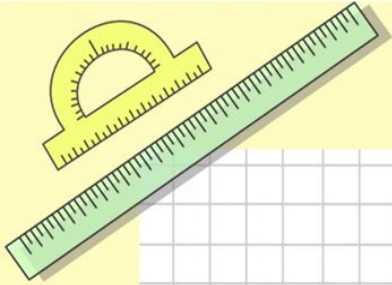
$$\begin{cases} y = 1 \\ x = 25 + 45 \\ \hline x = 70 \end{cases}$$

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

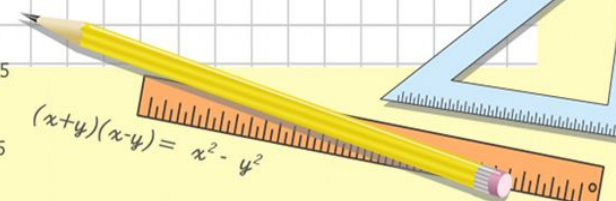
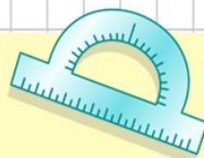


$$y = \cos x$$

- 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



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



# Математик

## Практическая работа №2

1. Измерить углы:

АВО и СВО

Вывод

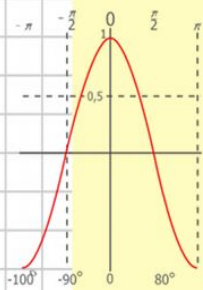
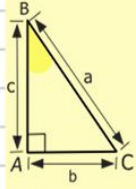
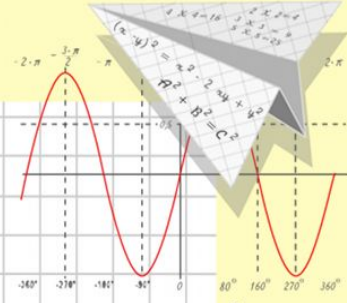
ВАО и ДАО

занести в таблицу №2

2. Измерить углы АОВ и СОВ

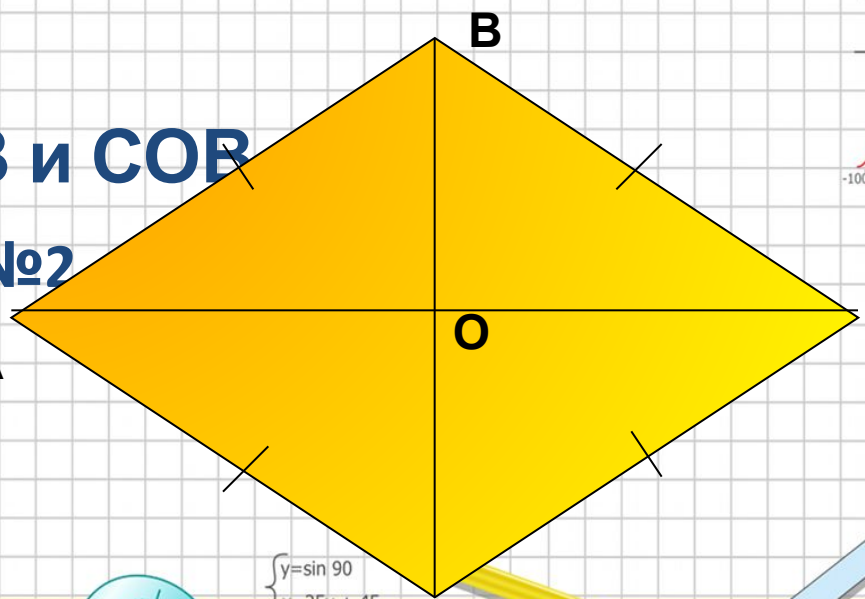
занести в таблицу №2

Вывод



$y = \cos x$

- 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



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



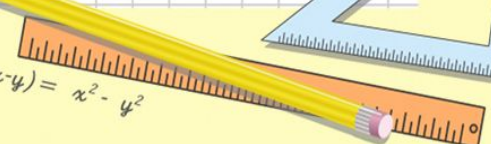
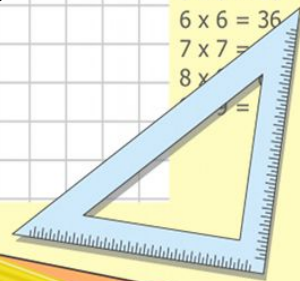
$$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$

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

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

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

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



# Математик

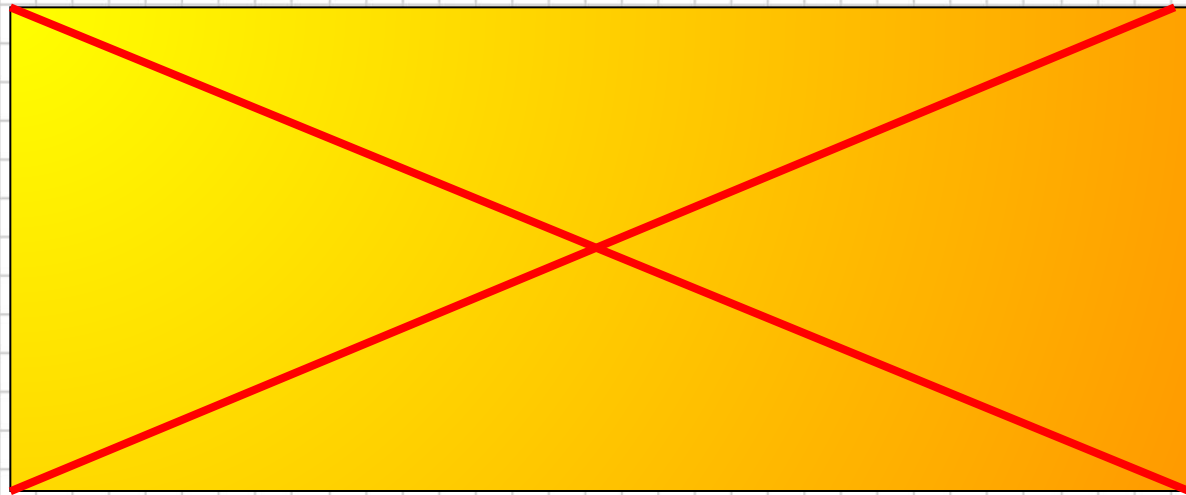
## Свойство <sup>3a</sup> прямоугольника

**В**

**С**

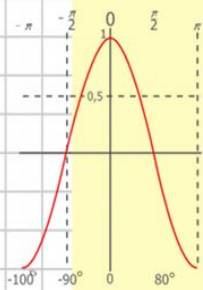
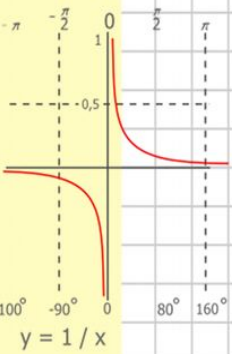
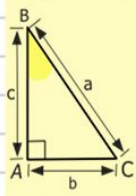
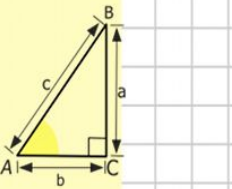
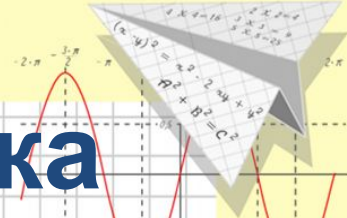
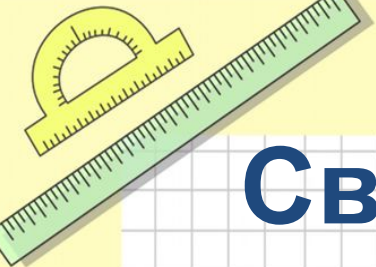
**А**

**Д**



**Диагонали прямоугольника равны**

**AC = BD**



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

$y = \cos x$

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

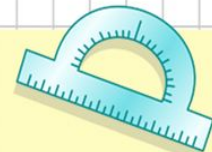


$$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$

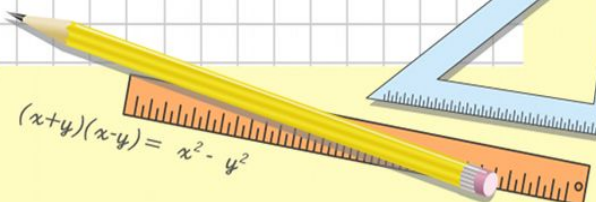
$$\frac{a}{c} + \frac{b}{c} = \frac{a+b}{c}$$



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

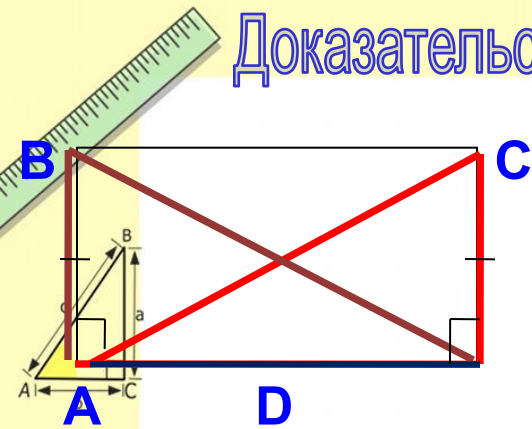


$$\begin{cases} y = \sin 90 \\ x = 25y + 45 \\ y = 1 \\ x = 25 + 45 \\ x = 70 \end{cases}$$



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

# Доказательство теоремы о диагоналях прямоугольника.



**Дано:** ABCD - прямоугольник,

AC и DB – диагонали.

**Доказать:**  $AC=BD$ .

**Доказательство**

Рассмотрим  $\triangle CDA$  и  $\triangle BAD$ :

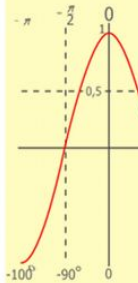
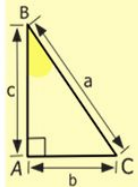
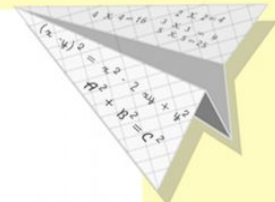
1. AD – общая,

2. CD = BA – противоположные стороны прямоугольника,

3.  $\angle CDA = \angle BAD$  ( по  $90^\circ$ ), значит  $\triangle CDA = \triangle BAD$ .

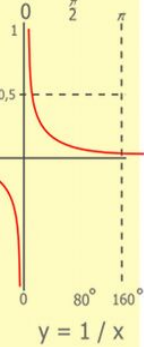
Из равенства треугольников следует равенство его соответствующих сторон,

значит  $AC=BD$ .

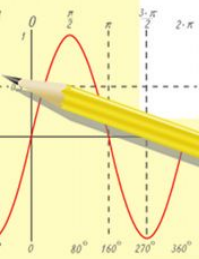


$y = \cos$

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



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



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

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

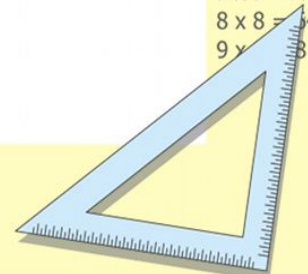
$$\sin 90^\circ = 1$$



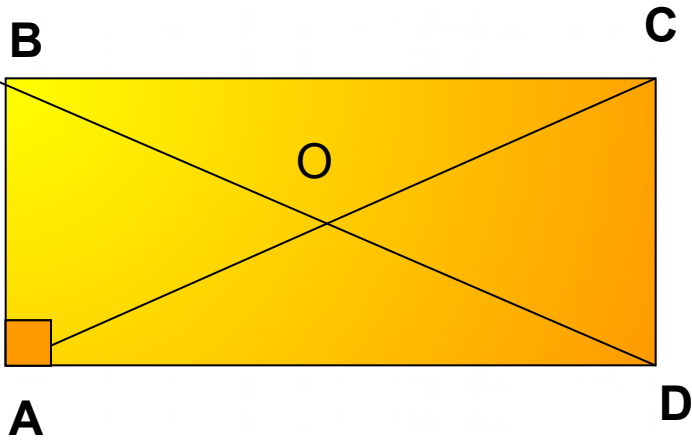
$$\begin{cases} y = \sin 90 \\ x = 25y + 45 \end{cases}$$

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

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

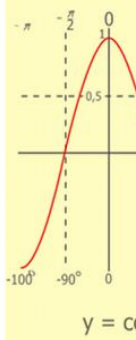
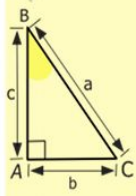
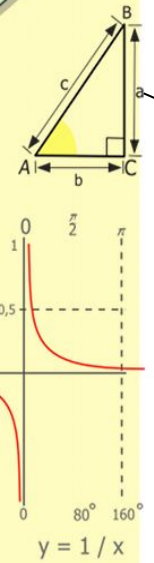
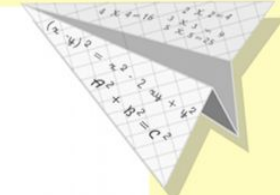
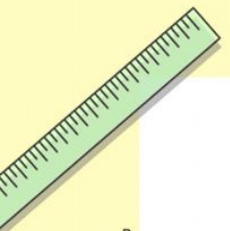


# Задача 1.



Дано:  
 ABCD - прямоугольник,  
 AB = 3 см, AD = 5 см, AC = 8 см  
 Найти:  
**P** Δ AOB = ?

Решение:



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

- 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



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

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

sin 90° = 1



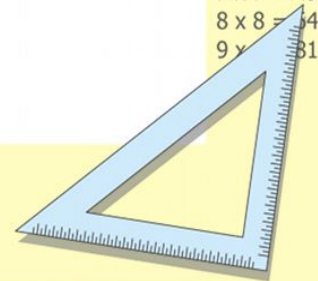
$$\begin{cases} y = \sin 90 \\ x = 25y + 45 \end{cases}$$

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


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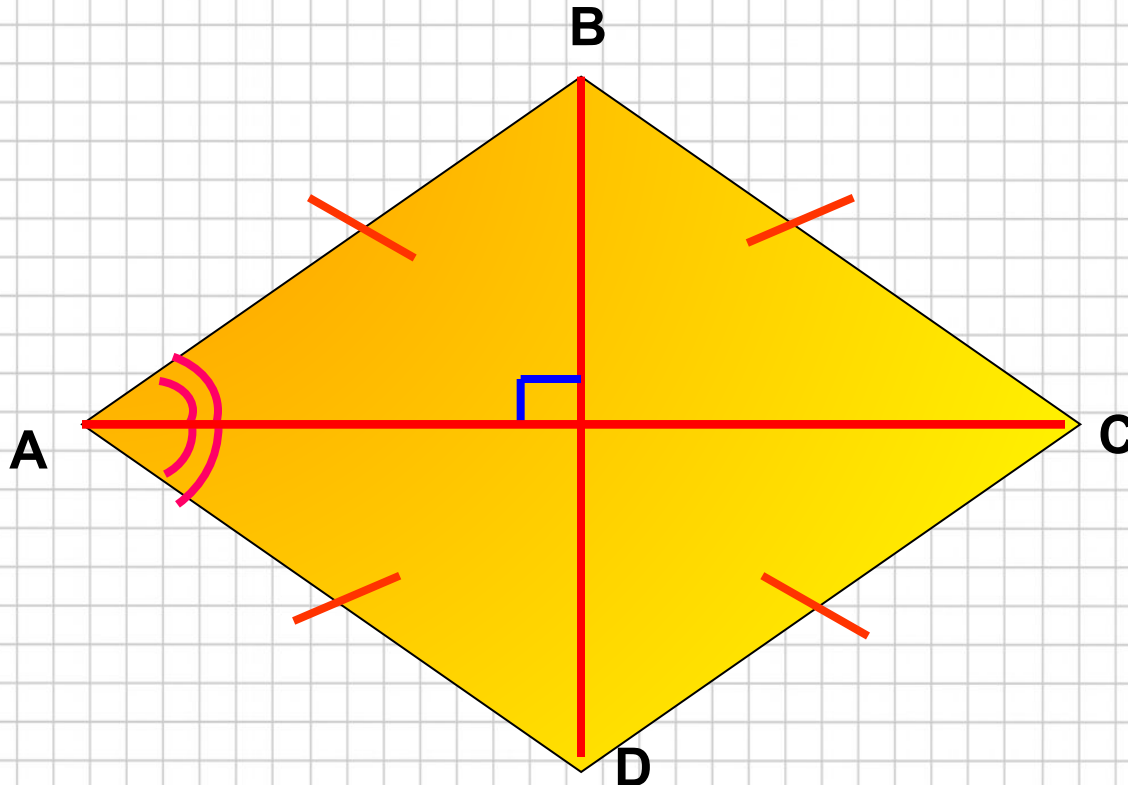

$$x = 70$$

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



# Математик

а



**Диагонали ромба являются биссектрисами его углов и взаимноперпендикулярны**

**$\angle BAO = \angle DAO, AC \perp BD$**

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

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

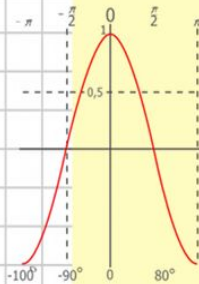
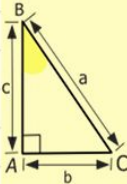
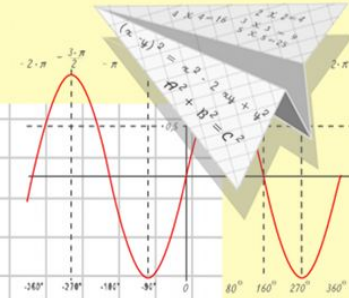
$$\sin 90^\circ = 1$$

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

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

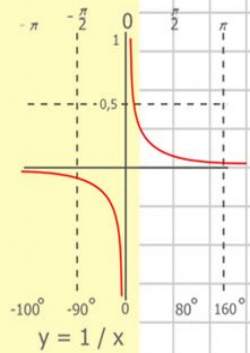
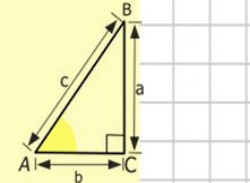
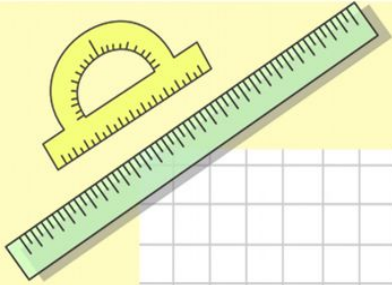
$$x = 70$$

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

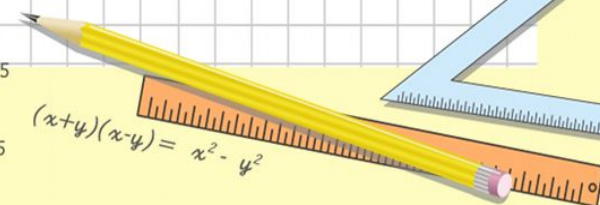


$$y = \cos x$$

- 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



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





**Теорема: Диагонали ромба пересекаются под прямыми углами и являются биссектрисами его углов.**

**Дано:** ABCD - ромб,  
AC и BD – диагонали,  
 $AC \cap BD = O$ .

**Доказать** 1)  $AC \perp BD$ ,

2) AC и BD – биссектрисы углов ромба.

**Доказательство**

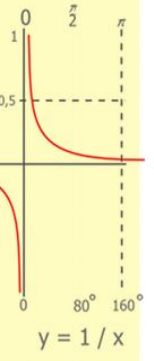
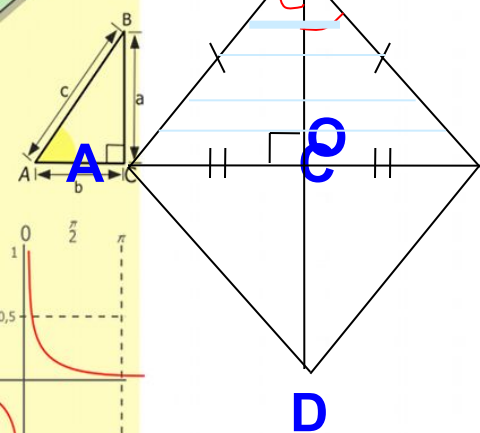
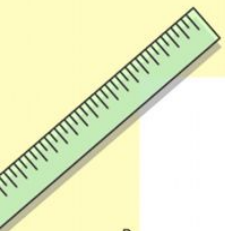
$\triangle ABC$  – равнобедренный с основанием AC,

O - середина AC (как точка пересечения диагоналей параллелограмма),  
тогда BO - медиана, значит BO – высота, и биссектриса.

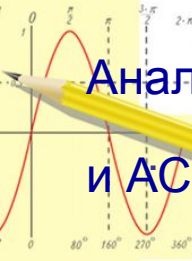
Получили: 1)  $AC \perp BD$ ; 2) BD - биссектриса угла B.

Аналогично доказывается, что BD – биссектриса угла D

и AC - биссектриса углов A и C.

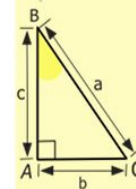
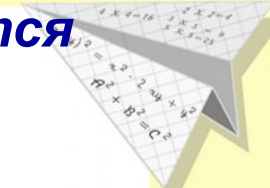


$y = 1/x$



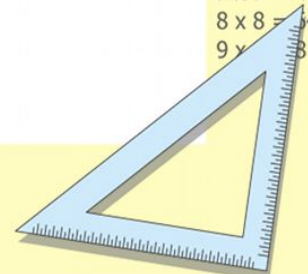
$$\begin{cases} x = 25y + 45 \\ y = 1 \\ x = 25 + 45 \\ x = 70 \end{cases}$$

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



$y = \cos$

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



## Задача 2.

**Дано:**

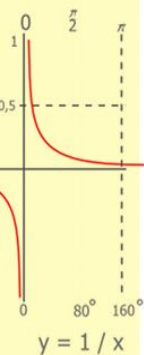
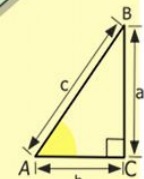
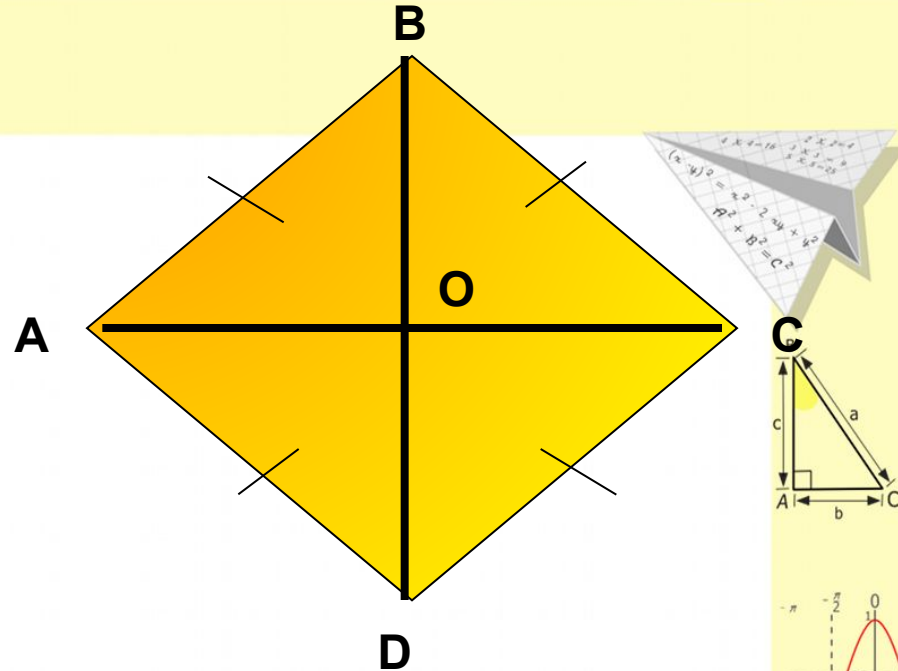
ABCD- ромб,

$\angle A = 80^\circ$

**Найти:**

$\angle \triangle AOB = ?$

**Решение:**



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



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

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

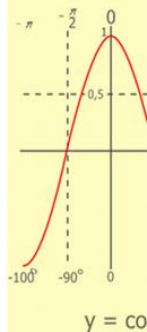
$$\sin 90^\circ = 1$$



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

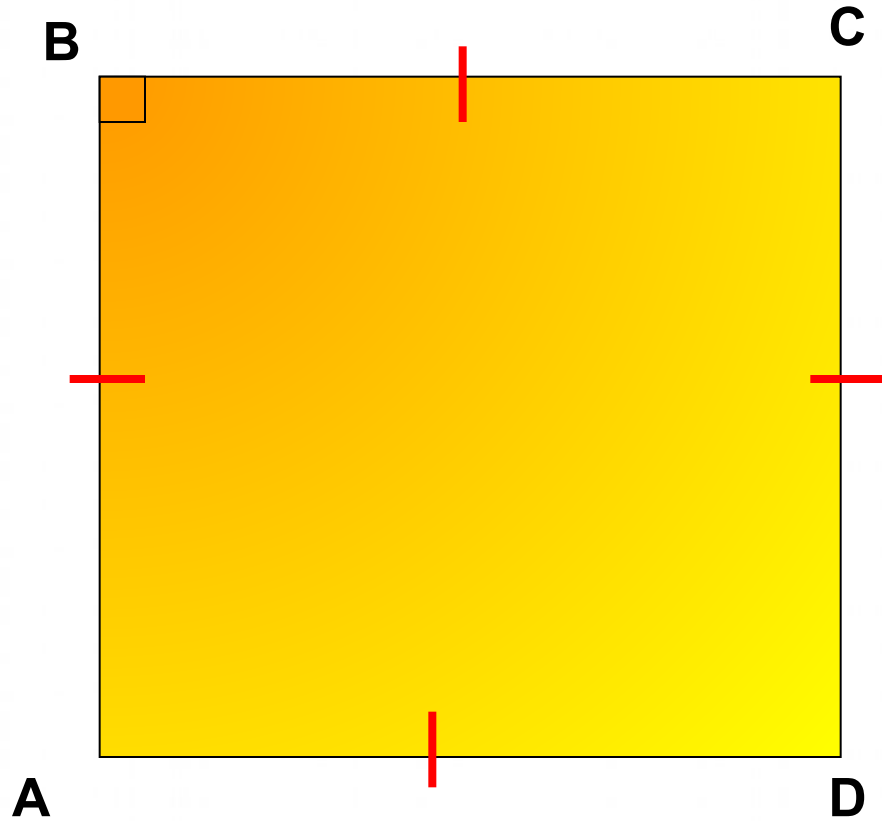
$$\begin{cases} y = 1 \\ x = 25 + 45 \\ \hline x = 70 \end{cases}$$

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



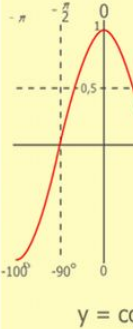
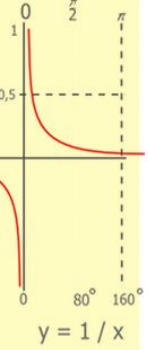
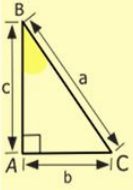
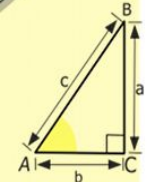
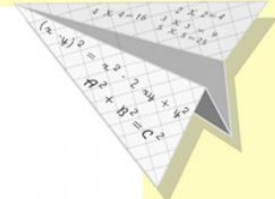
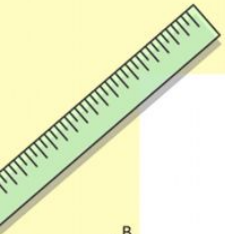
$$\begin{array}{l} 2 \times 2 = 4 \\ 3 \times 3 = 9 \\ 4 \times 4 = 16 \\ 5 \times 5 = 25 \\ 6 \times 6 = 36 \\ 7 \times 7 = 49 \\ 8 \times 8 = 64 \\ 9 \times 9 = 81 \end{array}$$

# Квадрат



Квадратом называется прямоугольник, у которого все стороны равны

$$AB = BC = CD = AD$$



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

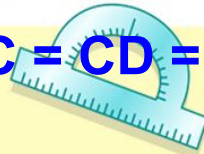
- 2 x 2 = 4
- 3 x 3 = 9
- 4 x 4 = 16
- 5 x 5 = 25
- 6 x 6 = 36
- 7 x 7 = 49
- 8 x 8 = 64
- 9 x 9 = 81



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

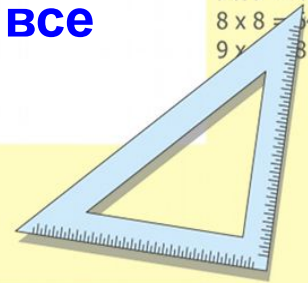
$$\frac{a}{c} + \frac{b}{c} = \frac{a+b}{c}$$

$$\sin 90^\circ$$

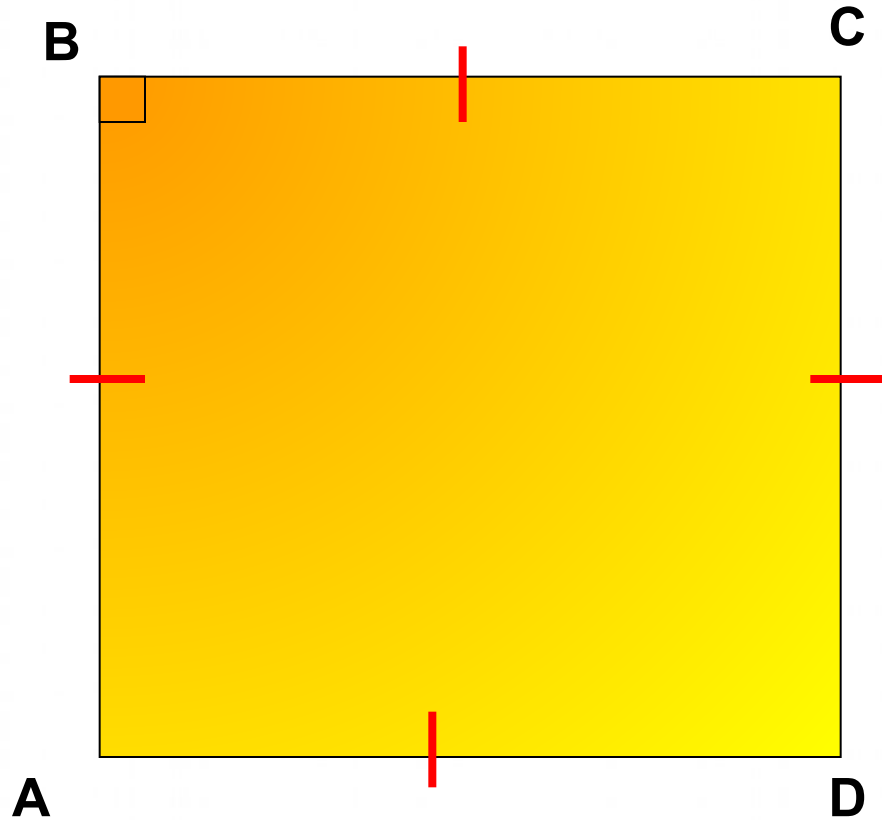


$$\begin{cases} y = \sin 90 \\ x = 25y + 45 \\ y = 1 \\ x = 25 + 45 \\ \hline x = 70 \end{cases}$$

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



# Квадрат



Квадратом называется ромб, у которого все углы прямые.

$$\angle A = \angle B = \angle C = \angle D = 90^\circ$$

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

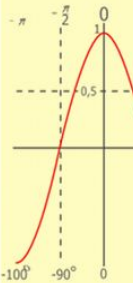
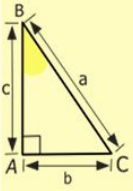
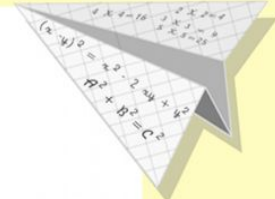
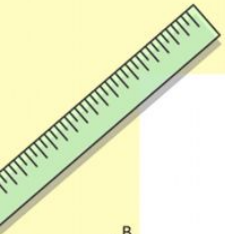
$$\frac{a}{c} + \frac{b}{c} = \frac{a+b}{c}$$

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



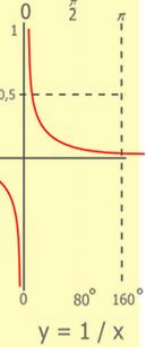
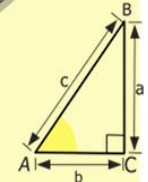
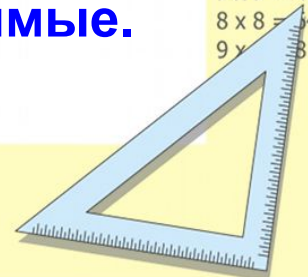
$$\begin{cases} y = \sin 90^\circ \\ x = 25y + 45 \\ y = 1 \\ x = 25 + 45 \\ \hline x = 70 \end{cases}$$

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

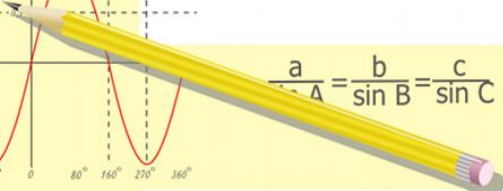


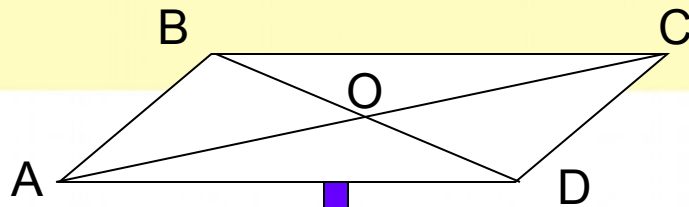
$$y = \cos$$

- 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



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



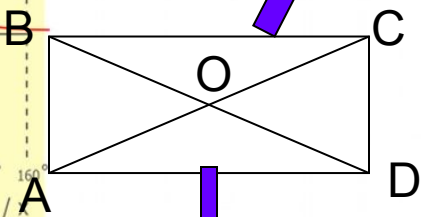


**1**  $AB \parallel CD$   
 $BC \parallel AD$

**2**  $AB = CD$   
 $BC = AD$

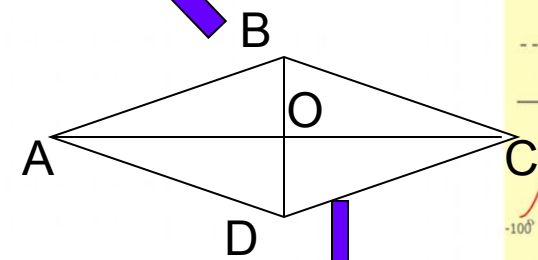
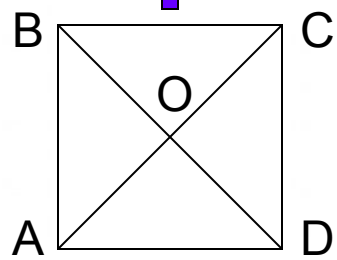
**3**  $\angle A = \angle C$   
 $\angle B = \angle D$

**4**  $AO = OC$   
 $BO = OD$



**5**  $\angle A = \angle B = \angle C = \angle D$

**6**  $BD = AC$



**7**  $AC \perp BD$

**8**  $\angle ABO = \angle CBO$   
 $\angle BAO = \angle DAO$

**9**  $AB = BC = CD = AD$

**10.** Квадрат является параллелограммом

**12.** Квадрат является прямоугольником.

**14.** Прямоугольник является параллелограммом.

**11.** Квадрат является ромбом.

**13.** Ромб является параллелограммом

$$\begin{cases} y = 2x + 45 \\ x = 25 + 45 \end{cases}$$

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

$$x = 70$$

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

$$\begin{matrix} 8 \times 8 = 64 \\ 9 \times 9 = 81 \end{matrix}$$

# Четырёхугольник

противоположные  
стороны  
которого  
параллельны

пара сторон  
сторон  
которого  
параллельны и равны

диагонали которого в  
точке пересечения  
делятся пополам

## Параллелограмм

у которого все углы прямые

у которого все стороны равны

### Прямоугольник

### Ромб

у которого все стороны равны

у которого все углы прямые

### Квадрат

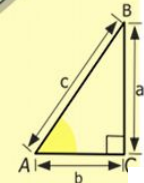
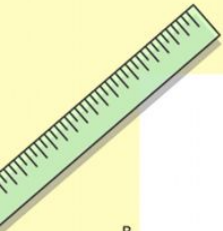
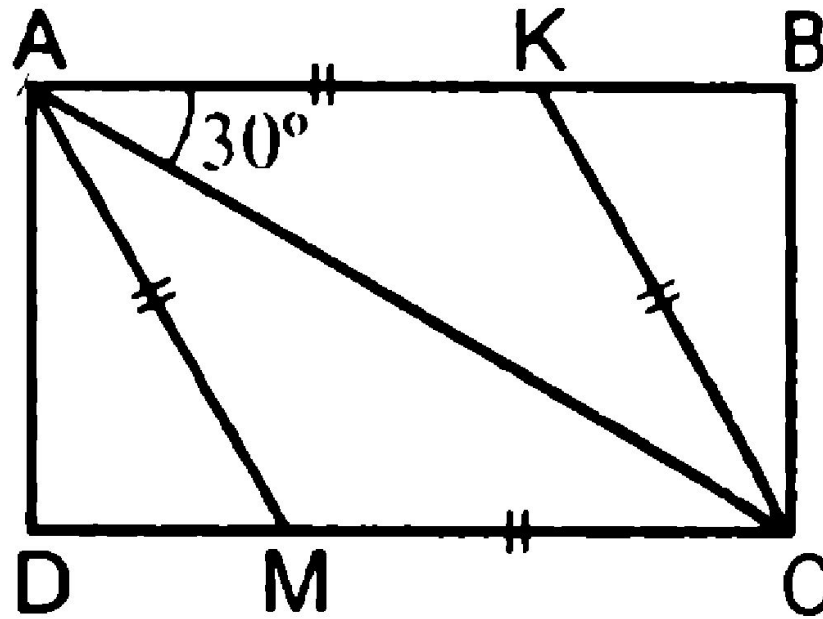
$$\frac{a}{A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$

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

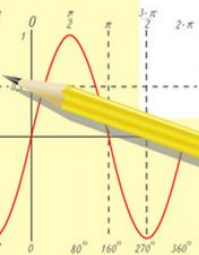
$$(x+y)(x-y) = x^2 - y^2$$

x = 70

Дано:  $ABCD$  – прямоугольник,  $AB = 3$ ,  $K \in AB$ ,  $M \in CD$ ,  
 $\angle KAC = 30^\circ$ ,  $AKCM$  – ромб.  
 Найти:  $AK$ .



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



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

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

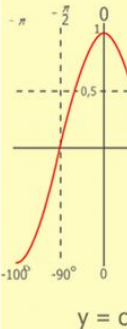
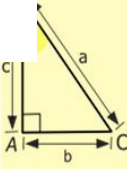
$$\sin 90^\circ = 1$$



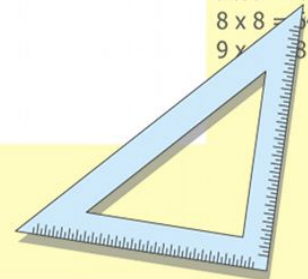
$$\begin{cases} y = \sin 90 \\ x = 25y + 45 \end{cases}$$

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

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

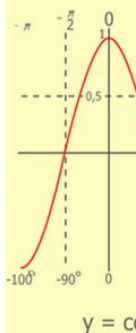
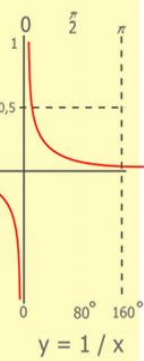
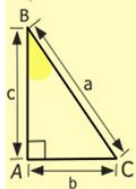
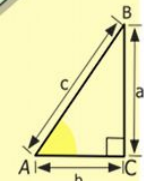
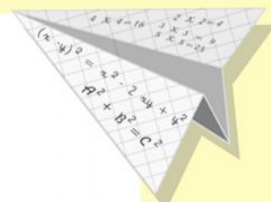
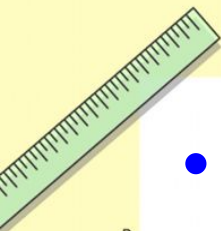


- $2 \times 2 = 4$
- $3 \times 3 = 9$
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- $9 \times 9 = 81$



# Домашнее задание

- 1. выучить определения и свойства п.45,46
- 2. №403,405.



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

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

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

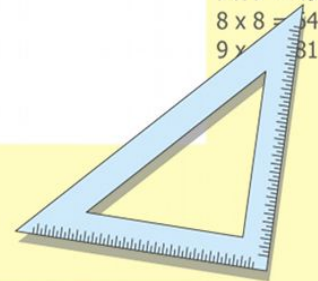
$$\sin 90^\circ = 1$$



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

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

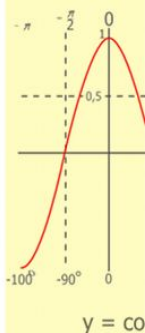
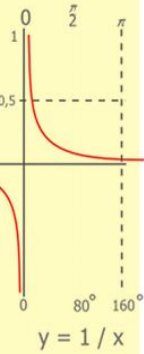
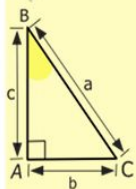
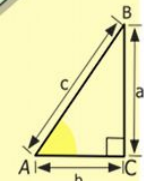
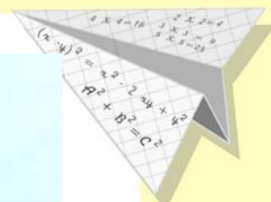
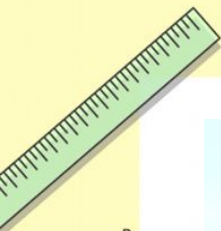
$$(x+y)(x-y) = x^2 - y^2$$





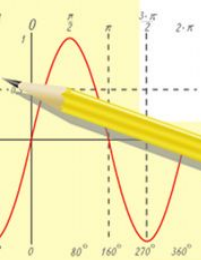
# Итоги урока

- Достигли ли мы поставленной цели?
- Какой главный итог нашего урока?
- Что мы использовали для достижения цели урока?



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

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



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

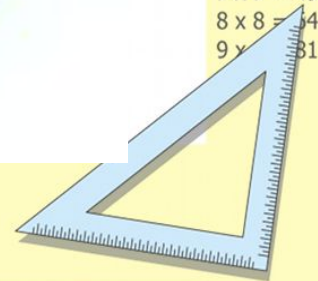
$$\frac{a}{c} + \frac{b}{c} = \frac{a+b}{c}$$

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



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

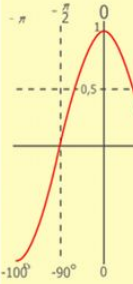
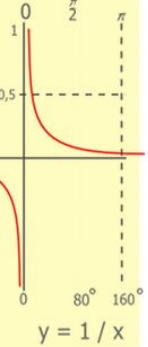
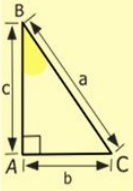
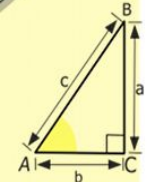
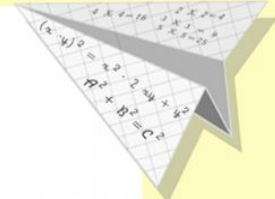
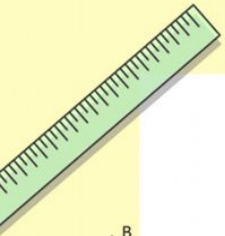
$$(x+y)(x-y) = x^2 - y^2$$



# спасибо

# за

# сотрудничество!!!



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

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

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

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