МБОУ «Кижингинская средняя школа им. Хоца Намсараева»

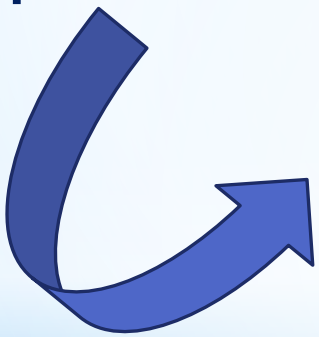
*«Решу задачи планиметрии!»

Система тренировочных упражнений для учащихся 10-11 классов

Автор: Заятуева Г.Н.
учитель математики

* ***Проблема:***

Задачи стереометрии



Задачи планиметрии

***Цели и задачи*:**

- Устранить у обучающихся «пробелы» в знаниях по планиметрии.

- Формировать специальные математические навыки решения планиметрических задач.

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Содержание

I. Подобные треугольники.

II. Соотношения между сторонами и углами прямоугольного треугольника.

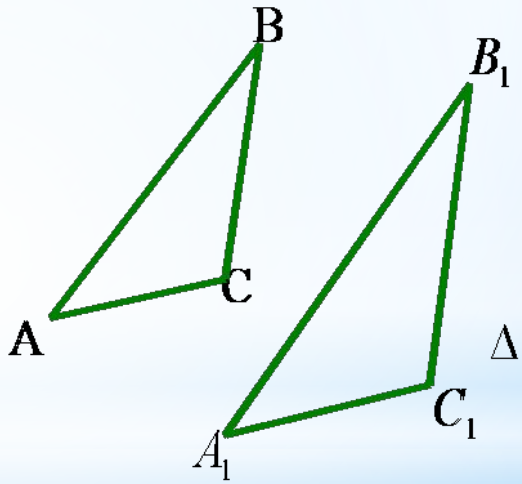
III. Площади фигур.

IV. Правильные многоугольники.

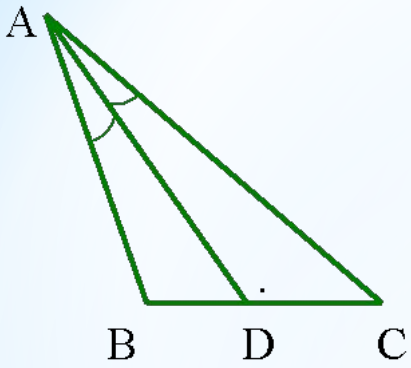
- Справочная таблица;
- Набор тренировочных упражнений;
- Проверочная работа;

* I. ПОДОБНЫЕ ТРЕУГОЛЬНИКИ

1. *Справочная таблица*

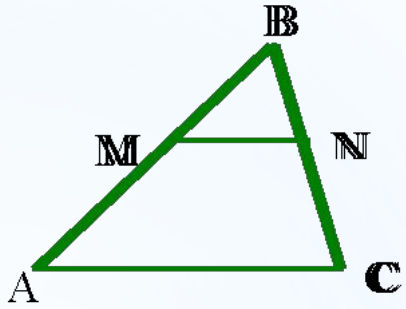
1.Определение подобных треугольников	2. Первый признак подобия треугольников
$\angle A = \angle A_1,\ \angle B = \angle B_1,\ \angle C = \angle C_1$ $\frac{AB}{A_1B_1} = \frac{BC}{B_1C_1} = \frac{AC}{A_1C_1} = k$ $\frac{S_{ABC}}{S_{A_1B_1C_1}} = k^2$	 $\angle A = \angle A_1$ $\angle C = \angle C_1$ $\Delta ABC \sim \Delta A_1B_1C_1$

3.Задачи



AD- *биссектриса*

$$\frac{BD}{AB}=\frac{DC}{AC}$$



$MN \parallel AC$

$$\frac{MB}{MA}=\frac{2}{3}$$

$$\frac{MA}{AB}=?$$

Решение:

$$\frac{MB}{MA}=\frac{2}{3},\ значит,\ MB=2k,\ MA=3k,$$

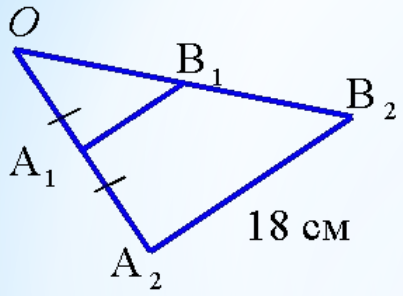
$$AB=5k\ и\ \frac{MA}{AB}=\frac{3k}{5k}=\frac{3}{5}.$$

$$Ответ:\ \frac{MA}{AB}=\frac{3}{5}.$$

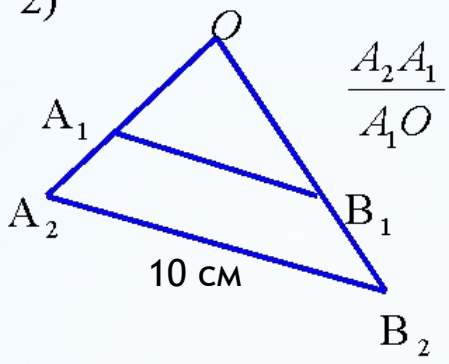
2. Тренировочные упражнения

Найти A_1B_1, *если* $A_1B_1 \parallel A_2B_2$

1)

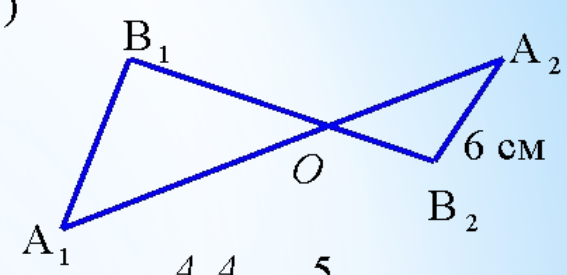


2)



$$\frac{A_2A_1}{A_1O} = \frac{2}{3}$$

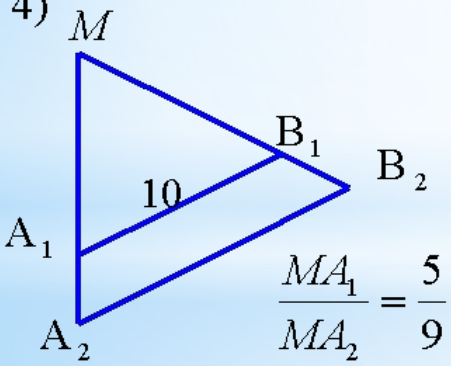
3)



$$\frac{A_1A_2}{A_1O} = \frac{5}{3}$$

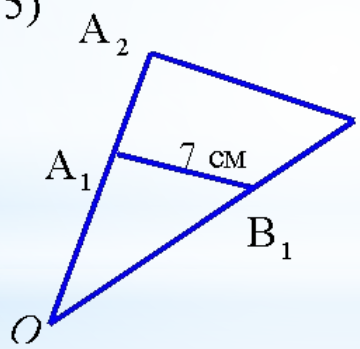
Найти A_2B_2, *если* $A_1B_1 \parallel A_2B_2$

4)



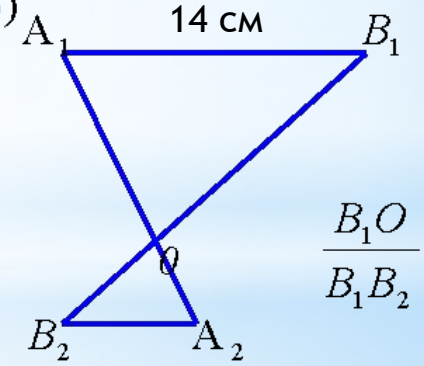
$$\frac{MA_1}{MA_2} = \frac{5}{9}$$

5)



$$\frac{A_1O}{A_1A_2} = \frac{4}{3}$$

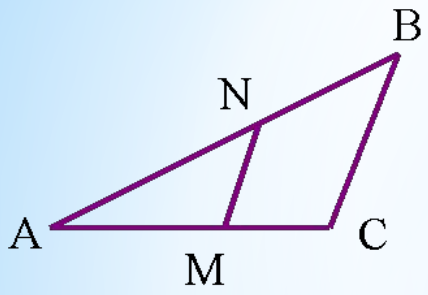
6)



$$\frac{B_1O}{B_1B_2} = \frac{5}{7}$$

3. Проверочная работа

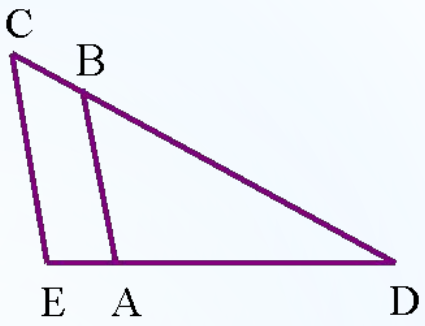
1) В-I



Дано: $MN \parallel BC$
$AN : NB = 7 : 2$
$BC = 2,7$ *см*.

Найти: MN

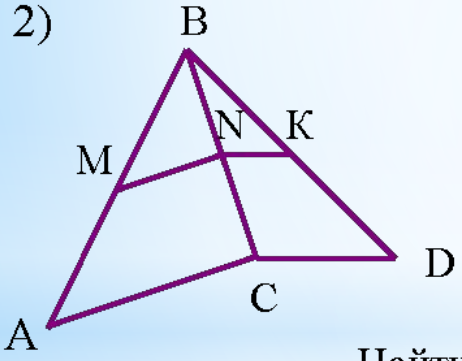
1) В-II



Дано: $BA \parallel CE$
$DB : BC = 5 : 2$
$AB = 4,5$ *см*

Найти: CE

2) В-I



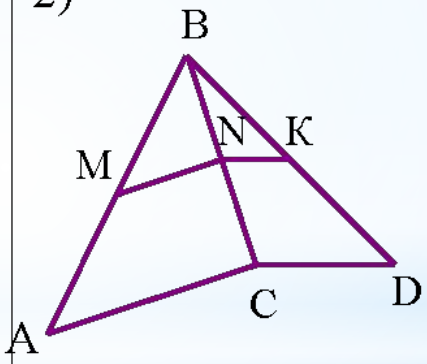
Дано: $MN \parallel AC$
$NK \parallel CD$

$$\frac{AM}{MB} = \frac{5}{3}$$

$NK = 1,8$ *см*

Найти: CD

2) В-II



Дано: $MN \parallel AC$
$NK \parallel CD$

$$\frac{AM}{MB} = \frac{2}{3}$$

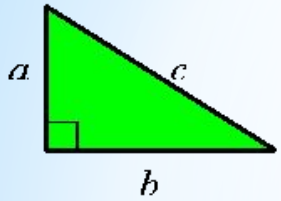
$CD = 2,1$ *дм*

Найти: NK

* II. СООТНОШЕНИЯ МЕЖДУ СТОРОНАМИ И УГЛАМИ ПРЯМОУГОЛЬНОГО ТРЕУГОЛЬНИКА

1.*Справочная таблица*

1.Теорема Пифагора

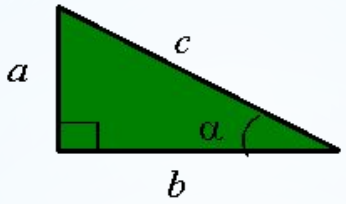


$$c^2 = a^2 + в^2, \quad c = \sqrt{a^2 + в^2};$$

$$a^2 = c^2 - в^2, \quad a = \sqrt{c^2 - в^2};$$

$$в^2 = c^2 - a^2, \quad в = \sqrt{c^2 - a^2}$$

2. Определение синуса, косинуса и тангенса острого угла и следствия из них

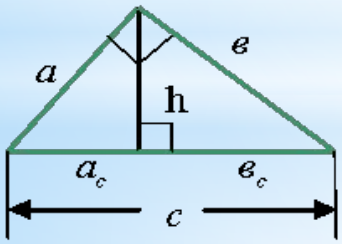


$$\sin\alpha = \frac{a}{c}, \quad a = c\cdot\sin\alpha, \quad c = \frac{a}{\sin\alpha};$$

$$\cos\alpha = \frac{b}{c}, \quad b = c\cdot\cos\alpha, \quad c = \frac{b}{\cos\alpha};$$

$$tg\alpha = \frac{a}{b}, \quad a = b\cdot tg\alpha, \quad b = \frac{a}{tg\alpha}.$$

3. Теоремы о среднем пропорциональном

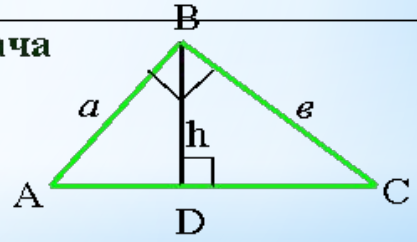


$$h^2 = a_c \cdot b_c, \quad h = \sqrt{a_c \cdot b_c};$$

$$a^2 = c \cdot a_c, \quad a = \sqrt{c \cdot a_c};$$

$$b^2 = c \cdot b_c, \quad b = \sqrt{c \cdot b_c}.$$

Задача



Найти: BD

Решение:

$$\sin A = \frac{BD}{a}; \quad \sin A = \frac{b}{AC};$$

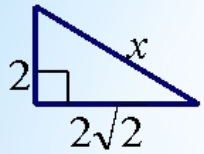
$$\vdots$$

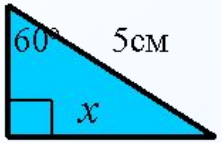
$$BD = \frac{ab}{\sqrt{a^2 + b^2}}.$$

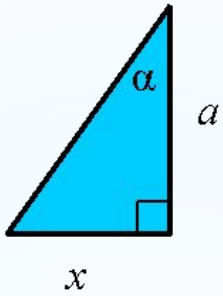
2. Тренировочные упражнения

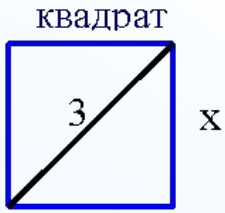
Найти x

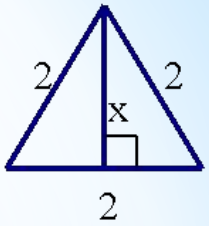
1)











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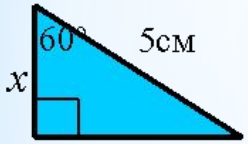

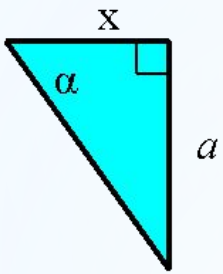

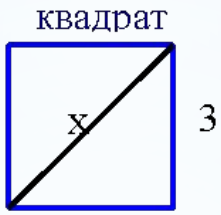

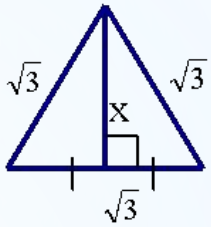

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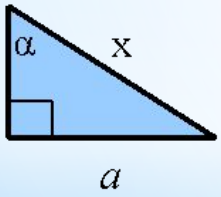

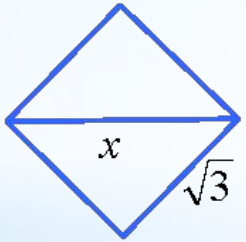

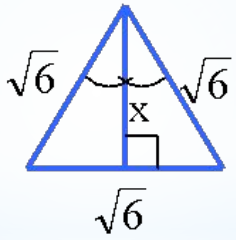

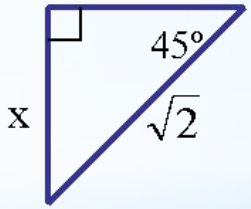

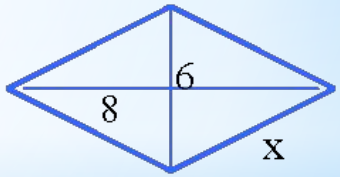

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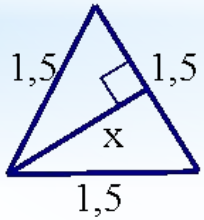

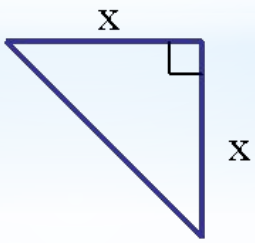

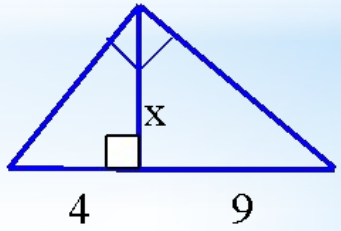

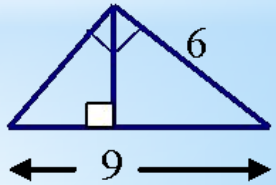

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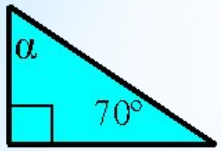
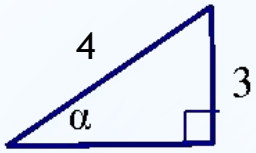
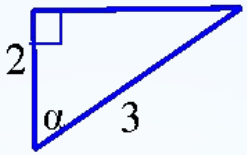
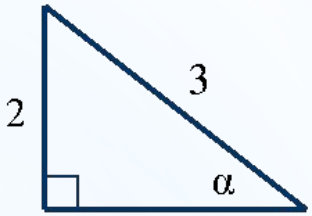
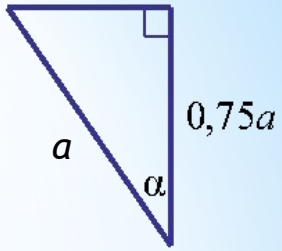
5)











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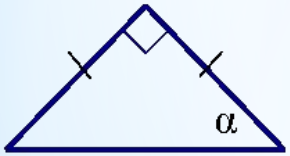

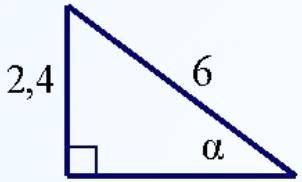

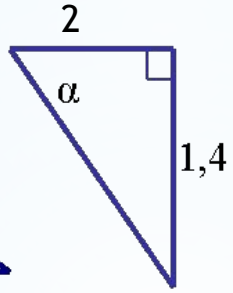

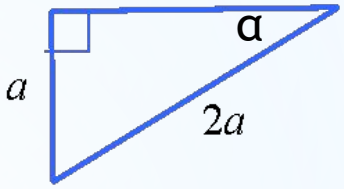

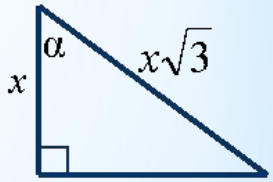

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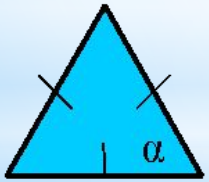
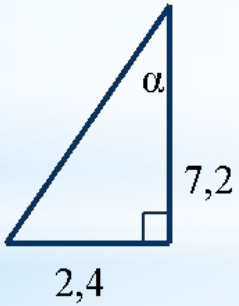
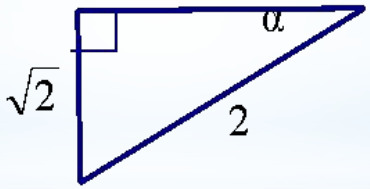
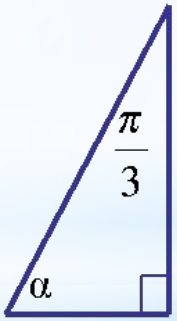
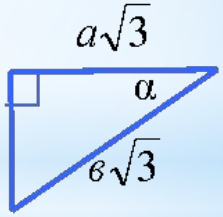








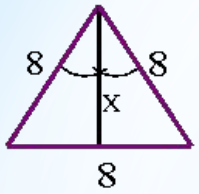


Проверочная работа №1

Найти x

Вариант 1

1)



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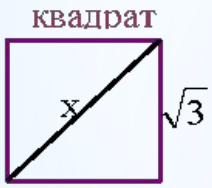

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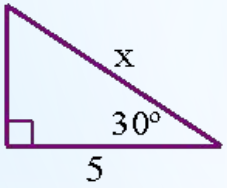
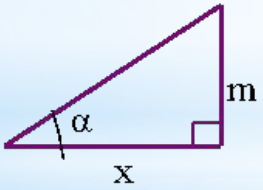
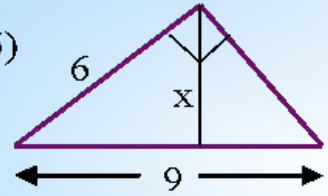


4)

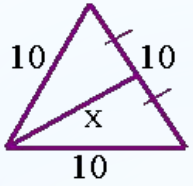


5)



Вариант 2

1)



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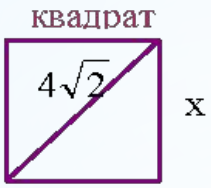

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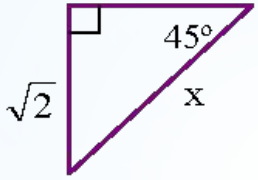

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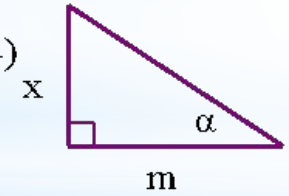

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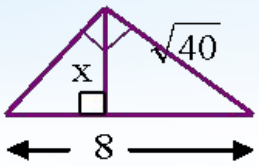
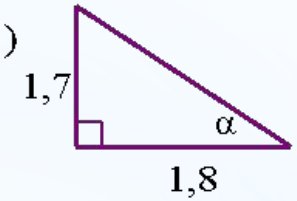


Проверочная работа №2

Найти угол α

Вариант 1

1)



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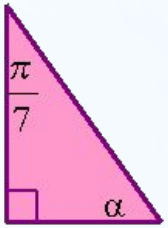
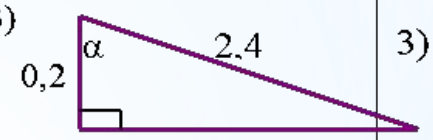


3)



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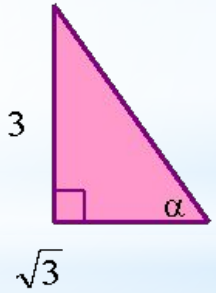
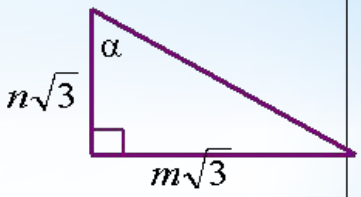
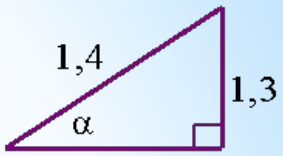


5)

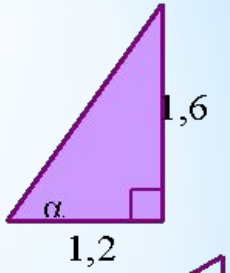


Вариант 2

1)



2)



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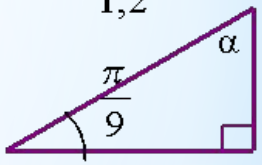

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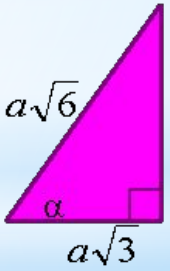

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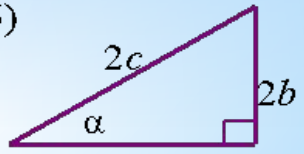
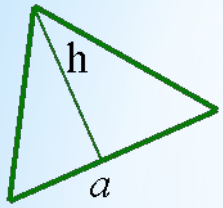
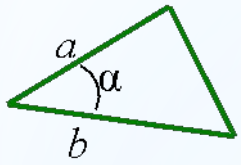
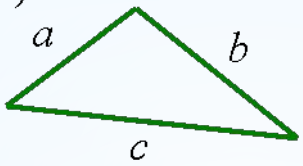
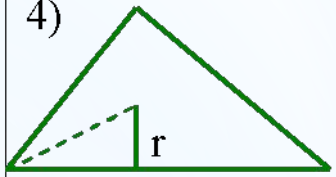
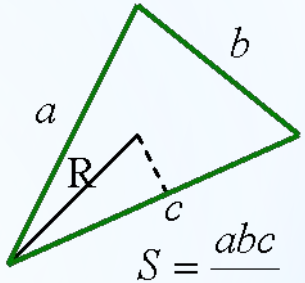
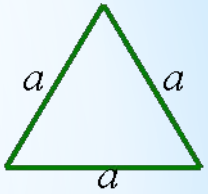
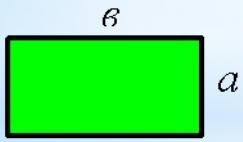
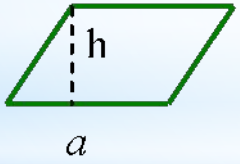
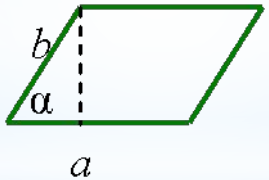
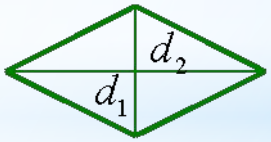
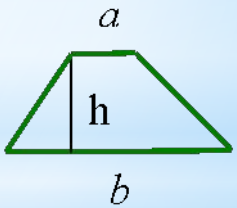
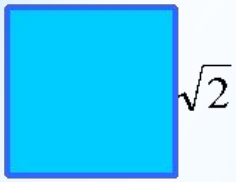
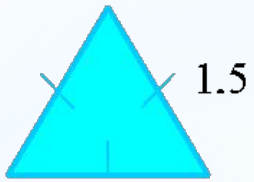
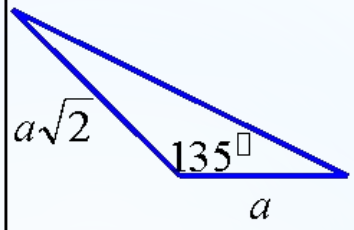
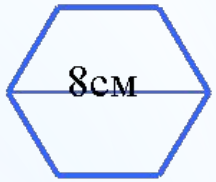
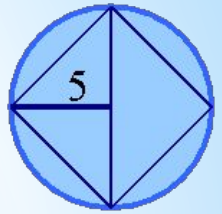
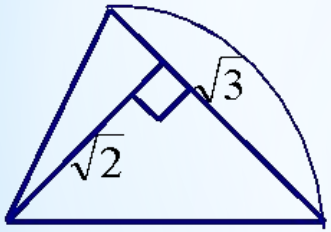
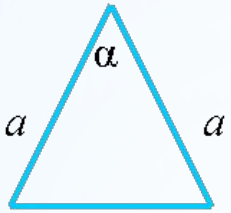
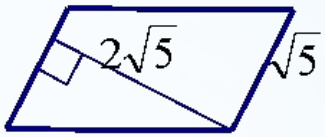
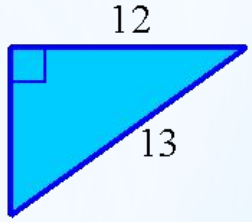
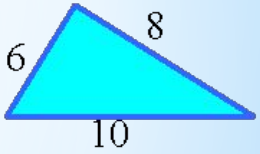
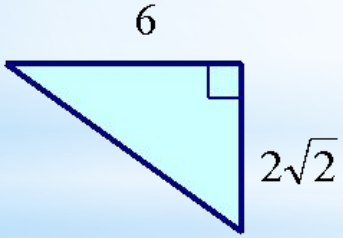
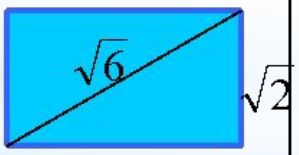
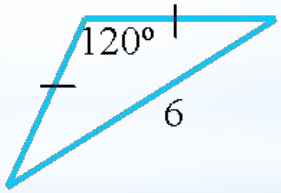
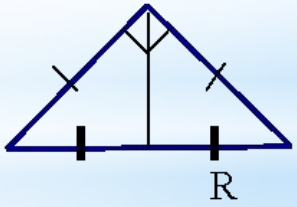
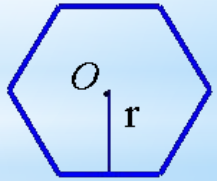


* III. ФОРМУЛЫ ПЛОЩАДЕЙ

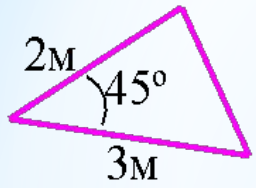
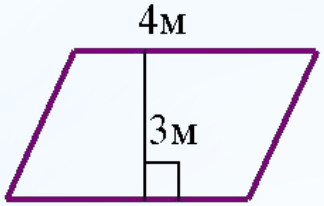
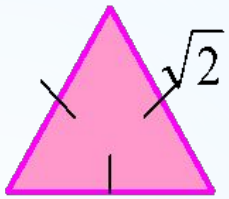
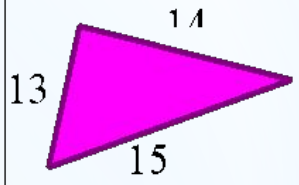
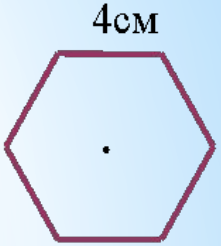
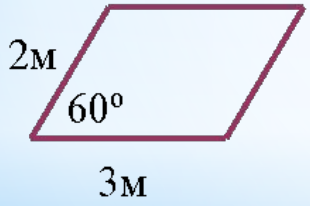
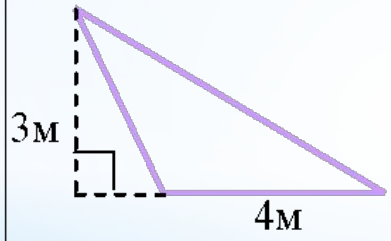
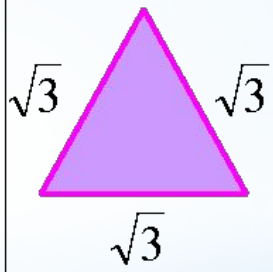
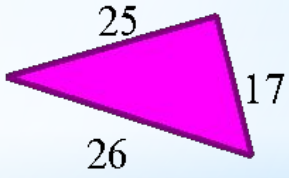
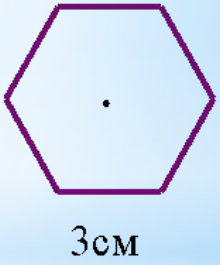
1.*Справочная таблица*

1)  $S = \frac{1}{2}ah$	2)  $S = \frac{1}{2}ab\sin\alpha$	3)  $S = \sqrt{p(p-a)(p-b)(p-c)}$ $p = \frac{a+b+c}{2}$	4)  $s = pr$  $S = \frac{abc}{4R}$	5)  $S = \frac{a^2\sqrt{3}}{4}$
 $S=ab$	 $S = ah$	 $S = ab\sin\alpha$	 $S = \frac{1}{2}d_1d_2$	 $S = \frac{1}{2}(a+b)\cdot h$

2. Тренировочные упражнения

Вычислить площадь фигуры					
1.					
2.					
3.					

3.Проверочная работа

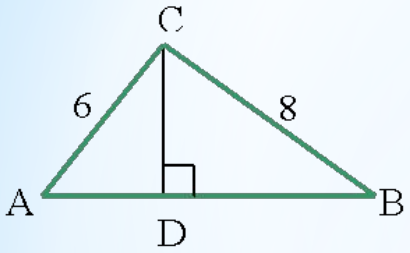
Вычислить площадь фигуры:					
В-I					
В-II					

Вычисление некоторых линейных элементов $[h, r, R]$ фигуры с использованием формулы площади

1.Справочная таблица

Задачи с решениями

Найти h



Дано : $\angle C = 90^{\circ}$,

$CD \perp AB,\ AC = 6,\ CB = 8.$

Найти : CD

Решение : $2S_{ABC} = AC \cdot BC,$

$2S_{ABC} = AB \cdot CD,$

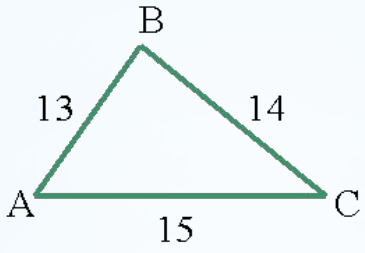
$CD = \dfrac{AC \cdot BC}{AB};$

$AB = \sqrt{6^2 + 8^2} = 10,$

$CD = \dfrac{6 \cdot 8}{10} = 4{,}8$

Ответ : $CD = 4{,}8$

Найти r



Найти : r

Решение :

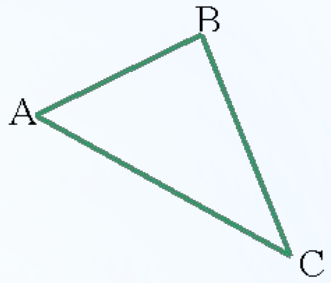
$S = \sqrt{21 \cdot 8 \cdot 7 \cdot 6} = 84$

$S = p \cdot r$

$r = \dfrac{s}{p} = \dfrac{84}{21} = 4$

Ответ : $r = 4.$

Найти R



Найти : R

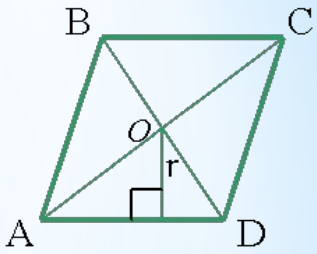
Решение :

$R = \dfrac{abc}{4S},$

$R = \dfrac{13 \cdot 14 \cdot 15}{4 \cdot 64} = 8\dfrac{1}{8}.$

Ответ : $R = 8\dfrac{1}{8}.$

Найти r



Дано : $ABCD$ – ромб,

$AC = 20,\ BD = 15.$

НАйти : r

Решение :

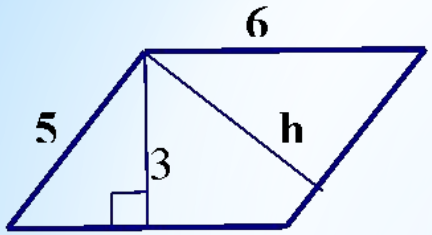
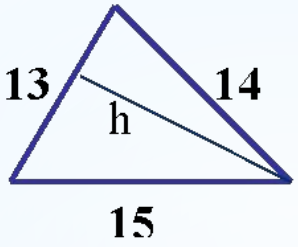
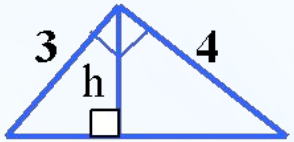
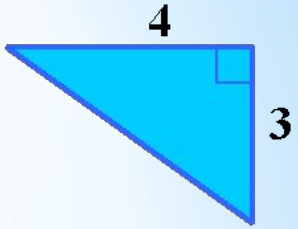
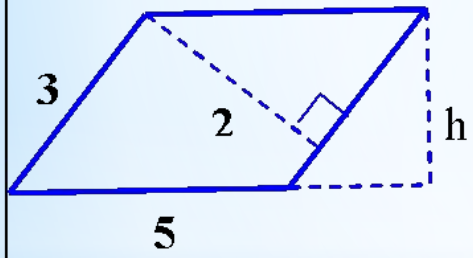
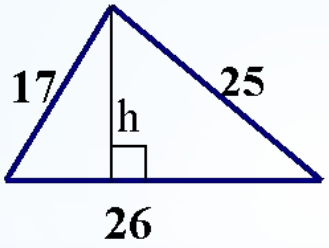
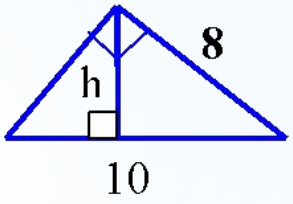
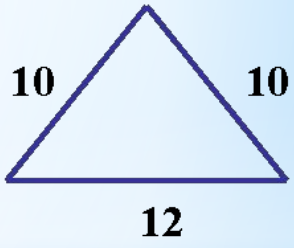
$S = \dfrac{1}{2} AC \cdot BD = 150$

$BC = 12{,}5$

$r = \dfrac{S}{p} = \dfrac{150}{25} = 6.$

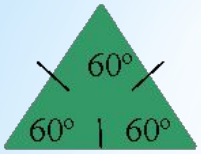
Ответ : $r = 6.$

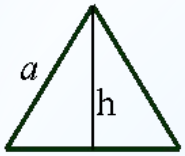
2. Тренировочные упражнения

	Найти h			Найти r и R
1.				
2.				

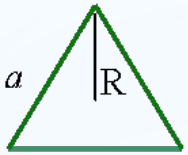
* IV. ПРАВИЛЬНЫЕ МНОГОУГОЛЬНИКИ

1. *Справочная таблица*

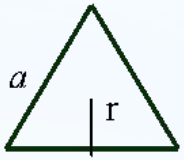




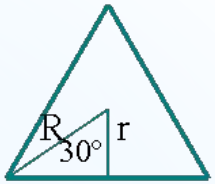
$$h = \frac{a\sqrt{3}}{2}$$



$$R = \frac{a}{\sqrt{3}};\ a = R\sqrt{3}$$

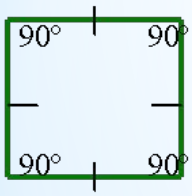


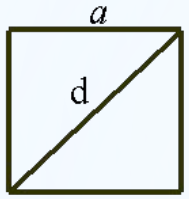
$$r = \frac{a}{2\sqrt{3}};$$



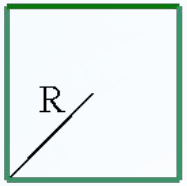
$$\frac{r}{R} = \frac{1}{2}$$

$$S = \frac{a^2\sqrt{3}}{4}$$

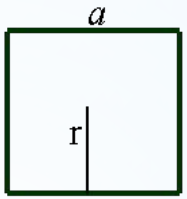




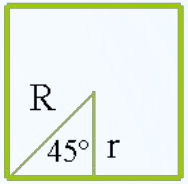
$$d = a\sqrt{2}$$



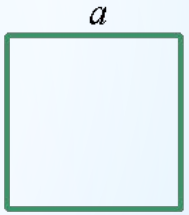
$$R = \frac{a}{\sqrt{2}},\ a = R\sqrt{2}$$



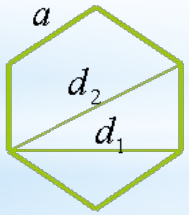
$$r = \frac{a}{2}$$



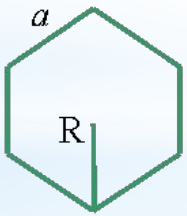
$$\frac{r}{R} = \frac{\sqrt{3}}{2}$$



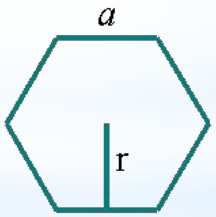
$$S = a^2$$



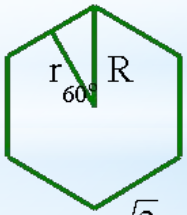
$$d_1 = a\sqrt{3}$$
$$d_2 = 2a$$



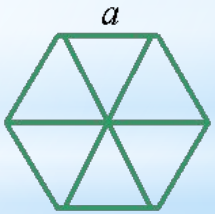
$$R = a$$



$$r = \frac{a\sqrt{3}}{2}$$



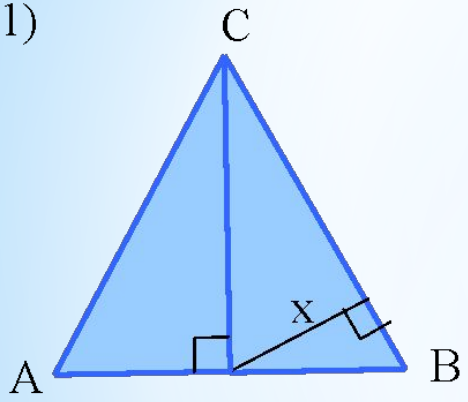
$$\frac{r}{R} = \frac{\sqrt{3}}{2}$$



$$S_{\triangle} = \frac{3a^2\sqrt{3}}{2}$$

2.Тренировочные упражнения

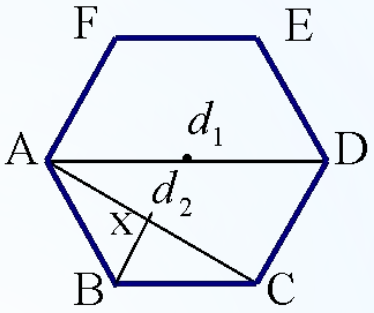
1)



Дано : ΔABC – *равносторонний*, $AB = 3$.

Найти : h, r, R, S, x.

2)



Дано : $ABCDEF$ – *правильный шестиугольник*, $AB = \sqrt{5}$.

Найти : d_1, d_2, r, s, x.

3.Проверочная работа .

Дан правильный треугольник АВС

I вариант	II вариант
1. $AB = m$. Найти медиану BD.	1. $AB = n$. Найти биссектрису AD.
2. $BD \perp AC$, $BD = 1$. Найти AB.	2. $AD \perp BC$, $AD = k$. Найти AC.
3. О- центр $\triangle$АВС, АО=3. Найти АВ.	3. О- центр $\triangle ABC$, $OK \perp AC$, $OK=3$. Найти AC.
4. О- центр, ОМ$\perp$АВ, ОМ=2. Найти АВ.	4. О- центр $\triangle ABC$, $OC=2$. Найти AC.
5. $S_{\Delta ABC} = 6\sqrt{3}$. Найти АВ.	5. $S_{\Delta ABC} = 8\sqrt{3}$. Найти АС.

*Спасибо за внимание!