Теоремы синусов и косинусов.

9 класс.

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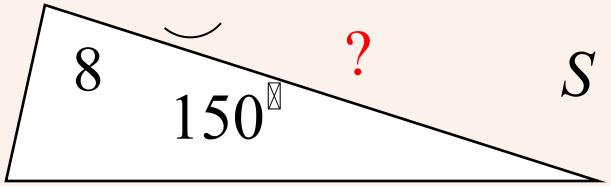
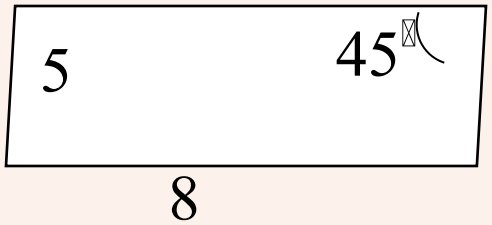
Самостоятельная работа:

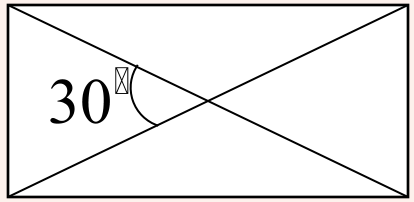
1 вариант:



$S = 20$



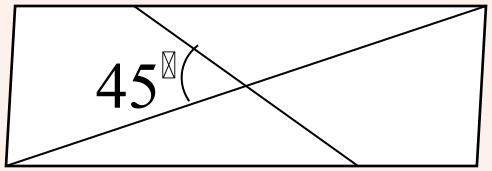
$S - ?$



d=8

$S - ?$

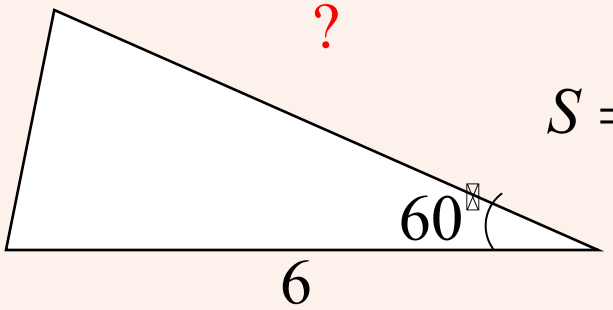
2 вариант:



$d_1 = 8см$

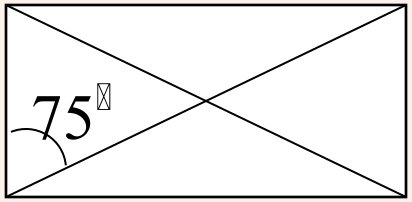
$d_2 = 12см$

$S - ?$



$S = 18$

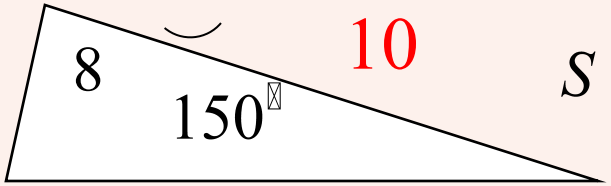
d=10



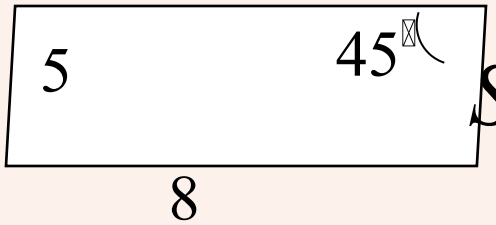
$S - ?$

Проверь ответы:

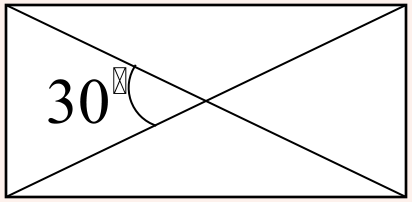
1 вариант:



$S = 20$



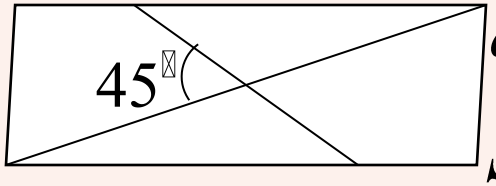
$S = 20\sqrt{2}$



d=8

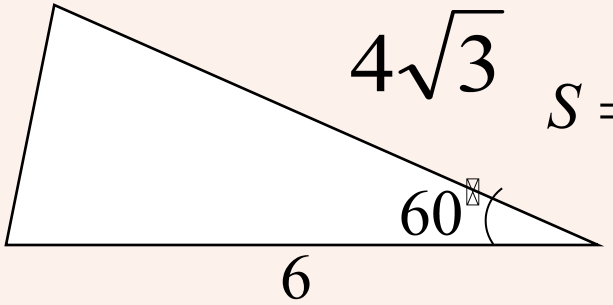
$S = 16$

2 вариант:



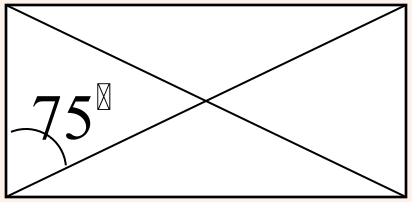
$d_1 = 8, d_2 = 12$

$S = 24\sqrt{2}$



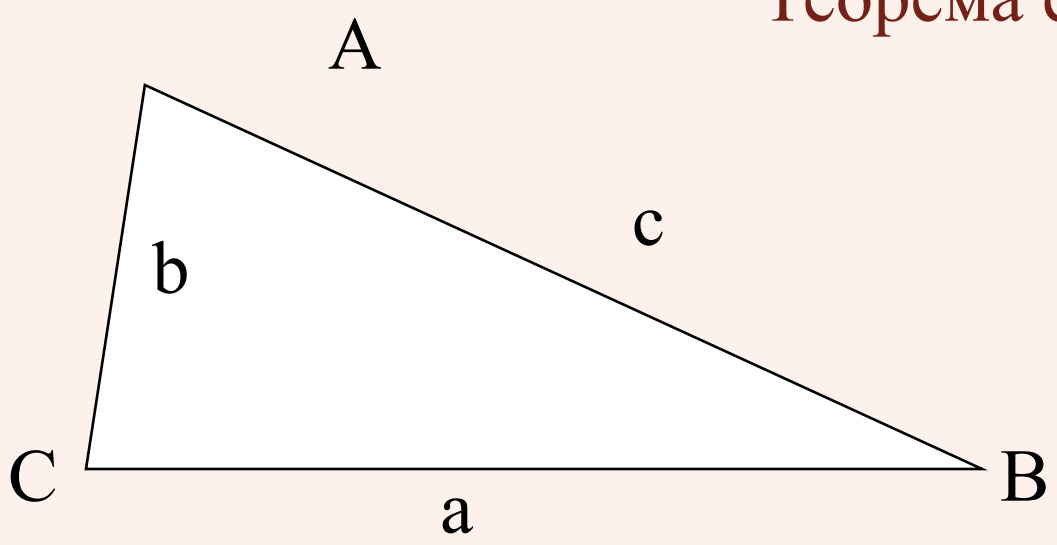
$S = 18$

d=10



$S = 25$

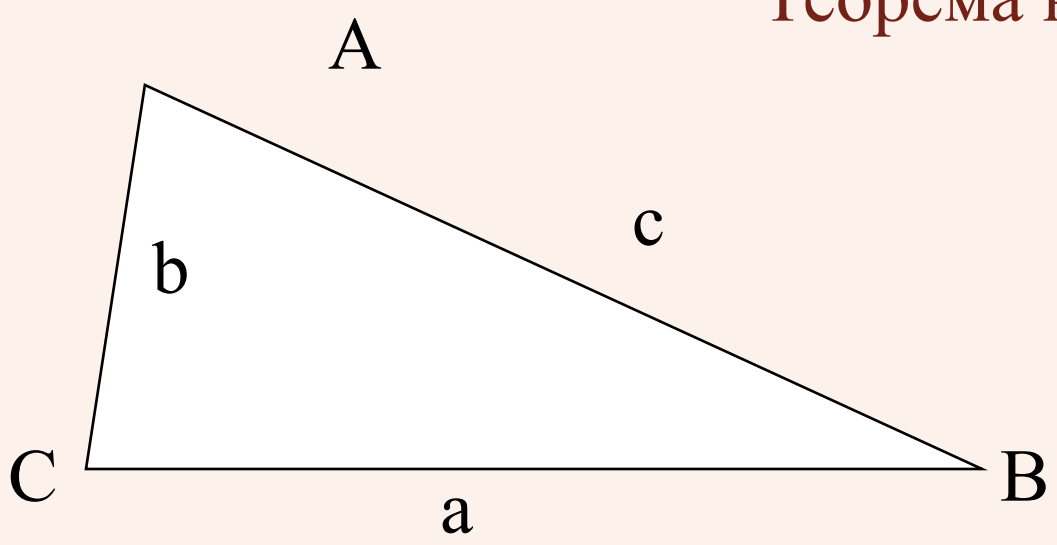
Теорема синусов:



Стороны треугольника пропорциональны синусам противолежащих углов

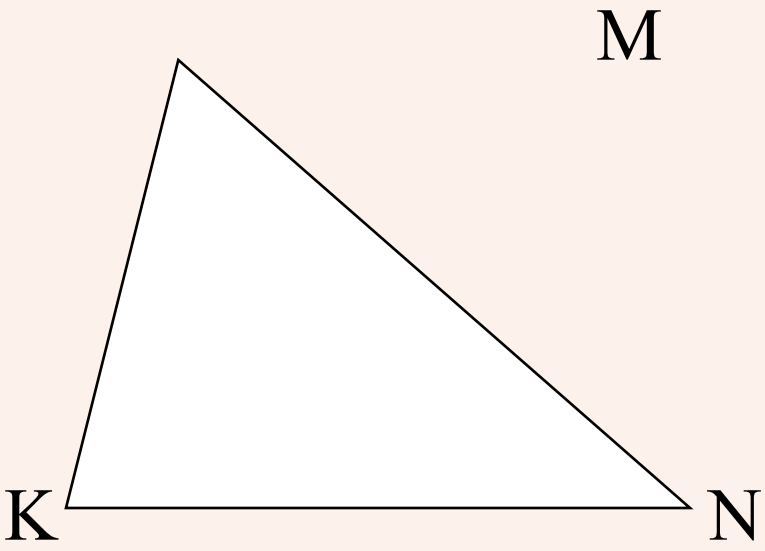
$$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$

Теорема косинусов:



Квадрат стороны треугольника равен сумме квадратов двух других сторон минус удвоенное произведение этих сторон на косинус угла между ними

$$a^2 = b^2 + c^2 - 2bc\cos A$$

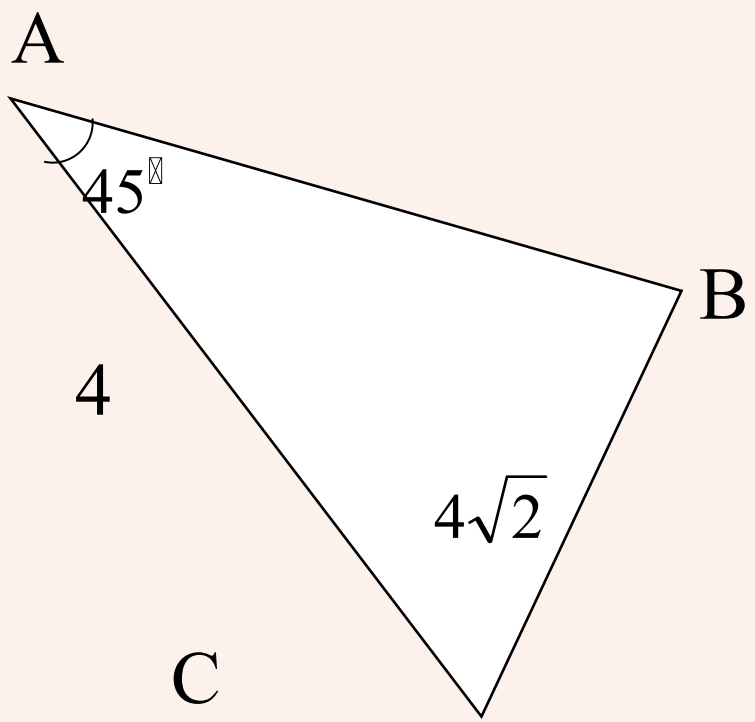


1) Запишите теорему синусов для данного треугольника:

$$\frac{MN}{\sin K} = \frac{NK}{\sin M} = \frac{KM}{\sin N}$$

2) Запишите теорему косинусов для вычисления стороны МК:

$$MK^2 = NM^2 + NK^2 - 2NM \cdot NK \cos N$$



Найдите угол B.

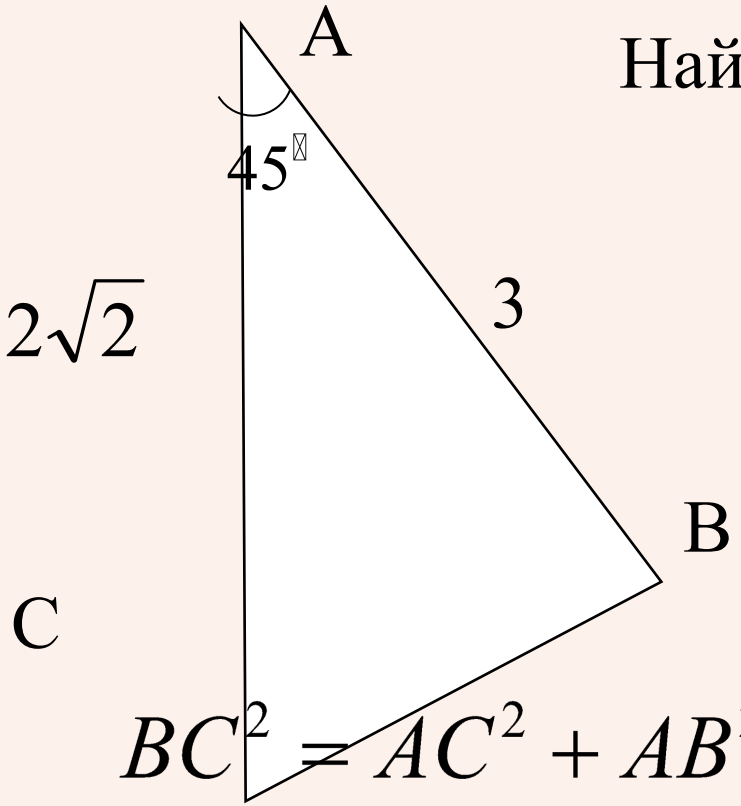
$$\frac{BC}{\sin A} = \frac{AC}{\sin B}$$

$$\sin B = \frac{AC \sin A}{BC}$$

$$\sin B = \frac{4 \sin 45^\circ}{4\sqrt{2}}$$

$$\sin B = \frac{1}{2} \Rightarrow \angle B = 30^\circ$$

Найдите длину стороны BC.

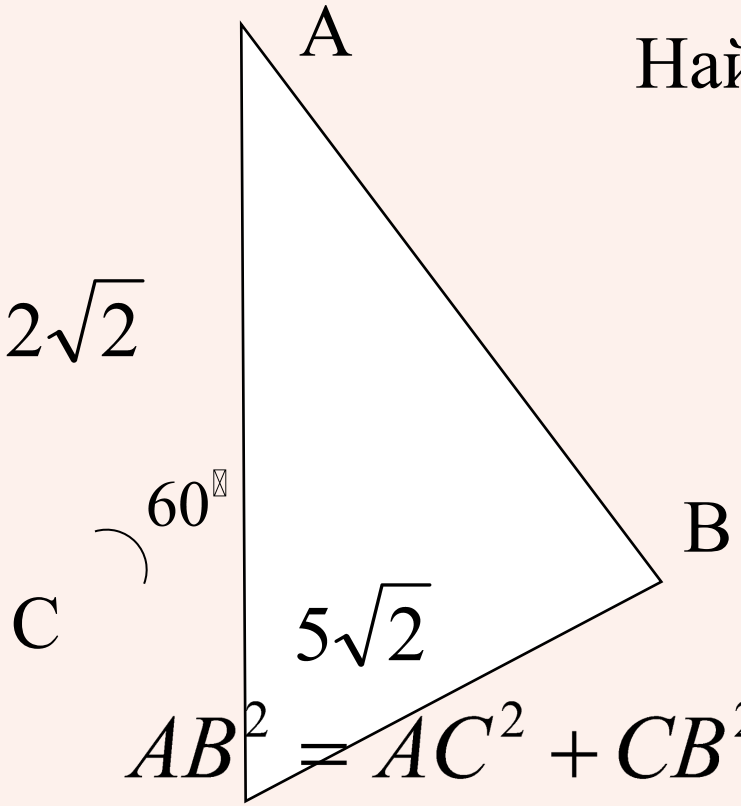


$$BC^2 = AC^2 + AB^2 - 2AC \cdot AB \cos A$$

$$BC^2 = (2\sqrt{2})^2 + 3^2 - 2 \cdot 2\sqrt{2} \cdot 3 \cos 45^\circ$$

$$BC^2 = 5 \Rightarrow BC = \sqrt{5}$$

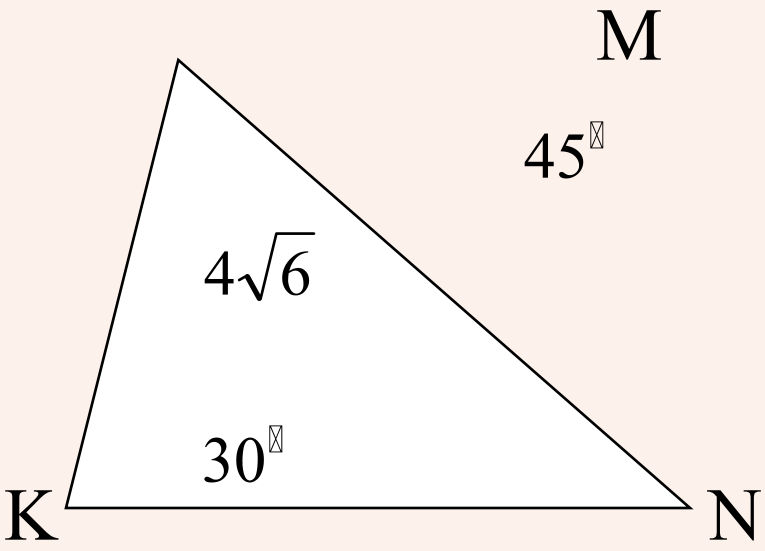
Найдите длину стороны AB.



$$AB^2 = AC^2 + CB^2 - 2AC \cdot CB \cos C$$

$$BC^2 = (2\sqrt{2})^2 + (5\sqrt{2})^2 - 2 \cdot 2\sqrt{2} \cdot 5\sqrt{2} \cos 60^\circ$$

$$BC^2 = 38 \Rightarrow BC = \sqrt{38}$$



$\angle M = 45^\circ, \angle K = 30^\circ,$

$KN = 4\sqrt{6}$

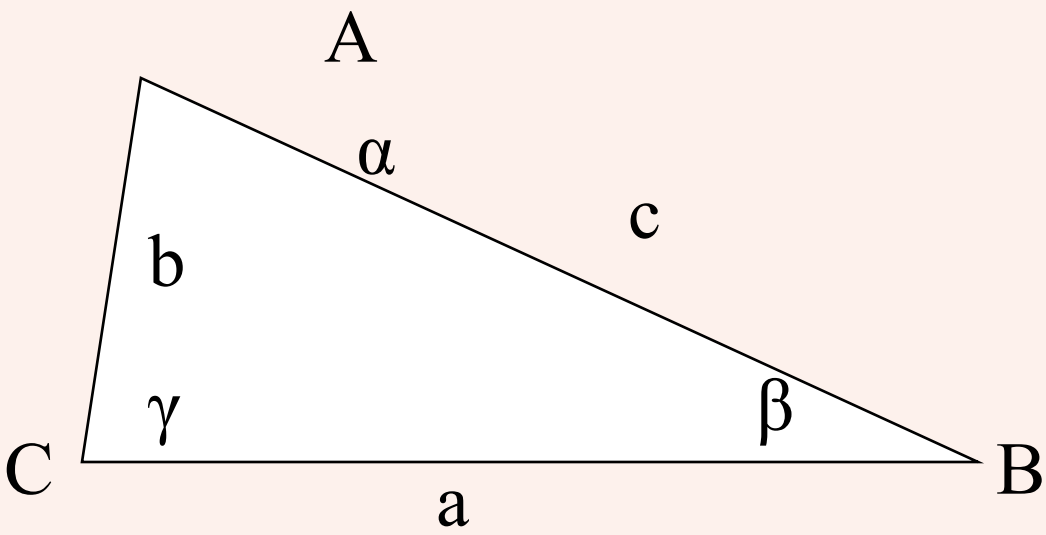
Найдите MN.

$$\frac{MN}{\sin K} = \frac{KN}{\sin M}$$

$$MN = \frac{4\sqrt{6}\sin 30^\circ}{\sin 45^\circ}$$

$$MN = \frac{KN \sin K}{\sin M}$$

$$MN = 4\sqrt{3}$$



Запишите формулу для вычисления:

AB, если $\angle C = \gamma$, $AC = b$.

BC, если $\angle B = \beta$, $AC = b$.

AC, если $\angle B = \beta$, $BC = a$.

$\angle C$, если $AB = c$, $AC = b$.

$\angle B$, если $AB = c$, $BC = a$.

$\angle A$, если $AC = b$, $BC = a$.

$$BC = \sqrt{AB^2 + AC^2 - 2AB \cdot AC \cdot \cos\alpha}$$

$$\sin\beta = \frac{b \cdot \sin\gamma}{c}$$

$$\sin\gamma = \frac{c \cdot \sin\beta}{b}$$

$$\sin(\gamma + \beta) = \sin\alpha$$