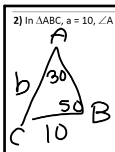
Lesson 78 Objective: SWBAT find the area of a triangle when the height is not given.

PUT YOUR WEEKLY HW ON MY DESK!

Kickoff

From our notes yesterday (not the HW sheet the other one!) complete question 2,3,4.

2) In ΔABC, a = 10, ∠A = 30°, and ∠B = 50°. Find side b to the nearest integer.



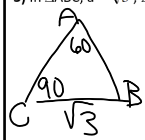
$\frac{a}{\sin A} = \frac{b}{\sin B}$

$\frac{10}{\sin 30} = \frac{b}{\sin 50}$

$\frac{b\sin 30}{\sin 30} = \frac{10\sin 50}{\sin 30}$

$b = 15$

3) In ΔABC, a = $\sqrt{3}$, ∠A = 60°, and ∠C = 90°. Find the length of side c.



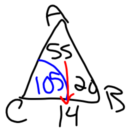
$\frac{a}{\sin A} = \frac{c}{\sin C}$

$\frac{\sqrt{3}}{\sin 60} = \frac{c}{\sin 90}$

$\frac{\sqrt{3}\sin 90}{\sin 60} = \frac{c\sin 60}{\sin 60}$

$2 = c$

4) In ΔABC, m<A = 55, m<B = 20, and side a = 14. Solve the triangle. everything!



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

$\frac{14}{\sin 55} = \frac{b}{\sin 20}$

$b = \frac{14\sin 20}{\sin 55}$

$b = 6$

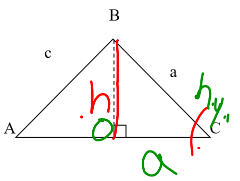
$\frac{a}{\sin A} = \frac{c}{\sin C}$

$\frac{14}{\sin 55} = \frac{c}{\sin 105}$

$c = \frac{14\sin 105}{\sin 55}$

$c = 17$

Area of a Triangle



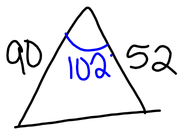
Area = $\frac{1}{2}b\boxed{h}$

$\frac{h}{a} = \sin C$

$h = a\sin C$

$$\boxed{A = \frac{1}{2}ba\sin C}$$

1. Find the area of a triangular lot having sides of lengths 90 meters and 52 meters and an included angle of 102°.

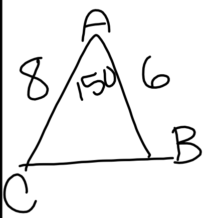


$A = \frac{1}{2}ab\sin C$

$\frac{1}{2}(90)(52)\sin 102$

$$\boxed{A = 2288.9\ m^2}$$

2. Find the area of ΔABC if ∠A = 150°, b = 8 and c = 6.

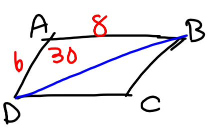


$A = \frac{1}{2}ab\sin C$

$\frac{1}{2}(8)(6)\sin 150$

$$\boxed{A = 12}$$

3. Find the area of parallelogram ABCD if ∠A = 30°, and a pair of adjacent sides equal 6 and 8 inches, respectively. (How does this change the formula we already know about triangles?)



$A_{\Delta} = \frac{1}{2}ab\sin C$

$\frac{1}{2}(6)(8)\sin 30$

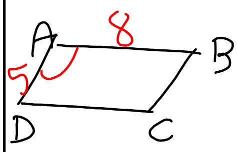
$A_{\Delta} = 12 \cdot 2$

$A_{\square} = ab\sin C$

$$\boxed{A_{\square} = 24\ in^2}$$

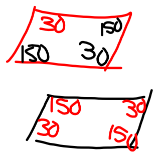
4. Find the area of an equilateral triangle whose side equals 4 cm.

5. If the area of parallelogram ABCD is 20 square feet and the two adjacent sides measure 5 feet and 8 feet respectively, find the measure of ∠A, the angle between the two sides.



$A = 20m^2$

Parallelogram → 360°



$A = ab\sin C$

$20 = (5)(8)\sin A$

$\frac{20}{40} = \frac{40\sin A}{40}$

$\frac{1}{2} = \sin A$

ref ∡ 30

$\boxed{\text{I } \theta = 30 \text{ OR II } \theta = 150}$

6. In isosceles triangle RST, RS = ST = 6 and ∠T = 75°. Find the area of this triangle.

7. In *ABC*, *AB* = 12 meters and *AC* = 20 meters. If the area of the triangle is 77 sq. meters, find the measure of <*A*, to the *nearest degree*.

8. A farmer has a triangular field where two sides measure 450 yards and 320 yards. The angle between these two sides measures 80º. The farmer wishes to use an insecticide that costs $4.50 per 100 sq. yard. What will it cost to use this insecticide on this field?