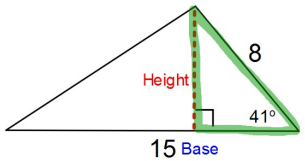
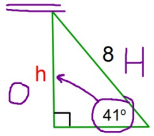
Thursday, April 2, 2020

Sec 10-5: Trigonometry and Area

Find the area of this triangle to the nearest hundredth.



SOHCAHTOA



$A = \frac{1}{2}(15)(5.25) = 39.38$

$\sin 41° = \frac{h}{8}$

$h = 8 \cdot \sin 41°$

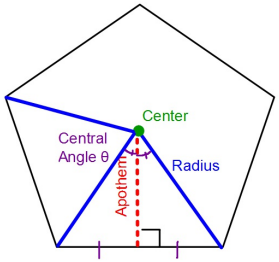
$h = 5.25$

The area of the triangle on the previous page can always be found by the same method as long as you have the correct information to work with.

Theorem: Area of a Triangle Given SAS

As long as you have two sides and the included angle you can find the area of the triangle using this technique.

Vocabulary in Regular Polygons:



Area of a Regular Polygon

$$A = \frac{1}{2}(a)(p)$$

a = Apothem

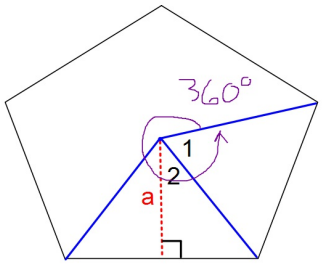
p = perimeter of the polygon

The area of some Regular Polygons involves using the Special Right Δ's:

Square → 45° - 45° - 90° Δ's

Equilateral Triangle →
Hexagon → 30° - 60° - 90° Δ's

Find the measure of these numbered angles in this Regular Pentagon



∠1 is a Central Angle:

$\angle 1 = \frac{360°}{5} = 72°$

$\angle 2 = \frac{72°}{2} = \boxed{36°}$

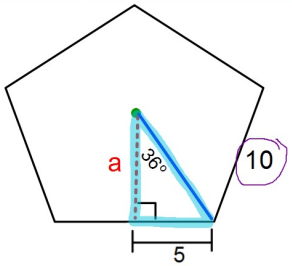
Finding the apothem and the area WON'T involve a Special Right Δ

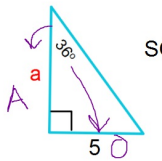
It will involve SOHCAHTOA

Find the area of this Regular Pentagon. Round to the nearest hundredth.

Perimeter = 5(10)

p = 50





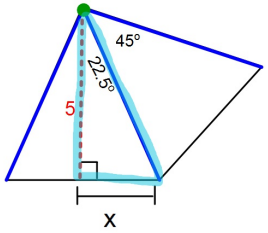
SOHCAHTOA

$\text{Tan}36° = \frac{5}{a}$

$a = \frac{5 \cdot 1}{\text{Tan}36°} = \boxed{6.88}$

$A = \frac{1}{2}(6.88)(50) = \boxed{172}$

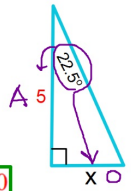
Find the area of a regular Octagon with an apothem equal to 5.



We already have the apothem:

$a = 5$

TOA



$\text{Tan}22.5° = \frac{x}{5}$

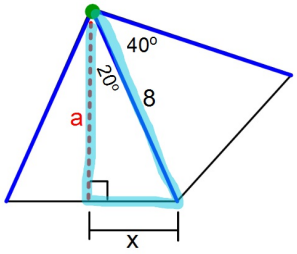
$x = 5 \cdot \text{Tan}22.5° = 2.07$

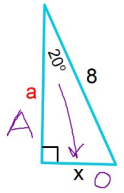
$\text{side} = 2x = 2(2.07) = 4.14$

$A = \frac{1}{2}(5)(33.12) = \boxed{82.80}$

$\text{perimeter} = 8 \cdot \text{side} = 8(4.14) = \boxed{33.12}$

Find the area of a regular Nonagon (9 sides) with a radius equal to 8.



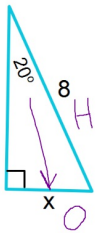


SOHCAHTOA

In this problem we need to find both the apothem and the perimeter.

Finding the perimeter.

SOHCAHTOA



$\text{Sin}20° = \frac{x}{8}$

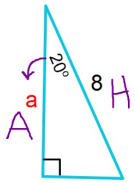
$x = 8 \cdot \text{Sin}20° = 2.74$

$\text{side} = 2x = 2(2.74) = 5.48$

$\text{perimeter} = 9 \cdot \text{side} = 9(5.48) = \boxed{49.32}$

Finding the apothem.

SOHCAHTOA



$\text{Cos}20° = \frac{a}{8}$

$a = 8 \cdot \text{Cos}20° = \boxed{7.52}$

Now find the Area:

$A = \frac{1}{2}(7.52)(49.32) = \boxed{185.44}$

You can now do Practice #14 which is posted on my blog.