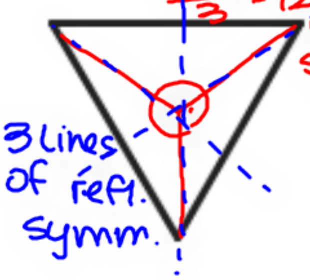
Questions on 7.3 HW?

Apr 8-8:30 AM

Topic: Symmetry, Trigonometric Ratios

Determine the angles of rotational symmetry **and the number of** lines of reflective symmetry **for each of the polygons below.**

1. Equilateral Triangle

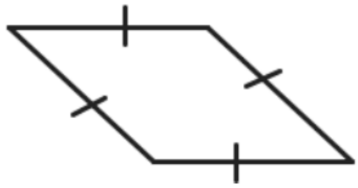


$\frac{360}{3} = 120°$ rotational symm.

3 Lines of refl. symm.

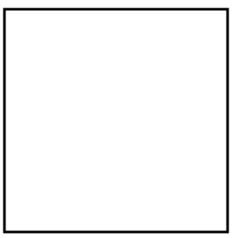
2. Rectangle

3. Rhombus

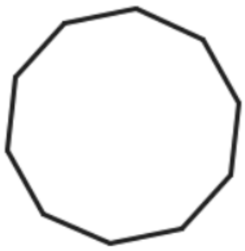


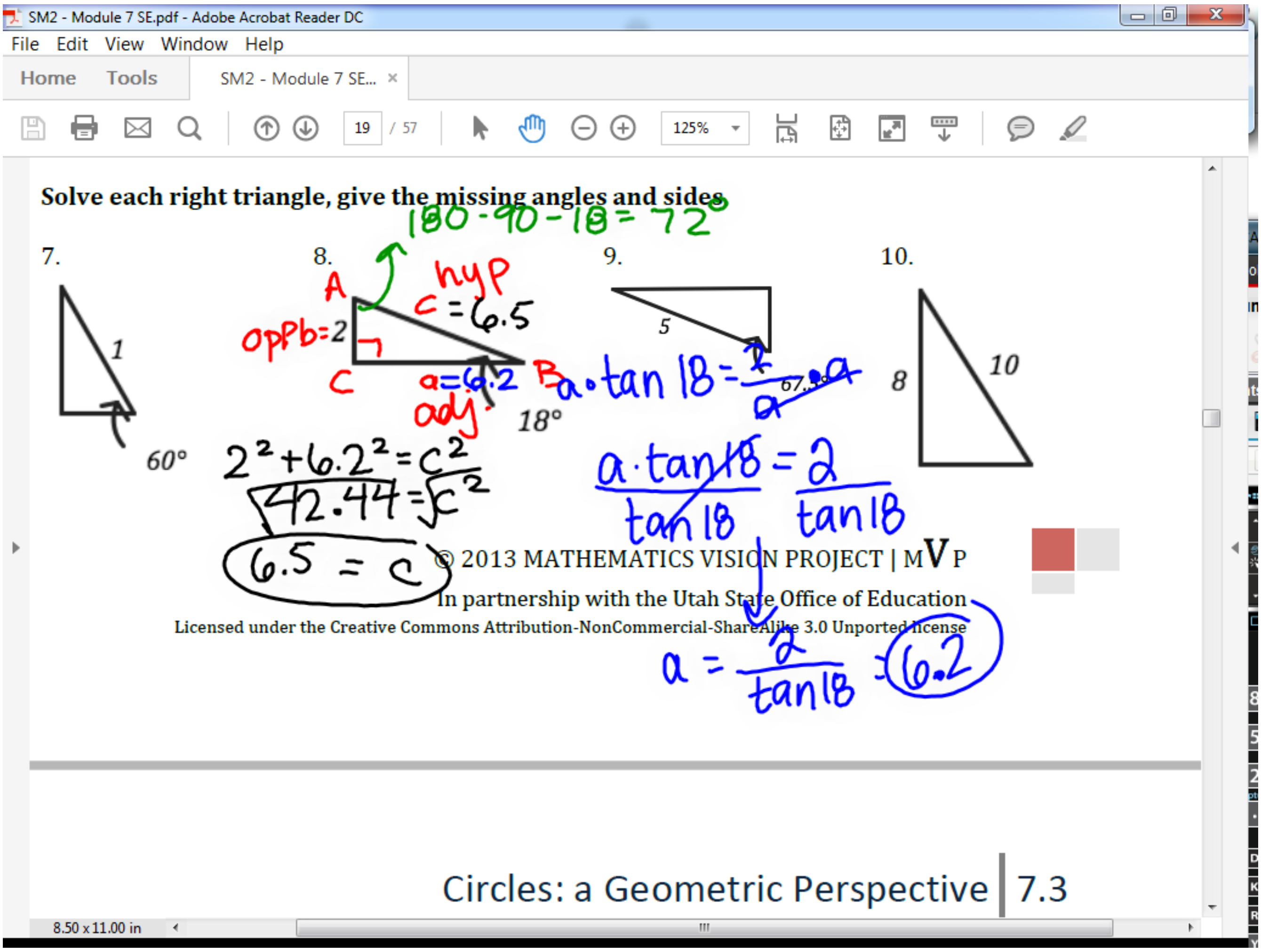
4. Regular Hexagon

5. Square



6. Decagon





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Solve each right triangle, give the missing angles and sides.

$180-90-18=72°$

7. 1, 60°

8. A, C, B, 18°; opp b = 2; hyp c = 6.5; adj a = 6.2

$2^2+6.2^2=c^2$

$\sqrt{42.44}=\sqrt{c^2}$

$6.5 = c$

9. 5, 67.38°

$\tan 18 = \frac{2}{a}$

$a \cdot \tan 18 = 2$

$\frac{a \cdot \cancel{\tan 18}}{\cancel{\tan 18}} = \frac{2}{\tan 18}$

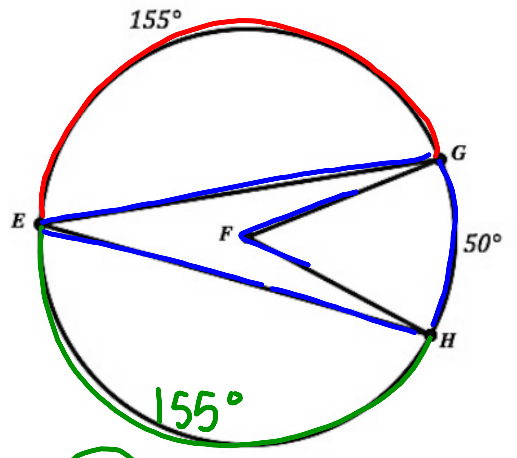
$a = \frac{2}{\tan 18} = 6.2$

10. 8, 10

Circles: a Geometric Perspective 7.3

8.50 x 11.00 in

13. $\odot F$



a. $m\widehat{EG} = 155°$

b. $m\widehat{EHG} = 155 + 50 = 205°$

$m\angle GEH = \frac{1}{2} \cdot 50 = 25°$

$m\angle GFH = 50°$

$m\widehat{EH} = 360 - 155 - 50 = 155°$

14. $\odot M$ with d

a. $NK =$

b. $m\widehat{NLK} =$

c. $m\widehat{NJK} =$

d. $m\angle NLK =$

e. $m\widehat{KL} =$

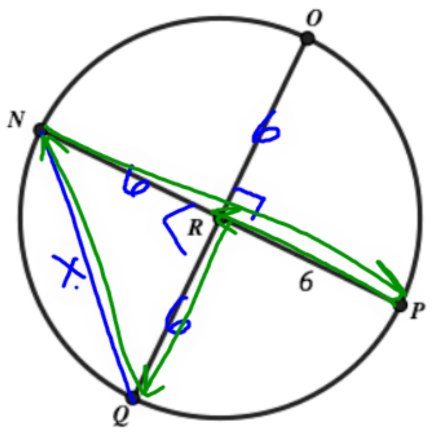
f. $m\widehat{NL} =$

15. How can a triangle be used to show the connection between an
measure of the arc it intercepts? What is true about the angle meas

8.50 x 11.00 in

Use what you know about finding circumference, C=2πr and Area, A=πr^2 for circles to find the indicated distances and areas below.

16. ⊙ *R* is cut by two diameters that are perpendicular to each other.



a. Find the distance to walk along arc NQ

$6^2+6^2=x^2$

b. Find the area inside one of the four sectors

$\frac{1}{4}\pi(6)^2=$

c. Find the distance to walk along the following path: Start at point P and go to R then to Q and over to N then back to P.

$6+6+x+6+6=$

17. ⊙ *S* is cut by three diameters that create equal angles at the center of the circle.

a. Find the distance to walk along arc UT

7.4 Planning the Gazebo

A Develop Understanding Task

all sides are ≅
all angles are ≅

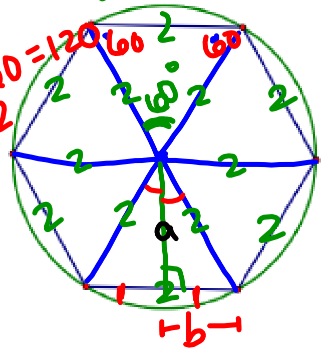
Zac is using his knowledge of geometry to design a gazebo for his family's back yard. The gazebo will be in the shape of a regular polygon. As part of his design, Zac will need to calculate several things so his parents can purchase the right amount of wood for the construction. For example, Zac will need to calculate the perimeter of the gazebo so he can order enough railing to surround it; he will need to calculate the area of the floor of the gazebo so he can order enough planks to lay it; and, he will need to calculate the surface area of the pyramid which forms the roof that will cover it. The problem is, his parents keep changing their minds about what shape they would like the gazebo be—a hexagon, an octagon, a decagon, a dodecagon, or even some other type of n-gon.

From his work in Mathematics I with *Symmetries of Regular Polygons*, Zac knows that all regular polygons are cyclic—that is, every regular polygon can be ***inscribed*** in a circle. Zac is wondering if he can use this property of regular polygons to help him find their perimeter and area.

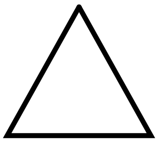
central ∠s: $360 \div 6 = 60°$

For his first attempt at creating a scale drawing of the gazebo, Zac has inscribed a regular hexagon inside a circle with a radius of 2 inches. He is wondering if this is enough information to find the perimeter of this hexagon and the area it encloses.

• $180 - 60 = 120$
$120 \div 2$



1. To get started with the task of finding the perimeter of this hexagon, Zac decides to write down what he already knows about this figure. Decide if you agree or disagree with each of his statements, and explain why. You will want to add features to the diagram to illustrate Zac's comments.



What Zac thinks he knows:	Do you agree or disagree? Explain why.
Two radii drawn to two consecutive vertices of the regular hexagon form a central angle whose measure can be found based on the rotational symmetry of the figure.	Agree, we have 60° rotational symmetry with the reg. hexagon.
The hexagon can be decomposed into 6 congruent isosceles triangles.	Agree, but more specifically the 6 triangles are equilateral.
The length of the altitudes of each of these 6 congruent triangles (the altitude drawn from the vertex of the triangle which is located at the center of the circle) can be found using trigonometry.	Agree, we can use $\sin 60 = \frac{a}{2}$ to find the altitude.

The length of the sides of the triangle that form chords of the circle can be found using trigonometry.	Agree, we could $\cos 60 = \frac{b}{2}$

2. Based on what you and Zac know, find the perimeter of the hexagon that he inscribed in the circle with a radius of 2 inches. Illustrate and describe your strategy so someone else can follow it.

Perimeter: $6 \cdot 2 = 12$ inches

3. Now find the area of the hexagon that Zac inscribed in the circle with a radius of 2 inches. Illustrate and describe your strategy so someone else can follow it.

Area of Δ: $\frac{1}{2} \cdot b \cdot h$

$2 \cdot \sin 60 = \frac{a}{\cancel{2}} \cdot 2$

$2 \cdot \sin 60 = a$

$\boxed{1.73 \text{ in} = a}$

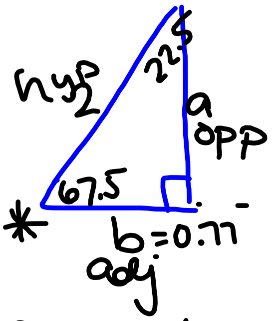
height

Area of hexagon:

$6\left(\frac{1}{2} \cdot 2(1.73)\right)$

$= \boxed{10.38 \text{ inches}^2}$

4. What if Zac had inscribed an octagon inside the circle of radius 2 instead of a hexagon? Modify your strategy to find the perimeter and area of the octagon.



$2 \cdot \sin 67.5 = \frac{a}{\cancel{2}} \cdot 2$

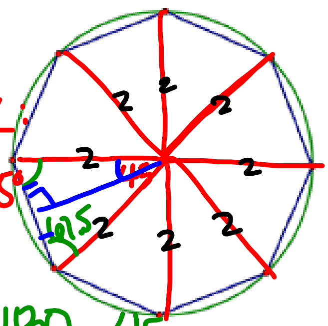
$2 \cdot \sin 67.5 = a$

$\boxed{1.84 = a}$

height

central ∠:

$\frac{360}{8} = 45°$



$\frac{180-45}{2} = 67.5°$

$2 \cdot \cos 67.5 = \frac{b}{\cancel{2}} \cdot 2$

$2 \cdot \cos 67.5 = b$

$0.77 = b$

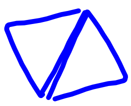
base $= 2(0.77) = \boxed{1.54}$

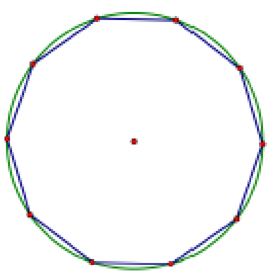
Area:

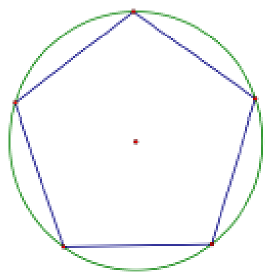
$8\left(\frac{1}{2}(1.54)(1.84)\right) = \boxed{11.33 \text{ in}^2}$

Perimeter: $8(1.54) = \boxed{12.32 \text{ inches}}$

5. Modify your strategy to find the perimeter and area of any regular n-gon inscribed in a circle of any given radius.







Homework

Finish 7.4 "Ready, Set, Go"