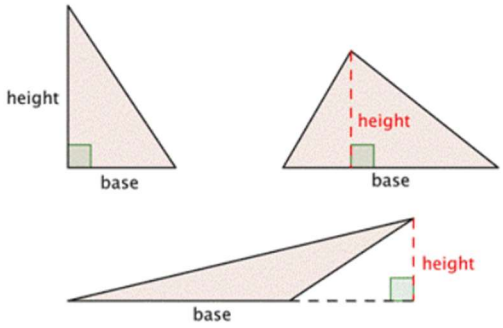
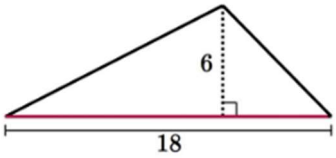
8.1 Notes: Area of Triangles and Circles

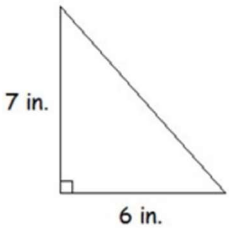
Objectives:

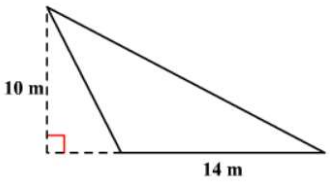
- **Students will be able to find the area of a triangle.**
- **Students will be able to find the area of a circle.**

Height of a Triangle	**The height of a triangle forms a _____ _____ with one side of the triangle. The height may not be an actual side of a triangle.**	
Base of a Triangle	**The base of a triangle is a _____ of the triangle that is *perpendicular to the height.***	
Area of a Triangle	$A = \frac{1}{2}bh$	

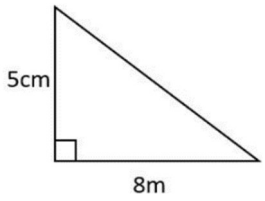
For #1-3: Find the area of each triangle.

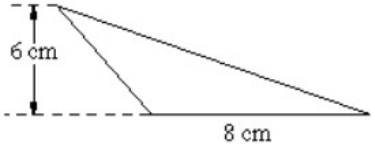
1) 

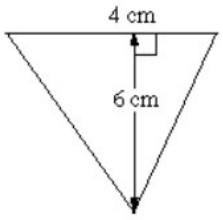
2) 

3) 

You try #4 – 6! Find the area of each triangle.

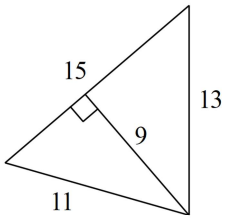
4) 

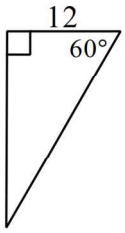
5) 

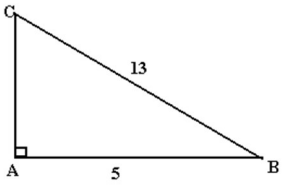
6) 

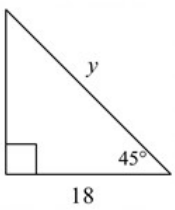
When it is more difficult to identify the base and height of a triangle: consider using the Pythagorean Theorem, a triple, or a special right triangle to find the missing side you need.

For #7 – 10: Find the area of each triangle. If needed, simplify radical answers.

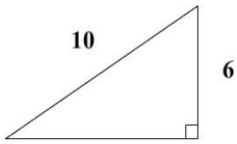
7) 

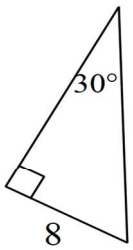
8) 

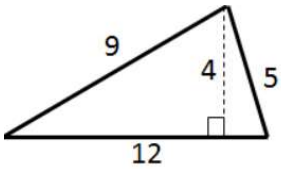
9) 

10) 

You try #11 – 13! Find the area of each triangle. If needed, simplify radical answers.

11) 

12) 

13) 

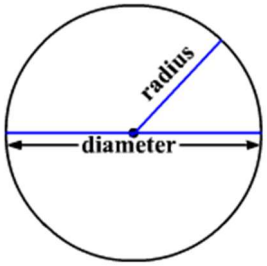
14) A triangle has an area of 40 in^2. If the height of the triangle is 10 in, what is the length of the base of the triangle?

A) 4 in

B) 30 in

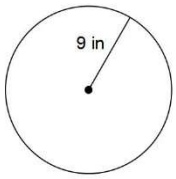
C) 2 in

D) 8 in

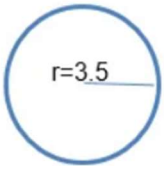
Radius of a Circle	**The radius of a circle connects the _____ of the circle and a point on the circle.**	
Diameter of a Circle	**The diameter of a circle is a segment passing through the _____ of the circle with endpoints on the circle.**	
Area of a Circle	$A = \pi r^2$	

For #15 – 17: Find the area of each circle in the requested form.

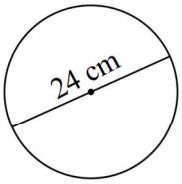
15) In terms of π.



16) Round to one decimal.

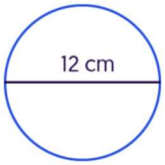


17) In terms of π.

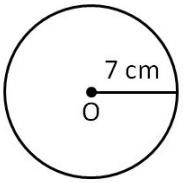


You try #18 – 19! Find the area of each circle in the requested form.

18) Round to one decimal.



19) In terms of π.



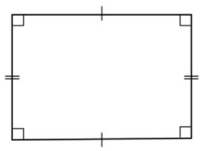
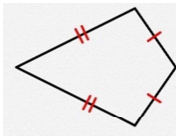
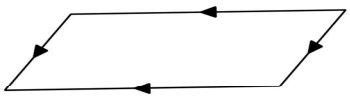
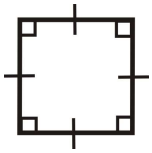
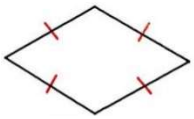
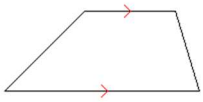
20) A circle has area of $36\pi\ cm^2$. Find the length of the radius. Also, what is the length of the diameter?

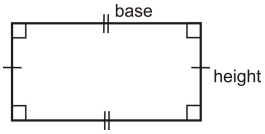
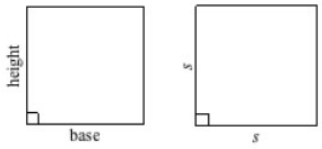
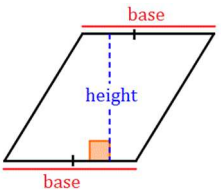
8.2 Notes: Area of Quadrilaterals

Objectives:

- **Students will be able to identify quadrilaterals by their names.**
- **Students will be able to find the area of common quadrilaterals.**

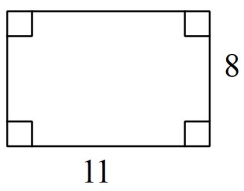
Do you know the names of quadrilaterals (4-sided figures)? Write the name, in the box, of each shape. Choose from: square, rectangle, parallelogram, rhombus, kite, and trapezoid.

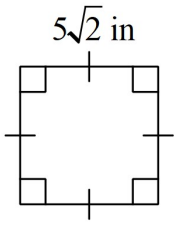
Area of a Rectangle	$A = bh$ or $A = lw$ Note: opposite sides are congruent.	
Area of a Square	$A = bh$ or $A = s^2$ Note: all sides are congruent.	
Area of a Parallelogram	$A = bh$ Note: opposite sides are congruent.	

For #1–3: Find the area of each quadrilateral. Identify the name of each shape, as well.

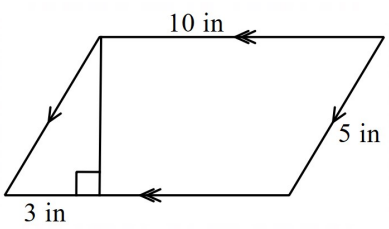
1)



2)

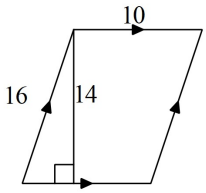


3)

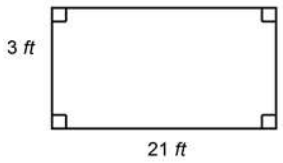


You try #4–6! Find the area of each quadrilateral. Identify the name of each shape, as well.

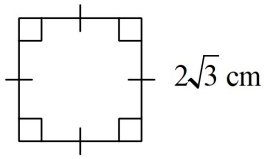
4)



5)

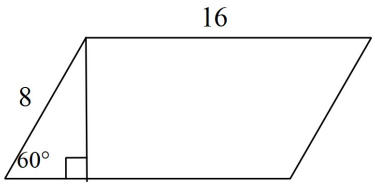


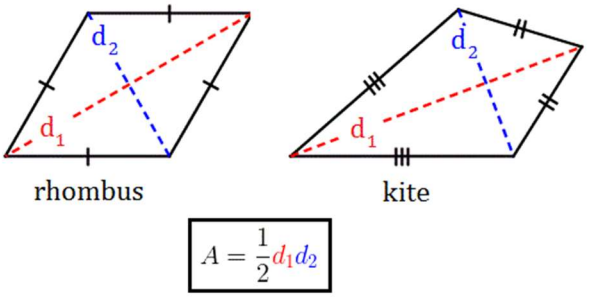
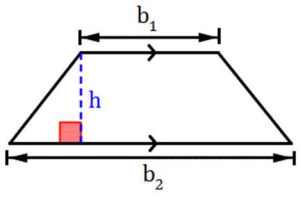
6)



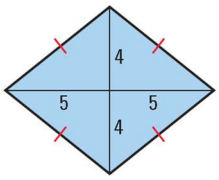
7) The area of a square is 50 ft^2. Find the length of one side, rounded to one decimal place.

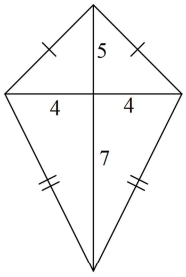
Challenge! 8) Find the area of the parallelogram shown. Simplify radical answers.

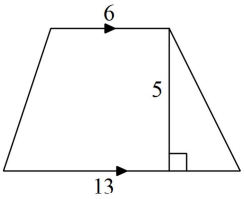


Area of a Rhombus	$A = \frac{1}{2} d_1 \cdot d_2$	
Area of a Kite	$A = \frac{1}{2} d_1 \cdot d_2$	
Area of a Trapezoid	$A = \frac{1}{2} h(b_1 + b_2)$ Note: bases are the parallel sides	

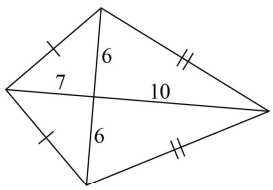
For #9–11: Find the area of each quadrilateral. Identify the name of each shape, as well.

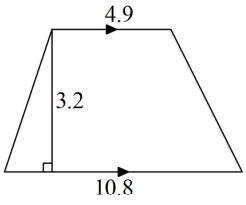
9) 

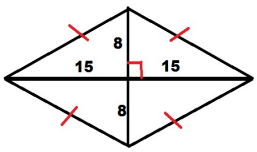
10) 

11) 

You try #12 – 14! Find the area of each quadrilateral. Identify the name of each shape, as well.

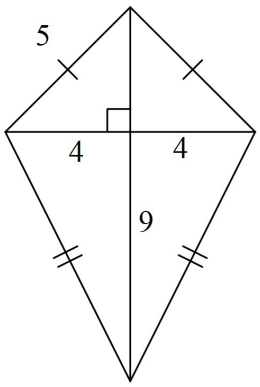
12) 

13) 

14) 

15) A rhombus has an area of 28 ft^2. If the measure of one diagonal is 16 ft, then what is the measure of the other diagonal?

16) **Challenge!** Find the area of the kite shown.



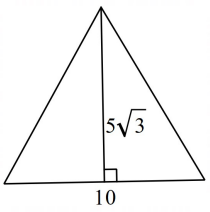
8.3 Notes: Area of Regular Polygons

Objectives:

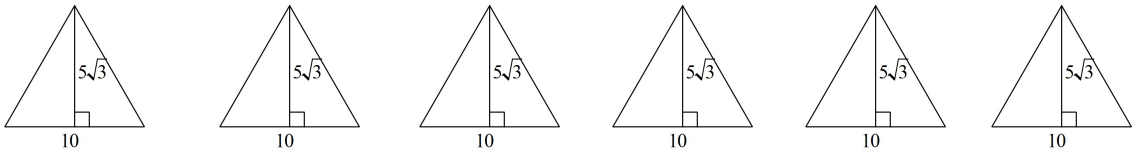
- **Students will be able to name regular polygons by the sides.**
- **Students will be able to find the area of a regular polygon.**

Exploration: Consider the triangle shown.

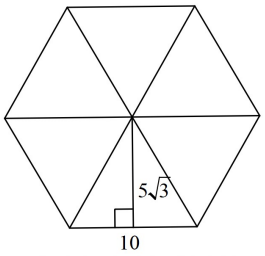
A. Find the area of the triangle. $A = \frac{1}{2}bh$

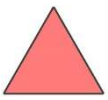
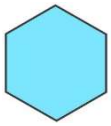
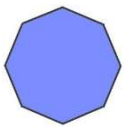
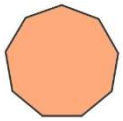
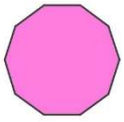


B. Imagine you had six of these exact same triangles. What would the combined area of all six triangles be?



C. We could rearrange these triangles to form a hexagon (six-sided figure). What would the area of this hexagon be?

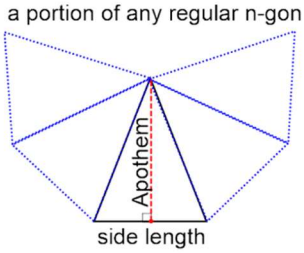


Polygon	**A polygon is a _____- sided _____ figure made of _____ edges.** Polygons are named by the number of sides.	**3 sides** **4 sides** **5 sides**    **6 sides** **7 sides** **8 sides**    **9 sides** **10 sides** **12 sides**   

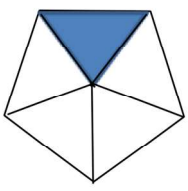
For #1-8: What is the name of a polygon with the number of specified sides? Try to do this without looking at the previous page.

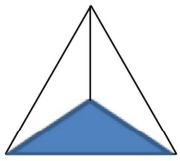
1) 8 sides 2) 5 sides 3) 9 sides 4) 4 sides

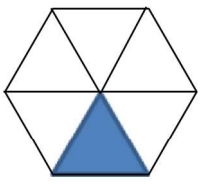
5) 10 sides 6) 7 sides 7) 3 sides 8) 12 sides

Regular Polygon	**A regular polygon has all sides that are _____, and all angles that are _____.** In other words, a regular polygon is both equilateral and equiangular.	A quadrilateral is regular. What is a common name for this shape? A triangular shape is regular. What is a common name for this shape?
Area of a Regular Polygon	**To find the area of a regular polygon, there are 2 methods.** **Option 1:** Find the **area of one triangle** and multiply it by the number of _____ of the polygon. **Option 2:** Use the **formula:** $A = \frac{1}{2}aP$ Where, **a is** **P is**	$A = \frac{1}{2}aP$ 

For #9-11: Find the area of each regular polygon if the area of the shaded region is given.

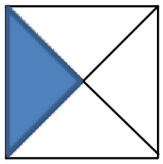
9) 15 in^2 

10) 40 mm^2 

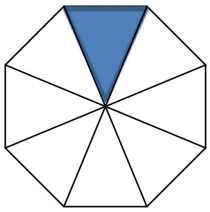
11) 8 cm^2 

You try #12 – 13! Find the area of each regular polygon if the area of the shaded region is given.

12) 120 mm^2

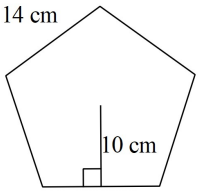


13) 11 ft^2

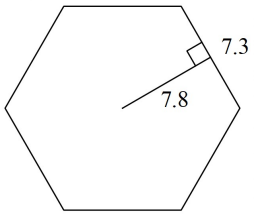


For #14-16: Find the area of each regular polygon.

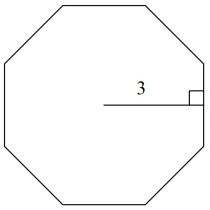
14)



15)

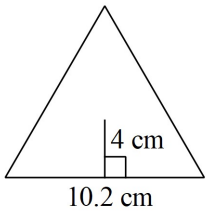


16) The perimeter is 30 in.

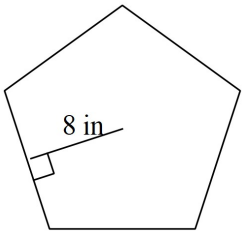


You try #17–18! Find the area of each regular polygon.

17)

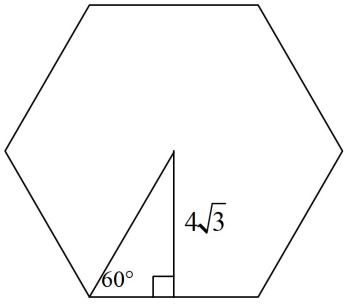


18) The perimeter is 65 in.

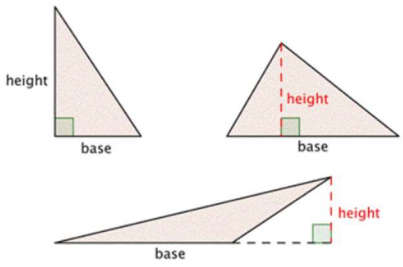
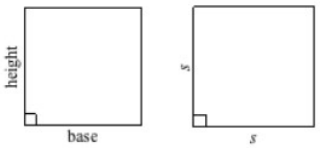
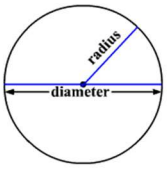
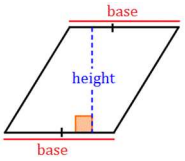
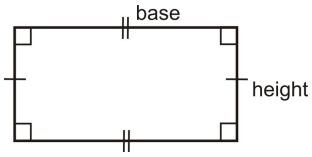
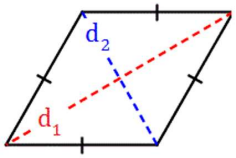
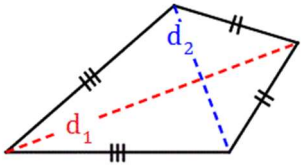
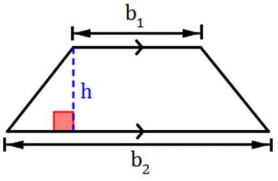


19) A regular decagon has one side of 12 inches and the apothem is 9 inches. Find the area of the regular decagon.

20) **Challenge!** Find the area of the regular hexagon shown. *Hint: Use the special right triangle shown to find the length of one side of the hexagon.*



Summary of Area Formulas

Area of a Triangle $A = \frac{1}{2}bh$		**Area of a Square** $A = bh$ or $A = s^2$	
Area of a Circle $A = \pi r^2$		**Area of a Parallelogram** $A = bh$	
Area of a Rectangle $A = bh$ or $A = lw$		**Area of a Rhombus** $A = \frac{1}{2}d_1 \cdot d_2$	
Area of a Kite $A = \frac{1}{2}d_1 \cdot d_2$		**Area of a Trapezoid** $A = \frac{1}{2}h(b_1 + b_2)$	
Area of a Regular Polygon (option 1)	Find the area of one triangle, and then multiply by the number of sides of the polygon.	**Area of a Regular Polygon (option 2)** $A = \frac{1}{2}aP$ **Note: *P* = *perimeter***