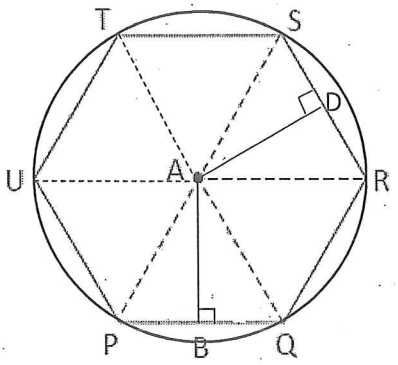
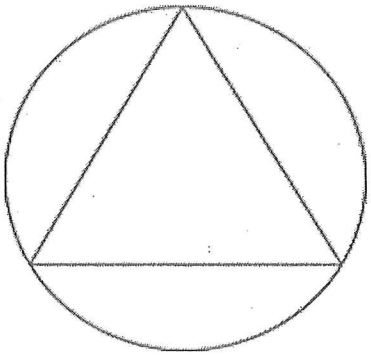
Name: _____

Area of Regular Polygons Notes

A REGULAR Polygon – a polygon with all sides congruent and all angles congruent. Any polygon can be inscribed in a circle, so many of the terms associated with circles are also used with regular polygons.





The **center** of a regular polygon is the center of the circumscribed circle. Point A is the center.

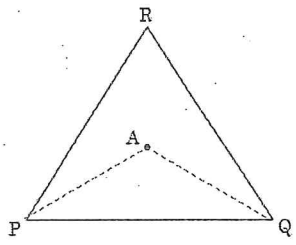
The **radius** of a regular polygon is the distance from the center to a vertex.
Ex: $\overline{AP}, \overline{AQ}, \overline{AR}$, etc.

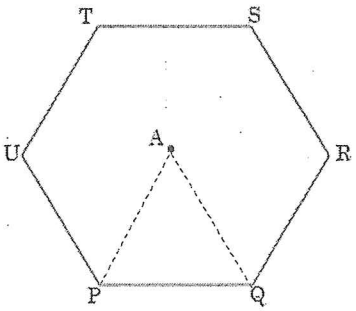
The **apothem** of a regular polygon is the segment from the center of the polygon perpendicular to a side.
Ex: $\overline{AB}$, $\overline{AD}$, etc

A **central angle** of a regular polygon is an angle formed by two radii drawn to consecutive vertices.
Ex: $\angle PAQ, \angle RAS$, etc.

The **measure of a central angle** of a regular polygon with n sides is $\frac{360°}{n}$

To find the **area of a regular polygon** break down the figure into congruent triangles using two radii.





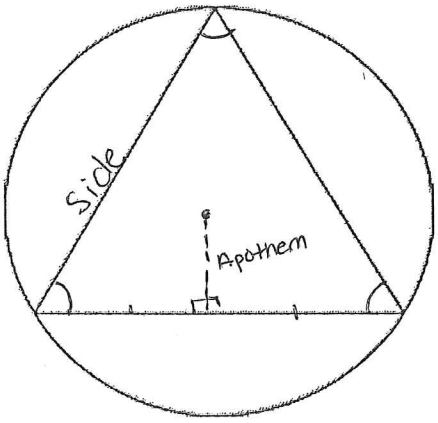
Name: _____

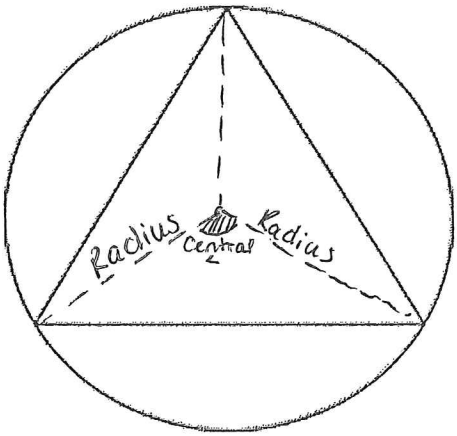
Area of Regular Polygons Notes

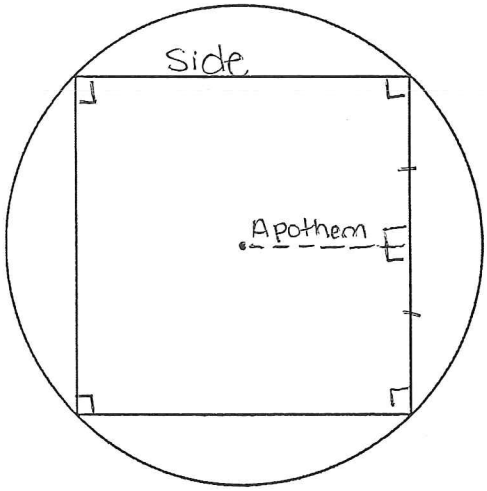
Know the following definitions:

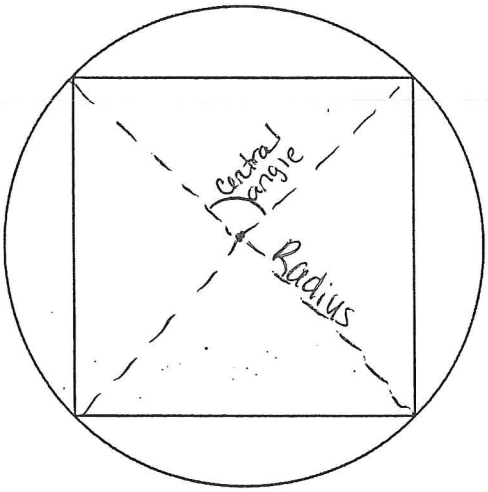
radius diameter side length apothem perimeter central angle base angles

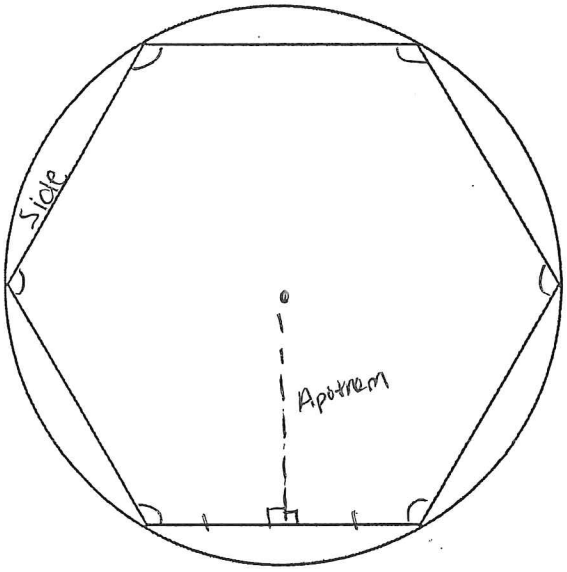
1. The following are regular polygons: Regular polygons have all congruent sides and all congruent angles.
As a class draw/label (in pencil) inscribed angles, side length, and apothem and in red pen radius, central angles and base angles.

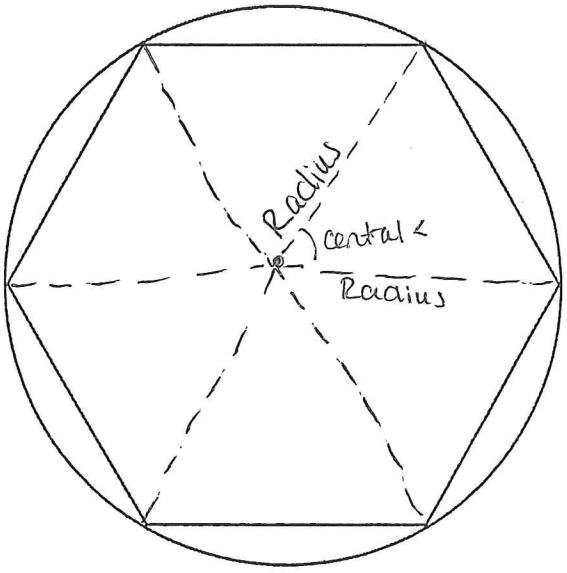






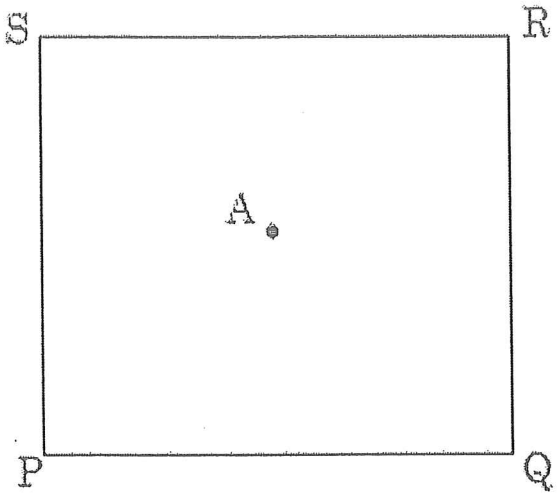






Directions: Find the information of the regular polygon.

2. If $PQ = 10\ in$ where B is the midpoint of PQ.



$m\angle PAQ =$ _____

$m\angle APQ =$ _____

$m\angle PAB =$ _____

Side length = _____

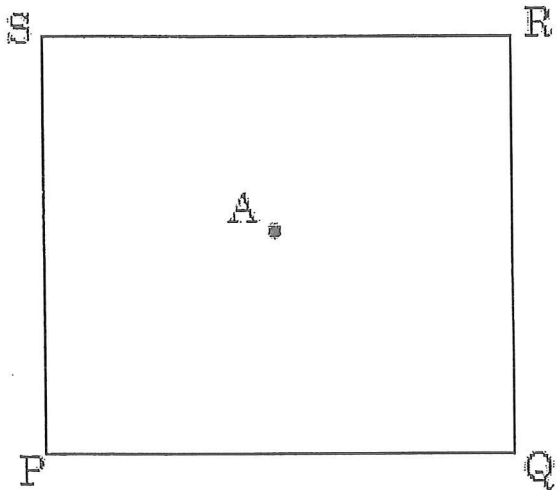
Radius = _____

Apothem = _____

Exact Area = _____

Rounded Area = _____

3. If $AP = 10\ in$ where B is the midpoint of PQ.



$m\angle PAQ =$ _____

$m\angle APQ =$ _____

$m\angle PAB =$ _____

Side length = _____

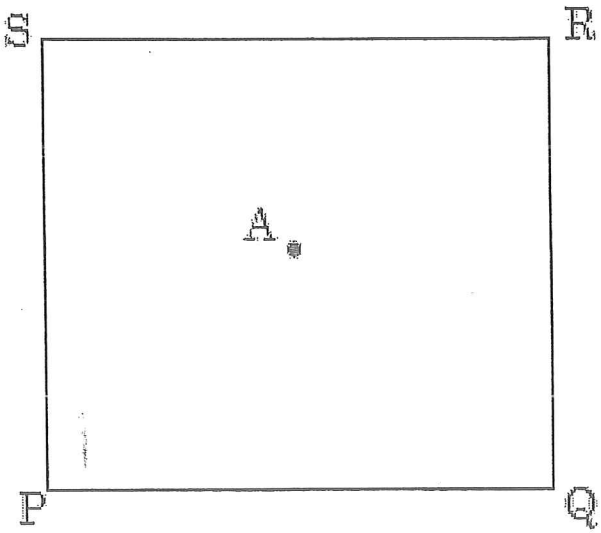
Radius = _____

Apothem = _____

Exact Area = _____

Rounded Area = _____

4. If $AB = 10\ in$ where B is the midpoint of PQ.



$m\angle PAQ =$ _____

$m\angle APQ =$ _____

$m\angle PAB =$ _____

Side length = _____

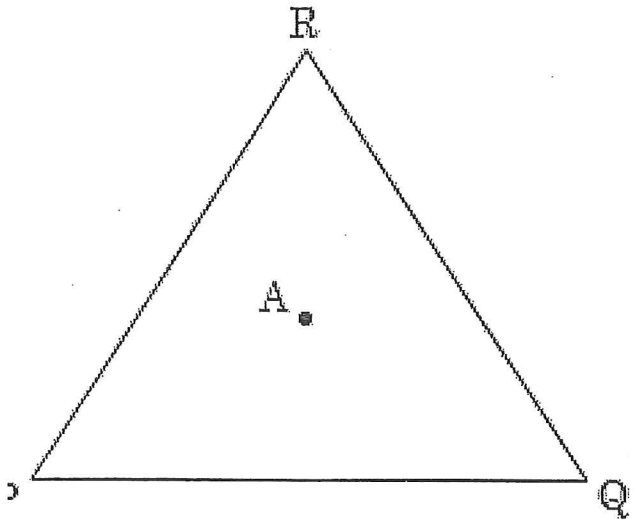
Radius = _____

Apothem = _____

Exact Area = _____

Rounded Area = _____

5. If PQ = 18 *in* where B is the midpoint of PQ.



$m\angle PAQ =$ _____

$m\angle APQ =$ _____

$m\angle PAB =$ _____

Side length = _____

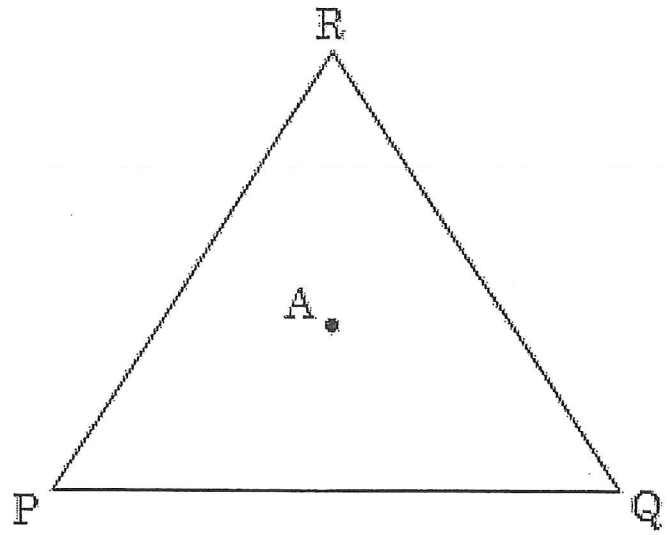
Radius = _____

Apothem = _____

Exact Area = _____

Rounded Area = _____

6. If AP = 18 *in* where B is the midpoint of PQ.



$m\angle PAQ =$ _____

$m\angle APQ =$ _____

$m\angle PAB =$ _____

Side length = _____

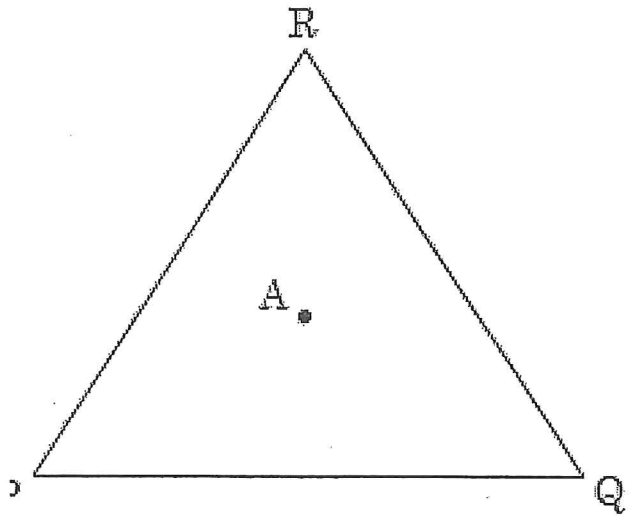
Radius = _____

Apothem = _____

Exact Area = _____

Rounded Area = _____

7. If AB = 18 *in* where B is the midpoint of PQ.



$m\angle PAQ =$ _____

$m\angle APQ =$ _____

$m\angle PAB =$ _____

Side length = _____

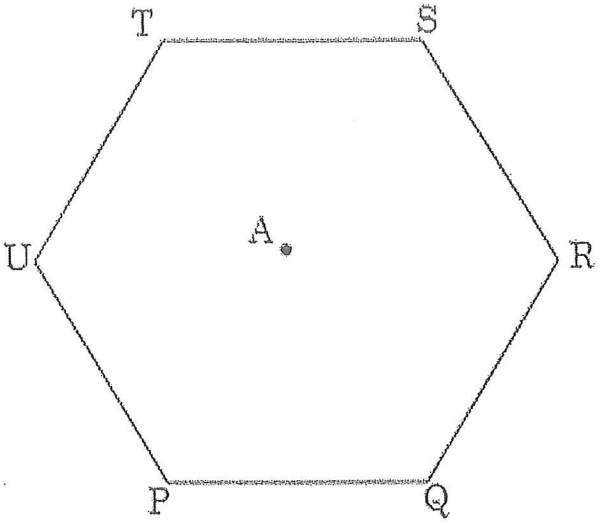
Radius = _____

Apothem = _____

Exact Area = _____

Rounded Area = _____

8. If PQ = 12 *in* where B is the midpoint of PQ.



$m\angle PAQ =$ _____

$m\angle APQ =$ _____

$m\angle PAB =$ _____

Side length = _____

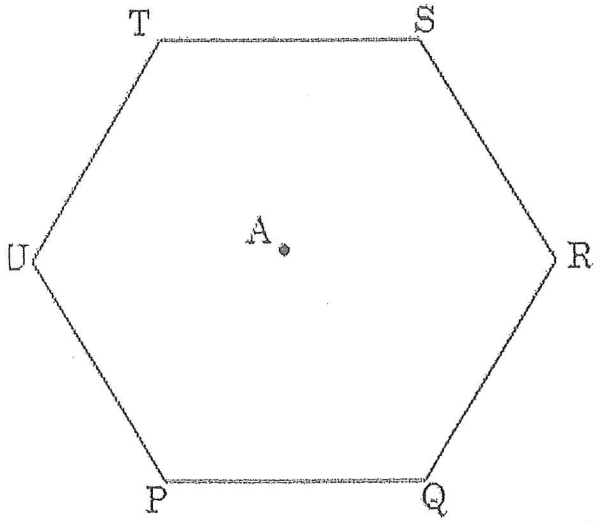
Radius = _____

Apothem = _____

Exact Area = _____

Rounded Area = _____

9. If PA = 12 *in* where B is the midpoint of PQ.



v$m\angle PAQ =$ _____

$m\angle APQ =$ _____

$m\angle PAB =$ _____

Side length = _____

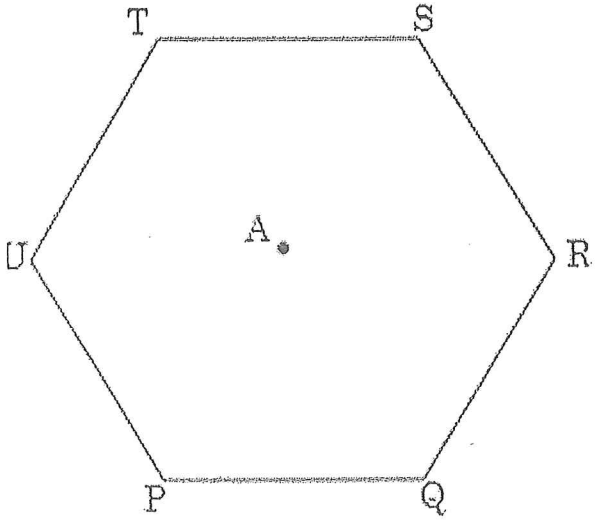
Radius = _____

Apothem = _____

Exact Area = _____

Rounded Area = _____

10. If AB = 12 *in* where B is the midpoint of PQ.



$m\angle PAQ =$ _____

$m\angle APQ =$ _____

$m\angle PAB =$ _____

Side length = _____

Radius = _____

Apothem = _____

Exact Area = _____

Rounded Area = _____

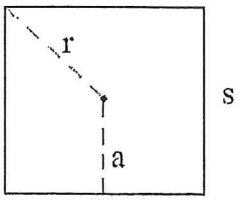
Name: _____

Geometry In-Class Practice

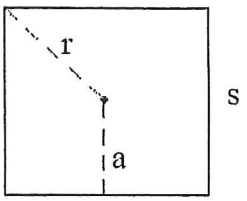
Area of Squares Given Side length (s), Radius (r), Apothem (a) and/or perimeter(p).

Directions: Find the exact area of the square. Circle your final answer.

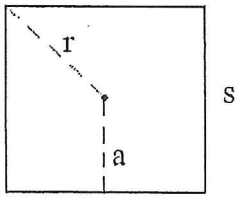
1. s = 16m



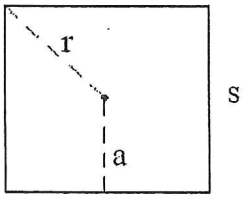
2. s = 18in



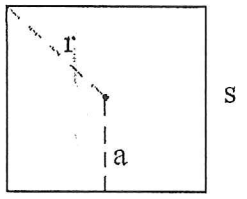
3. p = 16m



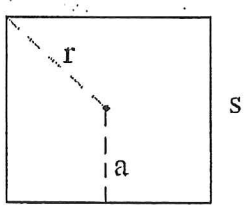
4. p = 88in



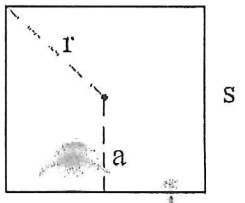
5. a = 15m



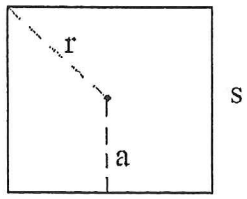
6. a = 20in



7. r = 18m



8. r = 12 in

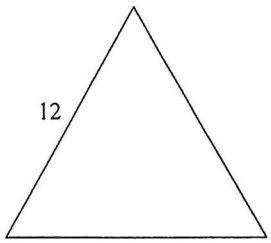


Geometry- In Class Practice Name_____ ID: 1

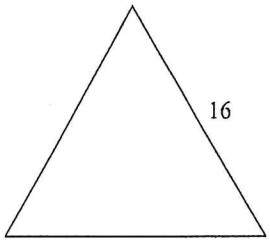
Area of Equilateral Triangles and Regular Hexagons Date_____ Period____

Find the area of each regular polygon. Leave your answer in simplest form.

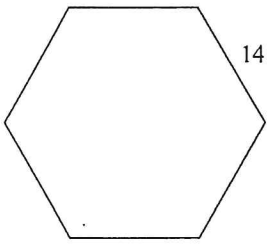
1)



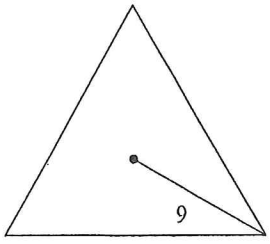
2)



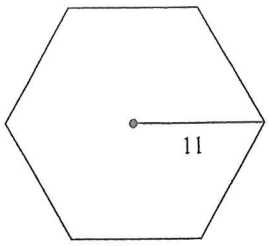
3)



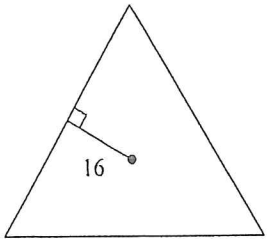
4)



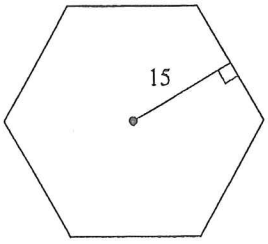
5)



6)



7)

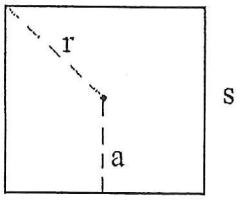


Name: _____

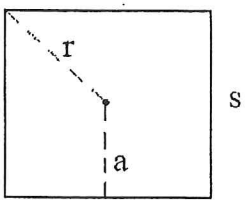
Geometry Homework
Area of Squares Given Side length (s), Radius (r), Apothem (a) and/or perimeter(p).

Directions: Find the exact area of the square. Circle your final answer.

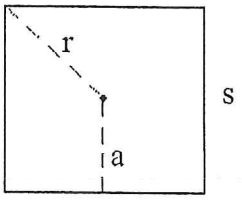
1. s = 12m



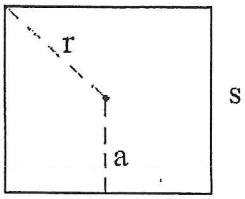
2. s = 22in



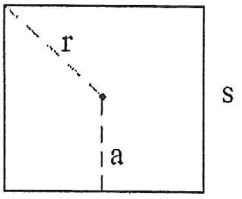
3. p = 24m



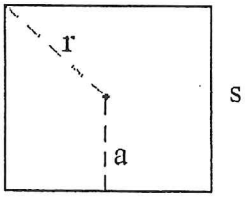
4. p = 104in



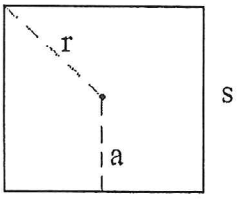
5. a = 10m



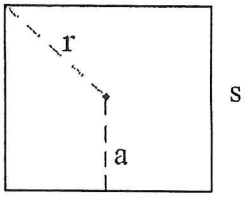
6. a = 14in



7. r = 8m



8. r = 16 in

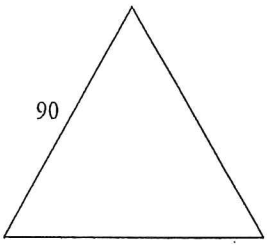


Geometry- HOMEWORK Name_____ ID: 1

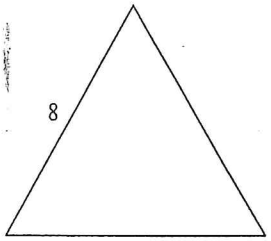
Area of Equilateral Triangles and Regular Hexagons Date_____ Period____

Find the area of each regular polygon. Leave your answer in simplest form.

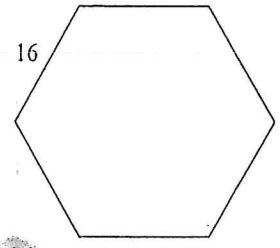
1)



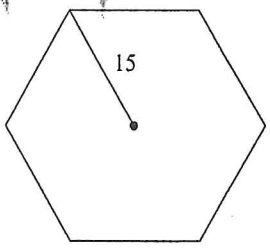
2)



3)



4)



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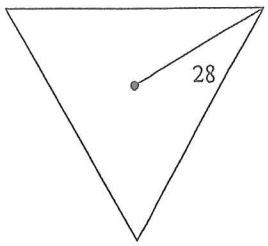
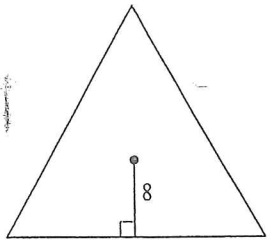
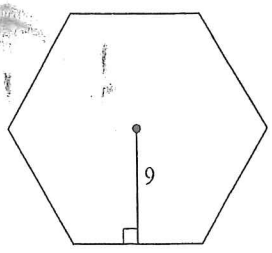


6)



7)

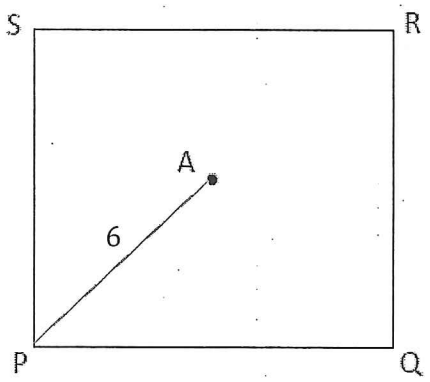


Name: _____ Date: _____

Area of Regular Polygons Day 2 Notes

Directions: Find the area of the regular polygon. Show all work. Find exact values when possible.

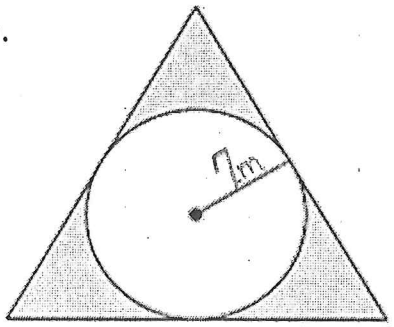
1. Find the area of the square.



2. Find the area of an equilateral triangle with perimeter of 36 Km

Directions: Find the area of the shaded region. Show all work.

3.



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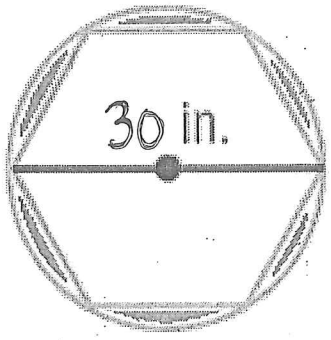

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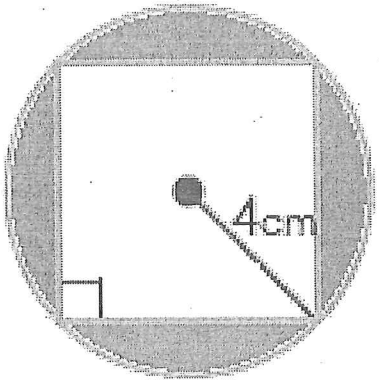


Name: _____ Hour: _____

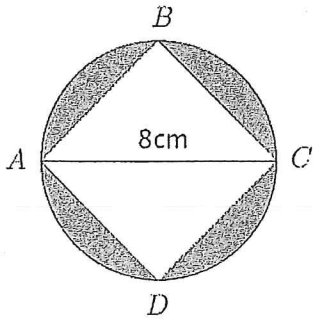
Area of Regular Polygons EXAMPLES Worksheet

Directions: Find the area of the regular polygon. Show all work. Find exact values when possible.

1. Find the area of a **regular triangle** with perimeter of 54 km.

Directions: Find the area of the shaded region. Show all work.

2.



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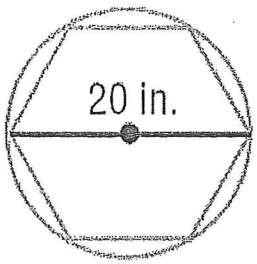

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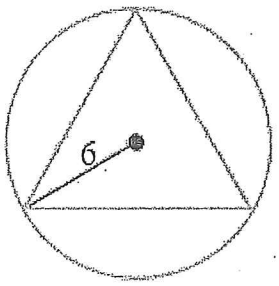

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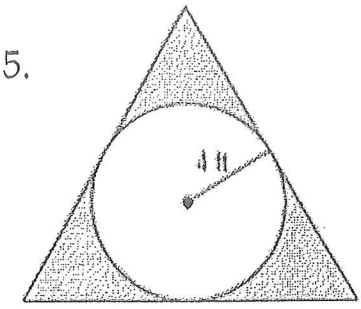

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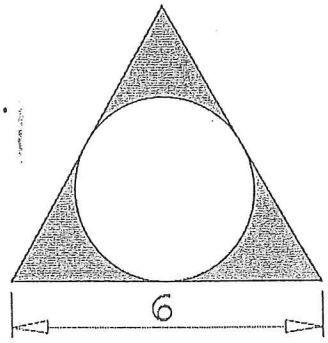

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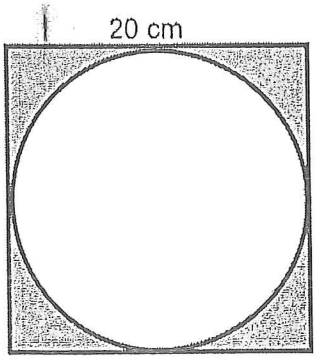


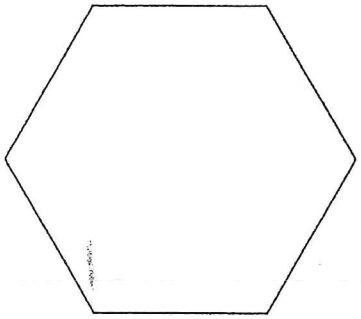
Name: _____ Hour: _____

Area of Regular Polygons Worksheet

Directions: Find the area of the regular polygon. Show all work. Find exact values when possible.

1. Find the area of a **regular triangle** with perimeter of 21 km.

2. S = 62m



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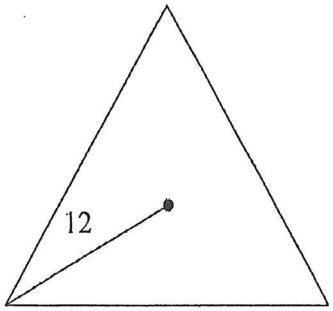

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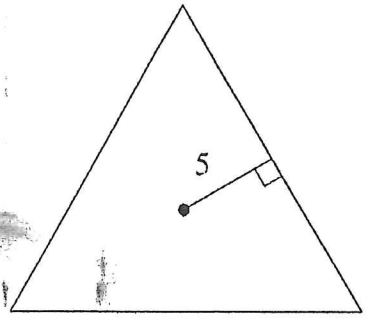

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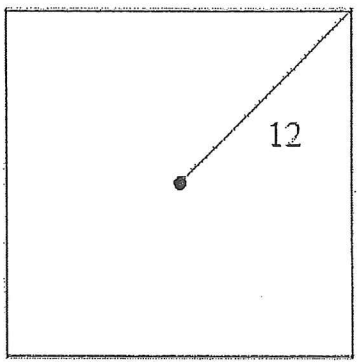
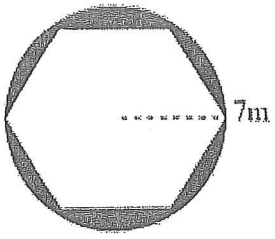


Directions: Find the area of the shaded region. Show all work.

6.



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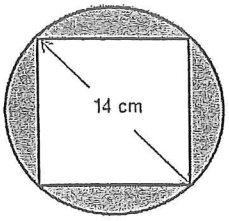

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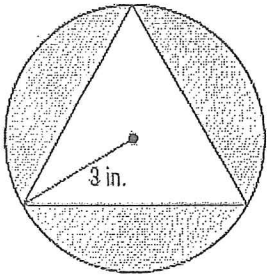

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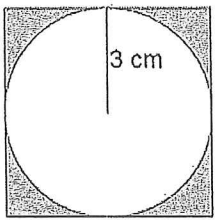

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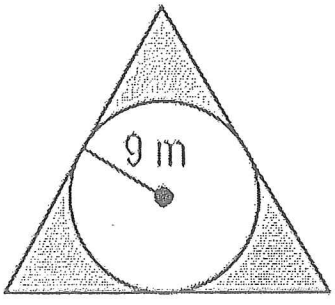

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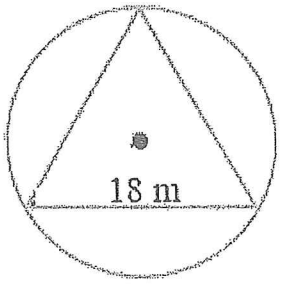


Notes – Sector Area & Arc Length	**Name:**	
Standard:	**Hour:**	

Objective: I know how to calculate arc length and sector area.
Given arc length or sector area, I can find the radius, central angle, total area or circumference.

Review & Connect

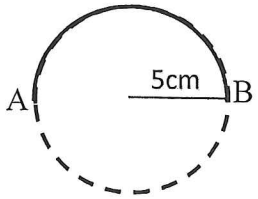
Sectors and Arc Length

Circumference of a Circle

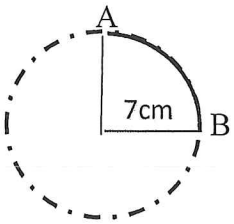
$$C = 2\pi r$$

Find the length of arc AB.

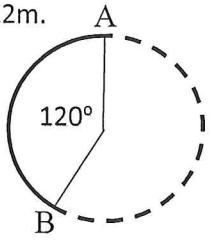
1.



2.



3. Diameter 12m.



4. Complete the formula for arc length

$L =$ _____ .

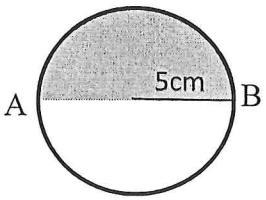
5. Find the arc length of a 288° central angle and a radius of 15.

Area of a Circle

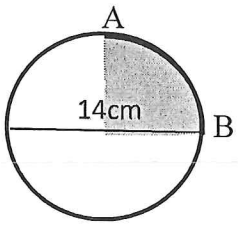
$$A = \pi r^2$$

Find the area of each sector (shaded region).

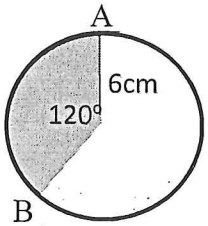
1.



2.



3.



4. Write a formula for sector area.

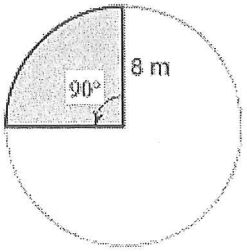
$S =$ _____ .

5. Find the area of a 288° sector with a radius of 15.

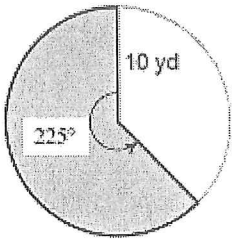
Examples

Find each indicated value. Show ALL work! Give answers as an exact value (fractions and in terms of pi).

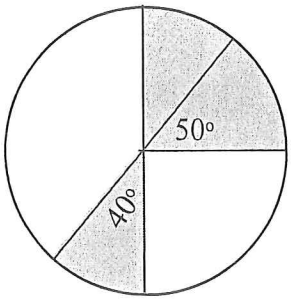
1. Find the area of the sector



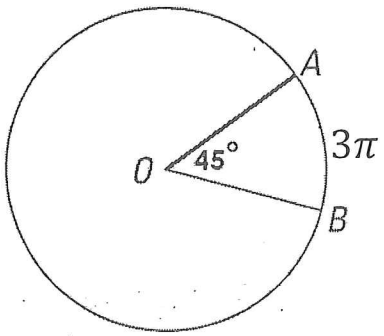
2. Find the area of the sector.



3. Find the area of the shaded sectors. Radius = 24



4. Find the area of the circle if a sector has a central angle of 90° and an area of 27π km^2.



5. Find the radius of the circle if a sector has a central angle of 240° and a sector area of 150π km^2.

6. The length of minor arc AB is 3π and measures 45°.

a) What is the circumference of the circle?

b) What is the measure of the radius of the circle?

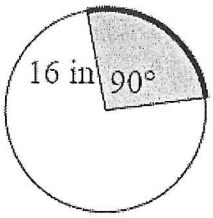
c) What is the area of the sector AOB?

Hmwk – Sectors Area & Arc Length

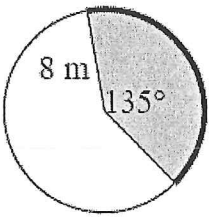
Name: _____

8. Calculate the sector area:

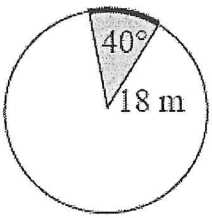
a.



b.



c.



9. The area of a circle is 225π square inches. Find the area of the sector whose central angle is $45°$.

10. The central angle of a sector is $60°$ and the area of the circle is 144π. What is the area of the sector?

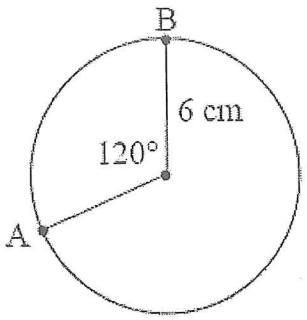
11. A circle has a radius of 12. Find the area of the sector whose central angle is $120°$.

12. Find the radius of a circle which has a sector area of 9π whose central angle is $90°$.

13. The central angle of a sector is $72°$ and the sector has an area of 5π. Find the radius.

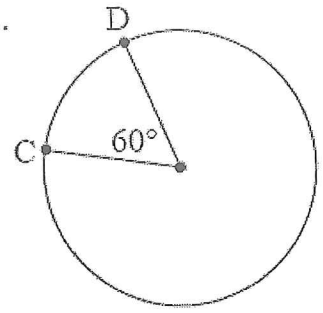
14. Find the measure of the central angle of a sector if its area is 5π and the radius is 6.

1. Find the length of arc AB.



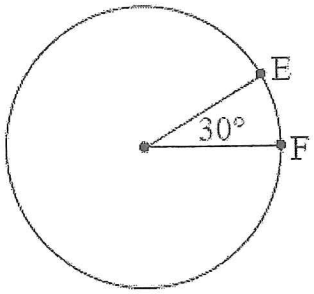
Arc: _____

2. The diameter is 24 cm. Find the length of arc CD.



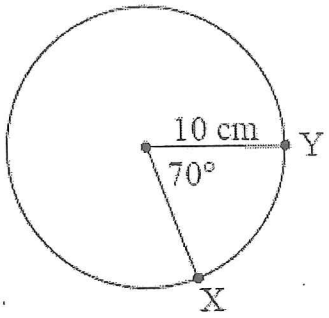
Arc: _____

3. The length of arc EF is 5π in. Find the length of the radius.



Radius: _____

4. Find the length of arc XY.



Arc: _____

5. A circle has an arc whose measure is 80° and whose length is 88π. What is the diameter of the circle?

6. A circle has a circumference whose length is 25π. Find the length of an arc whose central angle is 90°.

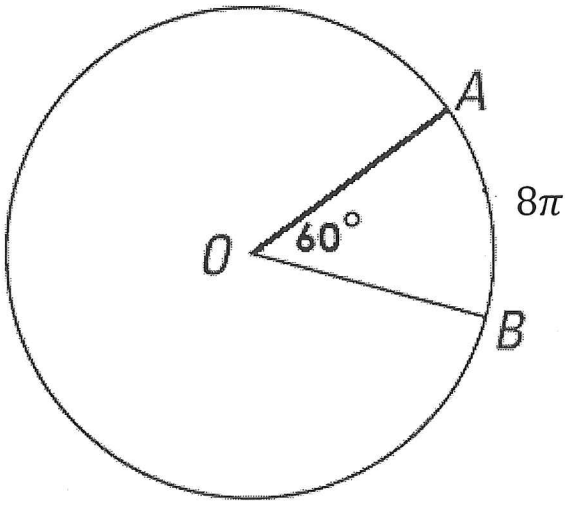
7. Find the measure of the central angle of an arc if its length is 14π and the radius is 18.

a) Minor arc AB has an arc length of 8π ft and a measure of 60°.

a) What is the total circumference?

b) What is the length of the radius?

c) What is the area of sector AOB?



16. Sector AOB has an area of 16π mi^2 and a central angle of 40°

a) What is the total area?

b) What is the length of the radius?

c) What is the length of minor arc AB?