

Name: _____

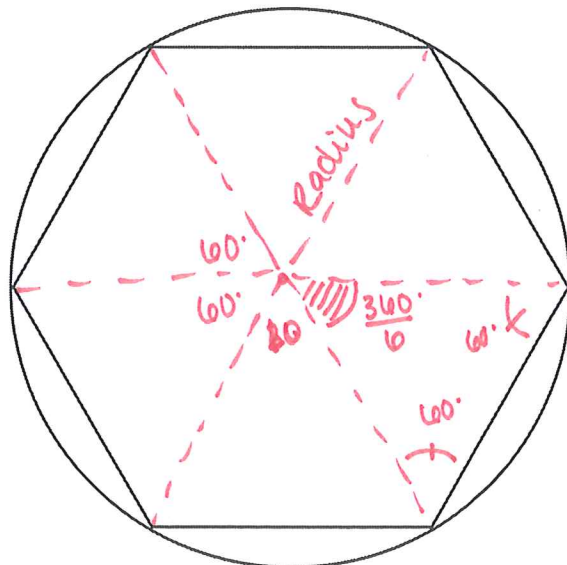
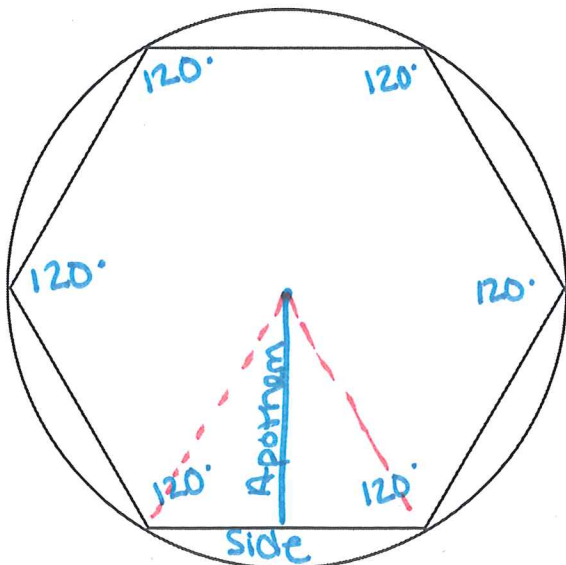
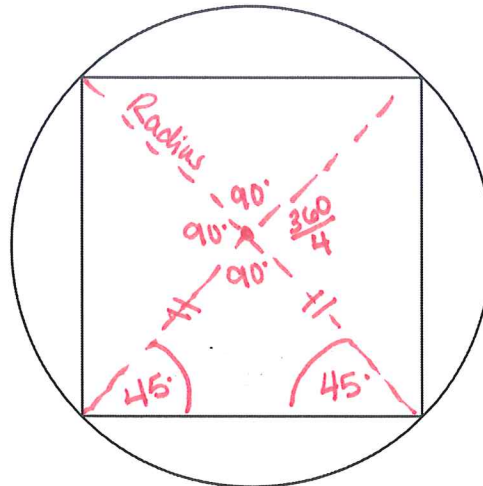
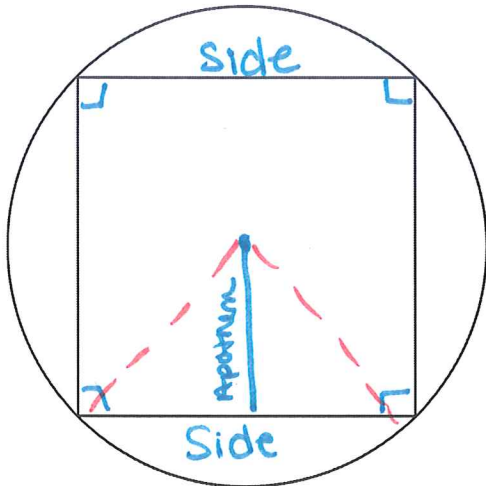
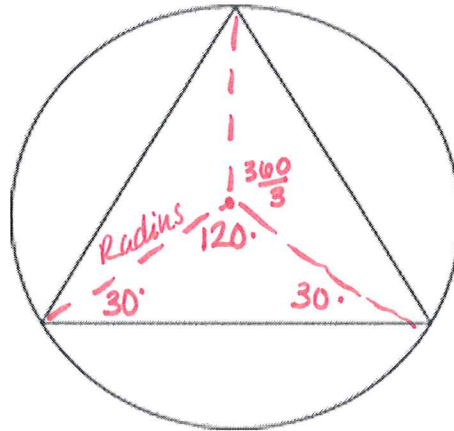
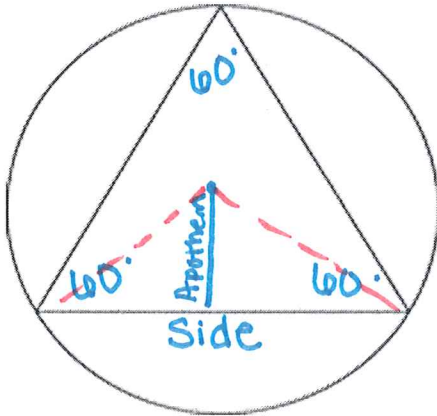
Area of Regular Polygons Notes

Know the following definitions:

radius diameter side length apothem perimeter central angle base angles

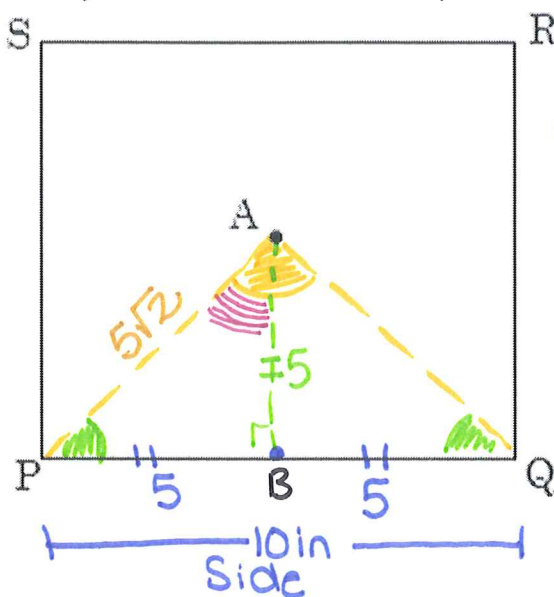
1. The following are regular polygons: Regular polygons have all congruent sides and all congruent angles.

As a class draw/label (in pencil) inscribed angles, side length, and apothem and in red pen radius, central angles and base angles.

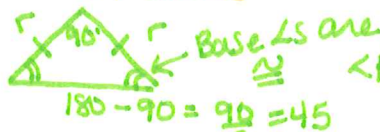


Directions: Find the information of the regular polygon.

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



$\angle PAQ = \frac{360}{4} = 90^\circ$
 Central $\angle = \frac{360}{n}$
 $n = \#$ of sides



$\angle PAB = \frac{1}{2} \angle PAQ$ $\angle PAB = \frac{1}{2} 90$

radius = $5\sqrt{2}$ in
 ($45^\circ, 45^\circ, 90^\circ$ Δ)

$A = 10 \cdot 10$
 $A = 100$ in²

$m\angle PAQ = \underline{90^\circ}$

$m\angle APQ = \underline{45^\circ}$

$m\angle PAB = \underline{45^\circ}$

Side length = 10 in *Given*

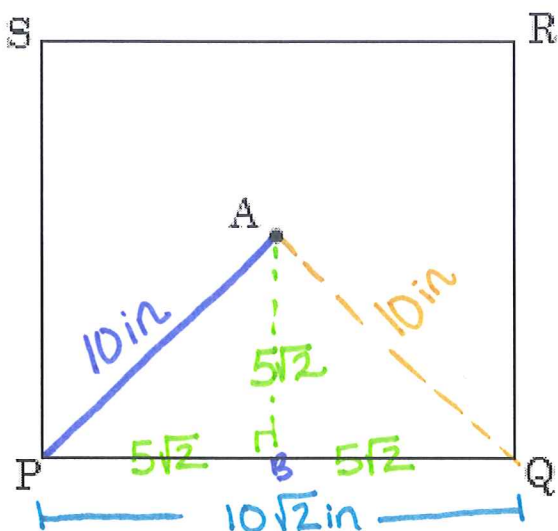
Radius = $5\sqrt{2}$ in

Apothem = 5 in ($45^\circ, 45^\circ, 90^\circ$ Δ)

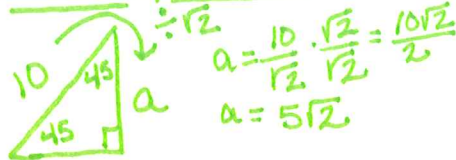
Exact Area = 100 in²

Rounded Area = 100 in²

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



Find apothem



$a = \frac{10 \cdot \sqrt{2}}{\sqrt{2} \cdot \sqrt{2}} = \frac{10\sqrt{2}}{2}$
 $a = 5\sqrt{2}$
 $A = 10\sqrt{2} \times 10\sqrt{2}$
 $A = 10 \cdot 10 \cdot \sqrt{2} \cdot 2$
 $A = 100 \cdot \sqrt{4}$
 $A = 100 \cdot 2$

$m\angle PAQ = \underline{90^\circ}$

$m\angle APQ = \underline{45^\circ}$

$m\angle PAB = \underline{45^\circ}$

Side length = $10\sqrt{2}$ in

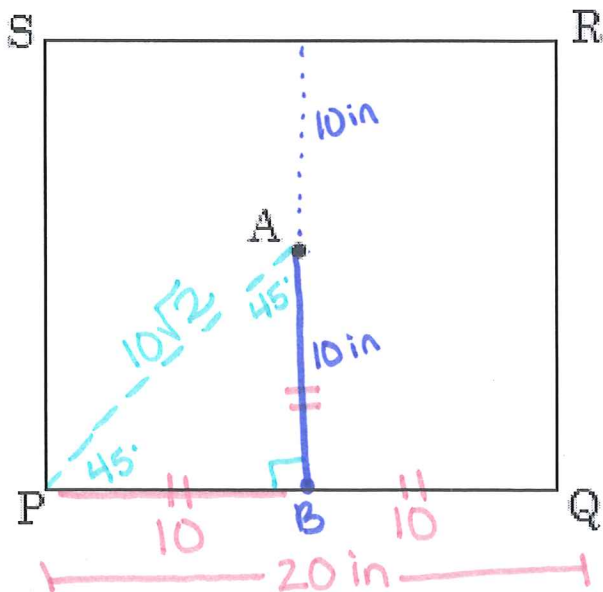
Radius = 10 in *Given*

Apothem = $5\sqrt{2}$ in

Exact Area = 200 in²

Rounded Area = 200 in²

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



$m\angle PAQ = \underline{90^\circ}$

$m\angle APQ = \underline{45^\circ}$

$m\angle PAB = \underline{45^\circ}$

Side length = 20 in

Radius = $10\sqrt{2}$ in

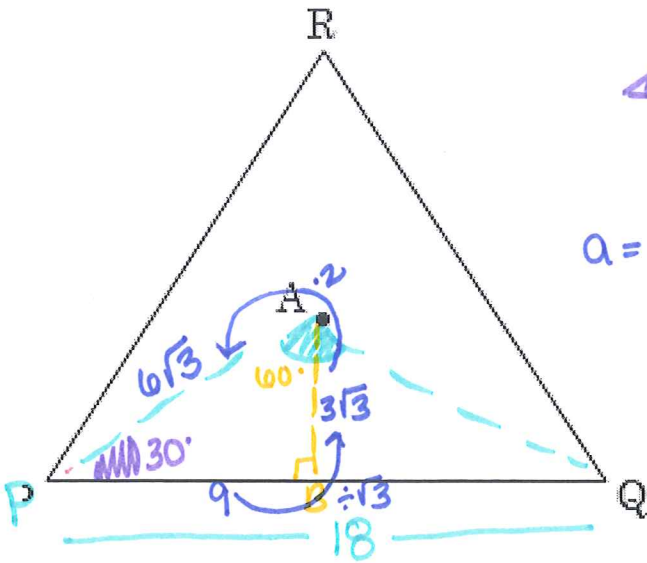
Apothem = 10 in *Given*

$A = 20 \cdot 20$
 $A = 400$ in²

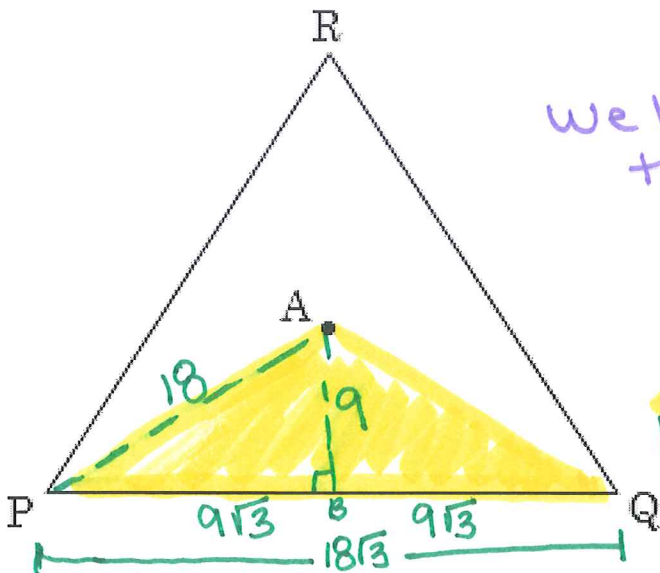
Exact Area = 400 in²

Rounded Area = 400 in²

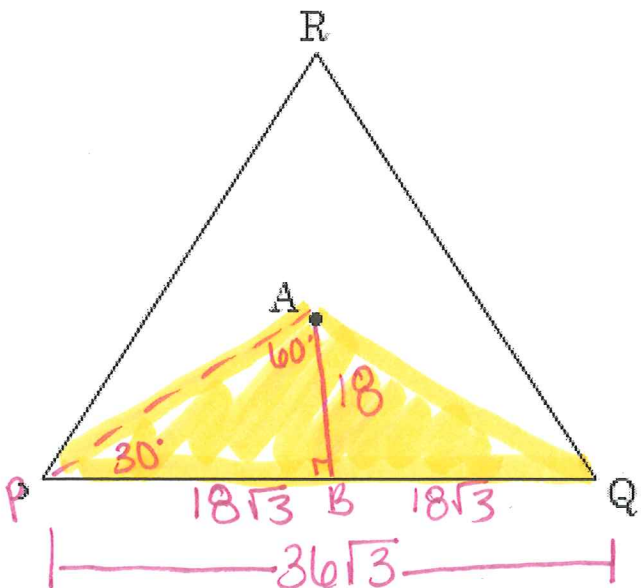
5. If $PQ = 18$ in where B is the midpoint of PQ.



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



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



$$\frac{360}{3} = 120^\circ$$



$$\frac{180 - 120}{2} = \frac{60}{2} = 30$$

$$\angle PAB = \frac{1}{2} 120^\circ$$

$$a = \frac{9 \cdot \sqrt{3}}{\sqrt{3} \cdot \sqrt{3}} = \frac{9\sqrt{3}}{\sqrt{9}} = \frac{9\sqrt{3}}{3}$$

$$a = 3\sqrt{3}$$



We have 3 of these

$$A = 3 \left(\frac{1}{2} b \cdot h \right)$$

$$A = 3 \cdot \frac{1}{2} \cdot 18 \cdot 3\sqrt{3} = \text{Plugin}$$

$$m\angle PAQ = 120^\circ$$

$$m\angle APQ = 30^\circ$$

$$m\angle PAB = 60^\circ$$

$$\text{Side length} = 18 \text{ in Given}$$

$$\text{Radius} = 6\sqrt{2} \text{ in}$$

$$\text{Apothem} = 3\sqrt{3} \text{ in}$$

$$\text{Exact Area} = 81\sqrt{3} \text{ in}^2$$

$$\text{Rounded Area} = 140.296 \text{ in}^2$$

$$m\angle PAQ = 120^\circ$$

$$m\angle APQ = 30^\circ$$

$$m\angle PAB = 60^\circ$$

$$\text{Side length} = 18\sqrt{3} \text{ in}$$

$$\text{Radius} = 18 \text{ in Given}$$

$$\text{Apothem} = 9 \text{ in}$$

$$\text{Exact Area} = 243\sqrt{3} \text{ in}^2$$

$$\text{Rounded Area} = 420.888 \text{ in}^2$$

$$m\angle PAQ = 120^\circ$$

$$m\angle APQ = 30^\circ$$

$$m\angle PAB = 60^\circ$$

$$\text{Side length} = 36\sqrt{3} \text{ in}$$

$$\text{Radius} = 36 \text{ in}$$

$$\text{Apothem} = 18 \text{ in Given}$$

$$\text{Exact Area} = 972\sqrt{3} \text{ in}^2$$

$$\text{Rounded Area} = 1683.553 \text{ in}^2$$

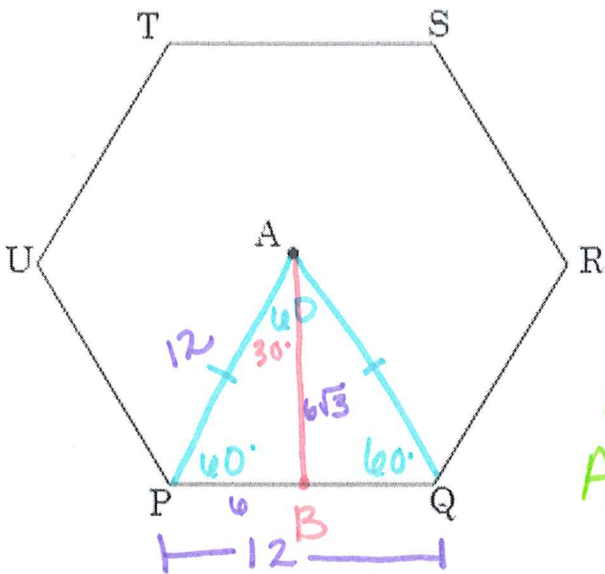
We have 3 of these triangles



$$A = 3 \left(\frac{1}{2} b \cdot h \right)$$

$$A = 3 \cdot \frac{1}{2} \cdot 18\sqrt{3} \cdot 9$$

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



$$A = 6 \triangle$$

$$A = 6 \left(\frac{1}{2} b \cdot h \right)$$

$$A = 6 \left(\frac{1}{2} 12 \cdot 6\sqrt{3} \right)$$

$$m\angle PAQ = 60^\circ$$

$$m\angle APQ = 60^\circ$$

$$m\angle PAB = 30^\circ$$

$$\text{Side length} = 12 \text{ in given}$$

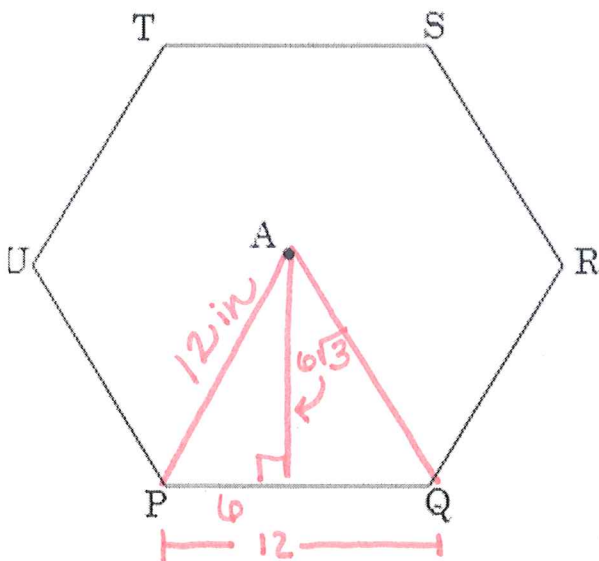
$$\text{Radius} = 12 \text{ in}$$

$$\text{Apothem} = 6\sqrt{3} \text{ in}$$

$$\text{Exact Area} = 216\sqrt{3} \text{ in}^2$$

$$\text{Rounded Area} = 374.123 \text{ in}^2$$

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



$$A = 6 \left(\frac{1}{2} b \cdot h \right)$$

$$A = 6 \left(\frac{1}{2} 12 \cdot 6\sqrt{3} \right)$$

$$m\angle PAQ = 60^\circ$$

$$m\angle APQ = 60^\circ$$

$$m\angle PAB = 30^\circ$$

$$\text{Side length} = 12 \text{ in}$$

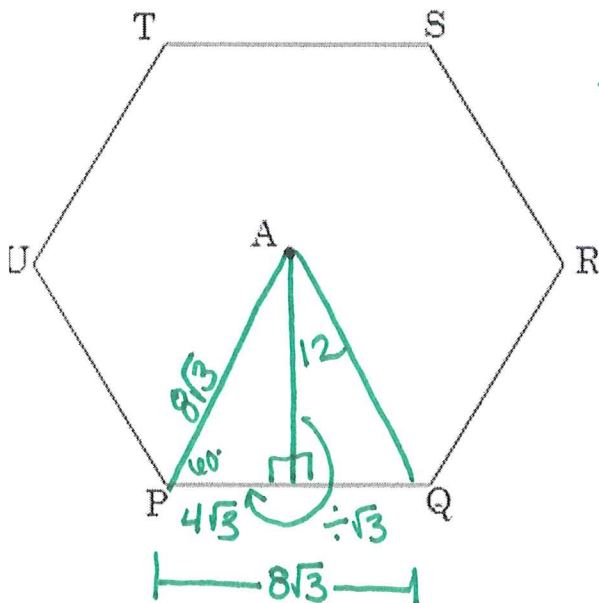
$$\text{Radius} = 12 \text{ in}$$

$$\text{Apothem} = 6\sqrt{3} \text{ in}$$

$$\text{Exact Area} = 216\sqrt{3} \text{ in}^2$$

$$\text{Rounded Area} = 374.123 \text{ in}^2$$

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



$$\frac{12}{\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}} = \frac{12\sqrt{3}}{3} = 4\sqrt{3}$$

$$A = 6 \left(\frac{1}{2} b \cdot h \right)$$

$$= 6 \left(\frac{1}{2} 8\sqrt{3} \cdot 12 \right)$$

$$m\angle PAQ = 60^\circ$$

$$m\angle APQ = 60^\circ$$

$$m\angle PAB = 30^\circ$$

$$\text{Side length} = 8\sqrt{3} \text{ in}$$

$$\text{Radius} = 8\sqrt{3} \text{ in}$$

$$\text{Apothem} = 12 \text{ in given}$$

$$\text{Exact Area} = 288\sqrt{3} \text{ in}^2$$

$$\text{Rounded Area} = 498.831 \text{ in}^2$$

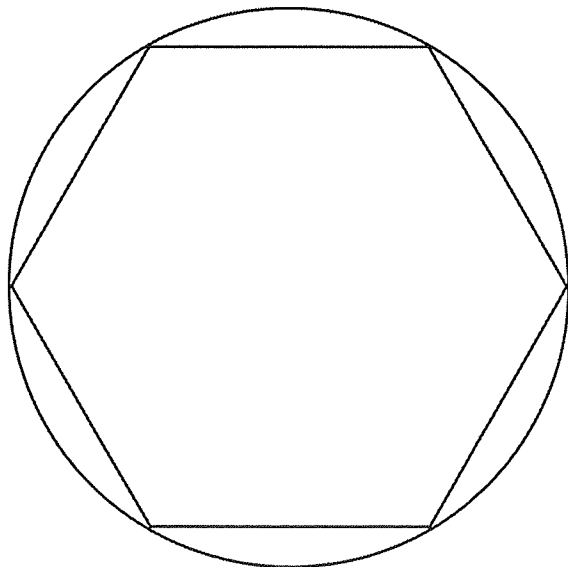
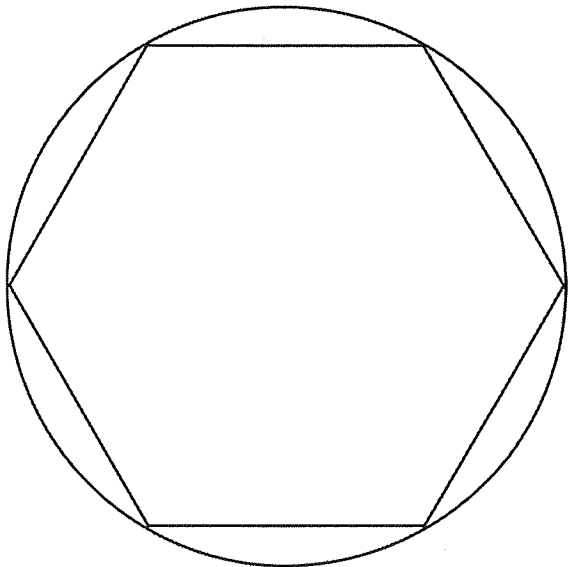
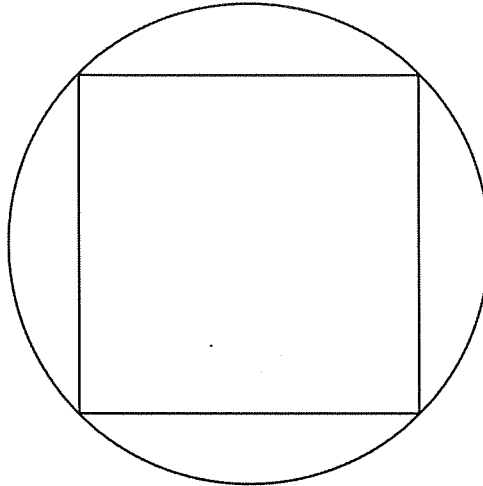
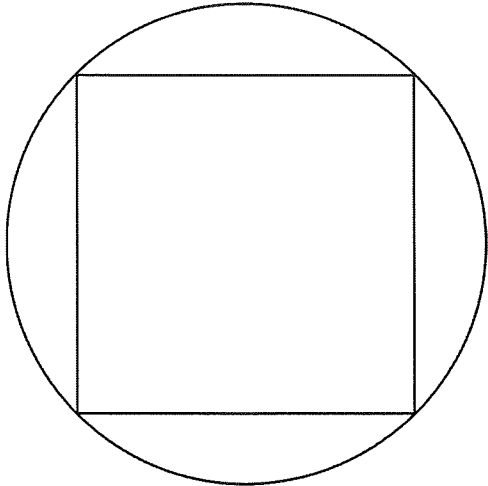
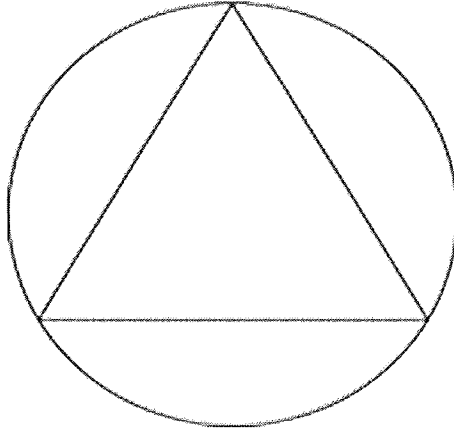
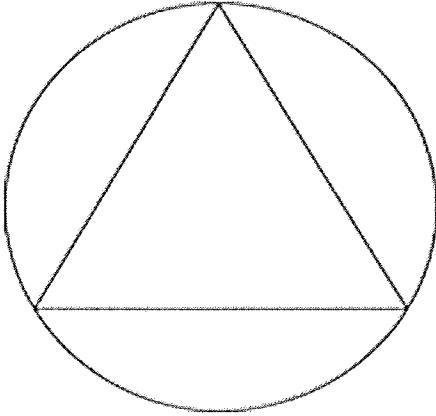
Name: _____

Area of Regular Polygons Notes

Know the following definitions:

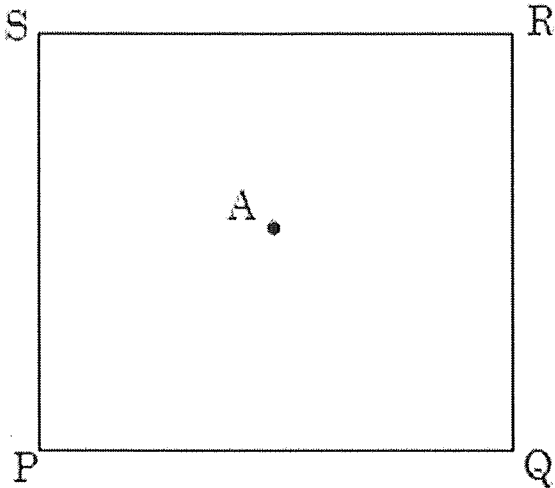
radius diameter side length apothem perimeter central angle base angles

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 = _____

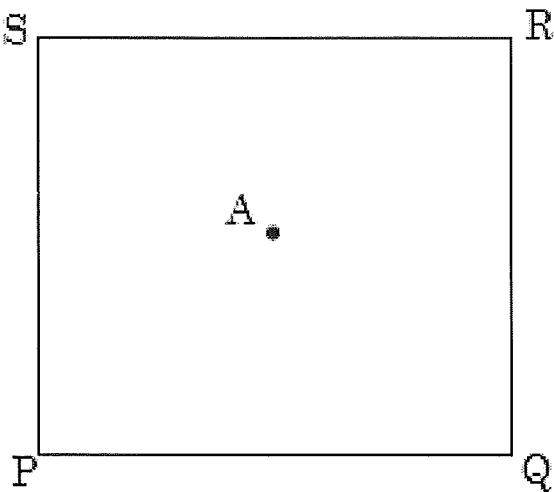
Radius = _____

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 = _____

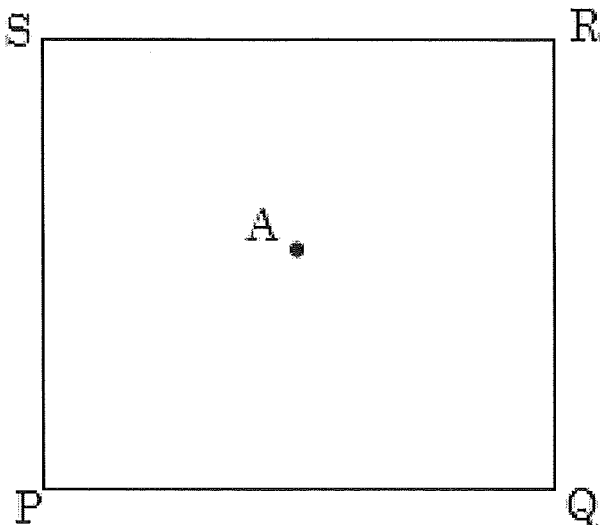
Radius = _____

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 = _____

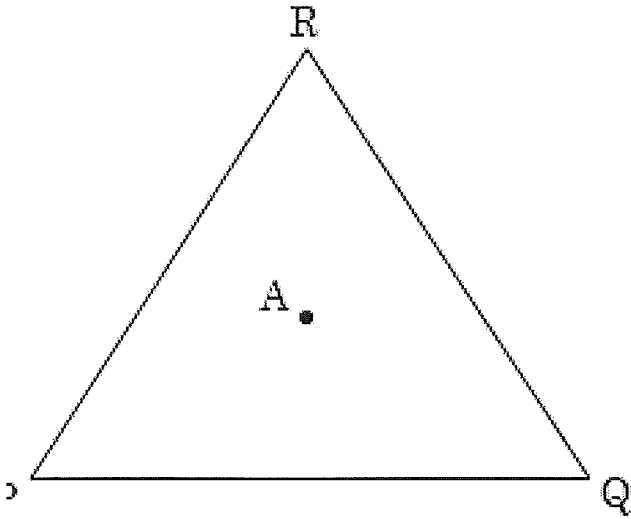
Radius = _____

Apothem = _____

Exact Area = _____

Rounded Area = _____

5. If $PQ = 18 \text{ in}$ where B is the midpoint of PQ.



$m\angle PAQ =$ _____

$m\angle APQ =$ _____

$m\angle PAB =$ _____

Side length = _____

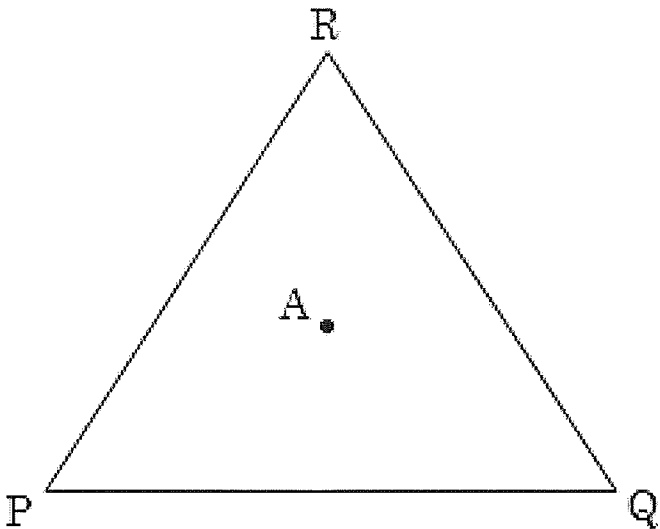
Radius = _____

Apothem = _____

Exact Area = _____

Rounded Area = _____

6. If $AP = 18 \text{ in}$ where B is the midpoint of PQ.



$m\angle PAQ =$ _____

$m\angle APQ =$ _____

$m\angle PAB =$ _____

Side length = _____

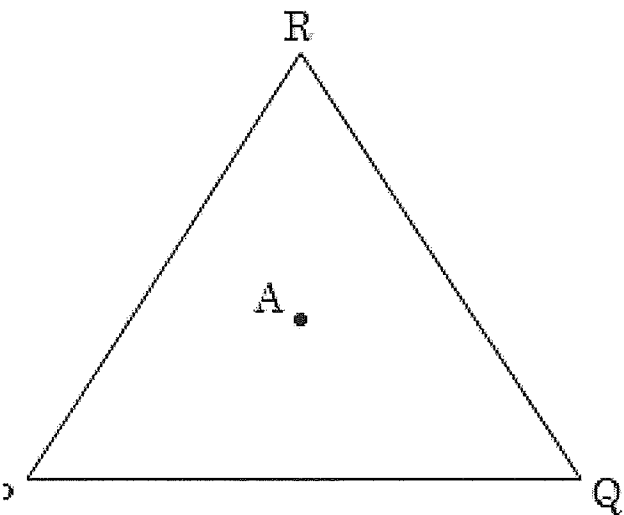
Radius = _____

Apothem = _____

Exact Area = _____

Rounded Area = _____

7. If $AB = 18 \text{ in}$ where B is the midpoint of PQ.



$m\angle PAQ =$ _____

$m\angle APQ =$ _____

$m\angle PAB =$ _____

Side length = _____

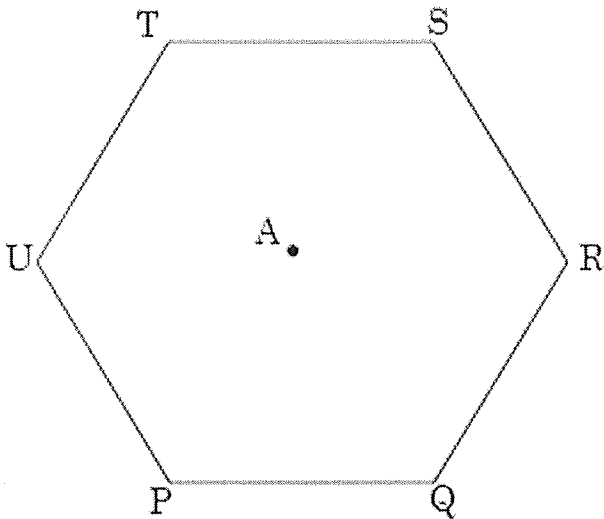
Radius = _____

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 = _____

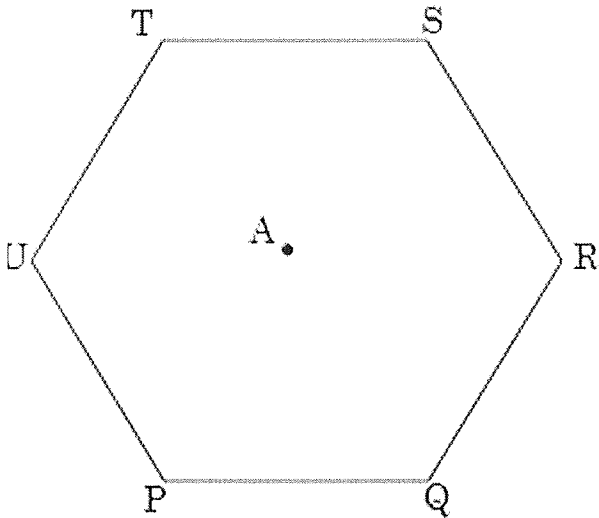
Radius = _____

Apothem = _____

Exact Area = _____

Rounded Area = _____

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



$vm\angle PAQ =$ _____

$m\angle APQ =$ _____

$m\angle PAB =$ _____

Side length = _____

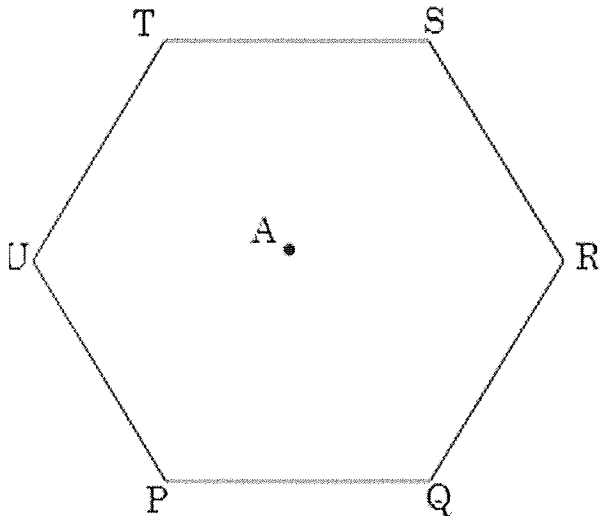
Radius = _____

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 = _____