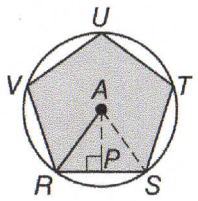
Area of Regular Polygons

In a regular polygon, the segment drawn from the center of the polygon perpendicular to the opposite side is called the _____.

In the figure at the right, $\overline{AP}$ is the apothem and $\overline{AR}$ is the radius of the circumscribed circle.



Area of a Regular Polygon	If a regular polygon has an area of A square units, a perimeter of P units, and an apothem of a units, then $A = \frac{1}{2}aP$.

Find the area of regular pentagon *RSTUV* if its perimeter is 60 cm.

First find the apothem.

The measure of central angle RAS is $\frac{360°}{5}$ or 72°. Therefore, m∠RAP = 36°.

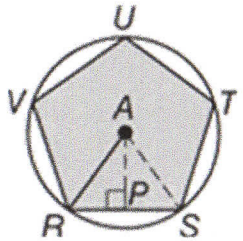
The perimeter is 60, so $RS = 12$ and $RP = 6$.

$$\tan m\angle RAP = \frac{RP}{AP}$$

$$\tan 36° = \frac{6}{AP}$$

$$AP = \frac{6}{\tan 36°}$$

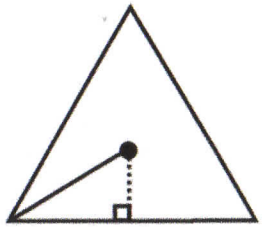
$$\approx 8.26$$



So, $A = \frac{1}{2}aP = \frac{1}{2}(8.26)(60)$ or 247.8.

The area is about 248 square centimeters.

Given: $P = 24\sqrt{3}$ m



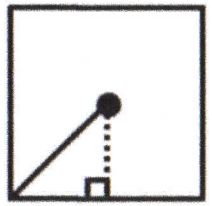
$r =$ _____

$a =$ _____

$P =$ _____

$A =$ _____

Given: $P = 72$ in



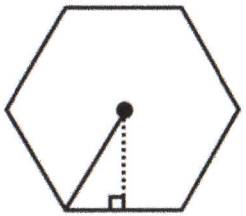
$r =$ _____

$a =$ _____

$P =$ _____

$A =$ _____

Given: $P = 48$ cm



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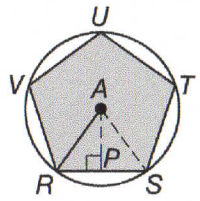

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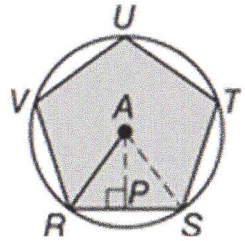

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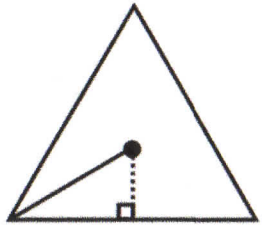

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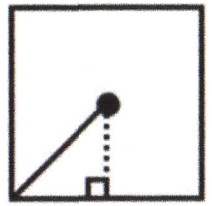
$P =$ _____

$A =$ _____

Given: $P = 72$ in



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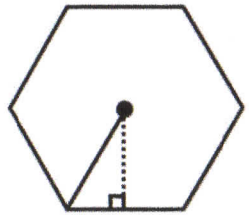

$r =$ _____

$a =$ _____

$P =$ _____

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