May 202014 H．gwb－1／5－Tue May 202014 11：58：34


A sketch of an inscribed regular polygon is given．Label the radius，$r$ ，and apothem，$a$ ．

A sketch of an inscribed regular polygon is given. Label the radius, $r$, and apothem, $a$.

$$
\begin{array}{ll}
a=\text { apothem } & \text { Regular }=a l l \text { sides } \cong \\
r=\text { radius } & \\
p=\text { perimeter of reg. poly. } \\
A_{\Delta}=\frac{1}{2} b \cdot h=\frac{1}{2} s \cdot a \\
A_{\text {reg.poly }}=\frac{\downarrow}{n} \cdot\left(\frac{1}{2} s a\right)=\frac{1}{2} a(n s)=\frac{1}{2} a \cdot p \\
\text { a of Regular Polygon }=\frac{1}{2} a \cdot p \quad \text { units } 2
\end{array}
$$

Examples

1) An equilateral triangle has a side 10 cm long. Find the triangle's area.

May 202014 H.qwb - 3/5 - Tue May 202014 12:20:29


Examples

1) An equilateral triangle has a side 10 cm long. Find the triangle's area.

$$
A=\frac{s^{2} \sqrt{3}}{4}=\frac{(10)^{2} \sqrt{3}}{4}=\frac{100 \sqrt{3}}{4}=25 \sqrt{3} \mathrm{~cm}^{2}
$$

2) A circle with a radius of 6 is inscribed in an equilateral triangle. Find the area of the triangle.
3) A circle with a radius of 6 is inscribed in an equilateral triangle. Find the area of the triangle.


$$
\begin{aligned}
& a=c \\
& p=3 \cdot 12 \sqrt{3} \\
& (12 \sqrt{3})^{2} \\
= & 12 \sqrt{3} \cdot 12 \sqrt{3} \\
= & 144 \cdot 3 \\
= & 432
\end{aligned}
$$

$$
p=3.12 \sqrt{3}=36 \sqrt{3}
$$

$$
\begin{aligned}
& A=\frac{1}{2} a \cdot p=\frac{1}{2}(6)(36 \sqrt{3})=108 \sqrt{3} \text { units } \\
& A=\frac{s^{2} \sqrt{3}}{4}=\frac{(12 \sqrt{3})^{2} \cdot \sqrt{3}}{4}=\frac{432 \sqrt{3}}{4}=108 \sqrt{3} \text { units }^{2}
\end{aligned}
$$

3) Find the area of a regular hexagon with sides 18 units long.

$$
P=6 \text { sides. } 18
$$

$$
=108
$$

$$
\begin{aligned}
A=\frac{1}{2} a \cdot p & =\frac{1}{2}(9 \sqrt{3}) \cdot 108 \\
& =486 \sqrt{3} \text { units }^{2}
\end{aligned}
$$


4) The radius of a regular hexagon is 12 . Find:
a) The length of one side 6
b) The apothem $6 \sqrt{3}$
c) The area

$$
\begin{aligned}
A & =\frac{1}{2} a \cdot p \quad p=6 \cdot 12=72 \\
& =\frac{1}{2}(6 \sqrt{3})(72) \\
& =216 \sqrt{3} \text { units }^{2}
\end{aligned}
$$



