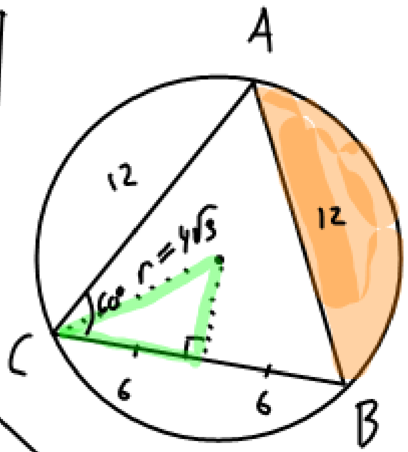
An equilateral $\triangle$ is inscribed in a $\odot$. The perimeter of the $\triangle$ is 36 units. Find:

$\frac{36}{3} = 12$

1. radius $= r = 4\sqrt{3}$ units
2. area of $\odot = 48\pi$ units$^2$
3. arc length of $\overset{\frown}{AB} = \frac{8\pi\sqrt{3}}{3}$ units
4. area of shaded region

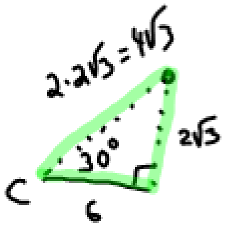



③


$\text{Length} = \frac{120}{360} \cdot 2\pi(4\sqrt{3})$

$= \frac{8\pi\sqrt{3}}{3}$

①




30 – 60 – 90 $\downarrow$ 6

30 – 60 – 90 $\downarrow$ $x\sqrt{3}$

$r = 4\sqrt{3}$

$\frac{6}{\sqrt{3}} = \frac{x\cancel{\sqrt{3}}}{\cancel{\sqrt{3}}}$

$\frac{6}{\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}} = \frac{6\sqrt{3}}{\sqrt{9}} = \frac{6\sqrt{3}}{3} = 2\sqrt{3}$

②

$A_{\odot} = \pi r^2$

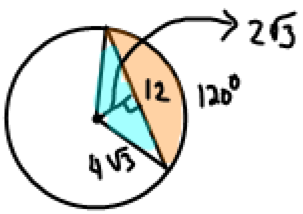
$= \pi(4\sqrt{3})^2$

$= \pi(4\sqrt{3})(4\sqrt{3})$

$= \pi 16\sqrt{9}$

$= \pi \cdot 16 \cdot 3 = 48\pi$ units$^2$

④




$A_{\triangle} = \frac{1}{2}bh$

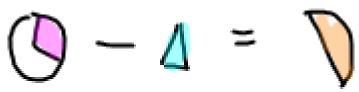
$= \frac{1}{2}(12)2\sqrt{3}$

$= 6 \cdot 2\sqrt{3}$

$= 12\sqrt{3}$

$A_{\text{sector}} = \frac{120}{360} \cdot \pi(4\sqrt{3})^2$

 $= 16\pi$



$\Rightarrow$ $16\pi - 12\sqrt{3}$ units$^2$