Geometry 14.3 #34

Area of triangle AOB (we will write "$\triangle AOB$")

$= \frac{1}{2}(\text{Base})(\text{Height})$

Base of $\triangle AOB = AP + PB$ Height $= a$

#32 says $PB = r/2$ #33 says $a = r/2(\sqrt{3})$

#30 says OP = apothem, so $PB = AP$ (p. 574)

Therefore Base of $\triangle AOB = AP + PB = r/2 + r/2 = \frac{2r}{2} = r$

Height $= a = r/2(\sqrt{3})$

Area $= 1/2(\text{Base})(\text{Height}) = 1/2(r)(r/2(\sqrt{3}))$

$= \frac{1}{2} \cdot \frac{r}{1} \cdot \frac{r}{2} \cdot \frac{\sqrt{3}}{1}$

$= \frac{r \cdot r \cdot \sqrt{3}}{2 \cdot 2} = \frac{r^2\sqrt{3}}{4}$

$= \frac{\sqrt{3}}{4} r^2$