Math 242 B - 11 February 2022


Circumference: $2 \pi$


Square: $2^{2}$-gon
side length $s_{2}=\sqrt{2} \quad \pi_{2}^{i}=\frac{4 \sqrt{2}}{2}=2 \sqrt{2} \approx 2.82 \ldots$

Octagon:

$$
\begin{aligned}
& a=\sqrt{1^{2}-\left(\frac{s_{2}}{2}\right)^{2}}=\frac{1}{\sqrt{2}} \\
& b=1-a=1-\frac{1}{\sqrt{2}}
\end{aligned}
$$

Side length:

$$
s_{3}=\sqrt{b^{2}+\left(\frac{s_{2}}{2}\right)^{2}}=\sqrt{2-\sqrt{2}}
$$

$$
\pi_{3}^{i}=\frac{8 s_{3}}{2}=4 \sqrt{2-\sqrt{2}} \approx 3.06 \ldots
$$

16-gon:

$$
\begin{aligned}
& a=\sqrt{1-\left(\frac{s_{3}}{2}\right)^{2}}=\frac{1}{2} \sqrt{2+\sqrt{2}} \\
& b=1-a \\
& s_{4}=\sqrt{b^{2}+\left(\frac{s_{3}}{2}\right)^{2}}=\sqrt{2-\sqrt{2+\sqrt{2}}} \\
& \pi_{4}^{i}=\frac{16 s_{4}}{2} \approx 3.12 \ldots
\end{aligned}
$$

