$$\sin(x) = \Im(e^{ix}) = \frac{e^{ix} - e^{-ix}}{2}$$

$$\begin{aligned}
\sin(1) + \sin(2) + ... + \sin(n) &= \sum_{k=1}^{n} \sin(k) \\
&= \Im\left(\sum_{k=1}^{n} e^{ik}\right) \\
&= \Im\left(e^{i}\frac{e^{in} - 1}{e^{i} - 1}\right) \\
&= \Im\left(e^{i}\frac{e^{i\frac{n}{2}}\left(e^{i\frac{n}{2}} - e^{-i\frac{n}{2}}\right)}{e^{\frac{i}{2}}\left(e^{\frac{i}{2}} - e^{-\frac{i}{2}}\right)}\right) \\
&= \Im\left(e^{i\frac{n+1}{2}}\frac{e^{i\frac{n}{2}} - e^{-i\frac{n}{2}}}{e^{\frac{i}{2}} - e^{-\frac{i}{2}}}\right) \\
&= \Im\left(e^{i\frac{n+1}{2}}\frac{\sin\left(\frac{n}{2}\right)}{\sin\left(\frac{1}{2}\right)}\right) \\
&= \frac{\sin\left(\frac{n+1}{2}\right)\sin\left(\frac{n}{2}\right)}{\sin\left(\frac{1}{2}\right)}
\end{aligned}$$