# Answer on Question #69112 – Math – Real Analysis

**Question**

Evaluate the limit as n → ∞ of the sum
1/n [sin (π/n) +sin (2π)/n +.....+ sin (2nπ)/n]

**Solution**

There is a mistake in the last term.
There should be $\frac{1}{n}\cdot\left(\sin\left(\frac{\pi}{n}\right)+\sin\left(\frac{2\pi}{n}\right)+\cdots+\sin\left(\frac{n\pi}{n}\right)\right)$ instead of $\frac{1}{n}\cdot\left(\sin\left(\frac{\pi}{n}\right)+\sin\left(\frac{2\pi}{n}\right)+\cdots+\sin\left(\frac{2n\pi}{n}\right)\right)$.

Sum $\frac{\pi}{n}\sum_{i=1}^{n} sin\left(\frac{\pi i}{n}\right)$ is the right Riemann sum for the integral $\int_0^{\pi} sinxdx$.
So $\lim_{n\to\infty}\frac{1}{n}\sum_{i=1}^{n} sin\left(\frac{\pi i}{n}\right)=\frac{1}{\pi}\int_0^{\pi} sinxdx=-\frac{1}{\pi}cosx|_{x=0}^{x=\pi}=\frac{2}{\pi}\approx 0.6366.$

**Answer:** $\frac{2}{\pi}\approx 0.6366.$