

CHALLENGE PROBLEM

TIM McLARNAN

Whittaker and Watson use without proof the following trig identity, which they seem to assume any reader either already knows or can quickly verify: For every integer $n \geq 2$,

$$\left(\sin \frac{\pi}{n}\right) \left(\sin \frac{2\pi}{n}\right) \cdots \left(\sin \frac{(n-1)\pi}{n}\right) = \frac{n}{2^{n-1}}.$$

It turns out not every modern reader of their book learned this one in high school.

Tim McLarnan will award a cool prize to the student submitting the best proof of this identity received on or before October 15.

Faculty may also participate, not for the prize but for the glory of finding a better proof than Tim's. Faculty from outside the Math Department might particularly enjoy humiliating one of their colleagues at his own game.

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