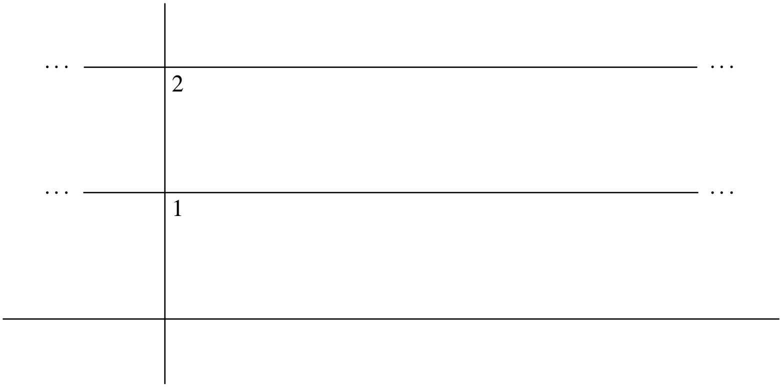


10.1017/mag.2025.33 © The Authors, 2025
Published by Cambridge University Press
on behalf of The Mathematical Association

DES MacHALE
*Department of Mathematics.*
*University College Cork,*
*Cork, Ireland*
e-mail: *d.machale@ucc.ie*

# Feedback

On [1]: Paul Belcher writes: The Note talks about a *shear-like* transformation that preserves area. The term *shear-like* is not defined and actually the transformation given is a vertical stretch with a factor of 2. This does not preserve area but multiplies it by 2. However as only half of the circle has been transformed the integral given for $\pi$ is correct.

To obtain the result given (not using the double angle formula), we do not have to use geometrical transformations. If we take the area enclosed between $y = +\sqrt{1 - x^2}$ and the $x$-axis it is half a circle, so $\frac{1}{2}\pi = \int_{-1}^{1} y\, dx$. Using parametric coordinates $x = \cos\theta$, $y = \sin\theta$ and integration by substitution with $\frac{dx}{d\theta} = -\sin\theta$ then

$$\frac{\pi}{2} = \int_{\pi}^{0} \sin\theta\,(-\sin\theta)\,d\theta = \int_{0}^{\pi} \sin^2\theta\, d\theta$$

The algebra is essentially that shown in the Teaching Note.

*Reference*

1. Colin Foster, Teaching Note $\int_0^{\pi} \sin^2\theta\, d\theta$ from a shear-like transformation of a circle, *Math. Gaz.* **108** (November 2024) pp. 541-542.

10.1017/mag.2025.34 © The Authors, 2025
Published by Cambridge University Press on behalf of The Mathematical Association

https://doi.org/10.1017/mag.2025.34 Published online by Cambridge University Press