

Student Problems

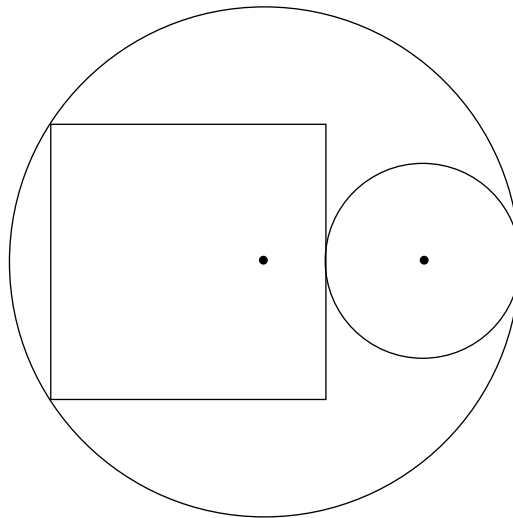
Students up to the age of 19 are invited to send solutions to either or both of the following problems to Tuya Sa, SCH.1.17, Schofield Building, Loughborough University, Loughborough, LE11 3TU. Two prizes will be awarded – a first prize of £25, and a second prize of £20 – to the senders of the most impressive solutions for either problem. It is not necessary to submit solutions to both. Solutions should arrive by 20th January 2023 and will be published in the March 2023 edition.

The Mathematical Association and the *Gazette* comply fully with the provisions of the 2018 GDPR legislation. Submissions must be accompanied by the SPC permission form which is available on the Mathematical Association website

<https://www.m-a.org.uk/the-mathematical-gazette>

*Note that if permission is not given, a pupil **may still participate and will be eligible for a prize in the same way as others.***

Problem 2022.5 (Paul Stephenson)



A square and circle fit a circle of unit radius symmetrically as shown. Is it possible to adjust their sizes so that their combined area is under half of that unit circle?

Problem 2022.6 (Paul Stephenson)

The primes p and q ($p > q$) are greater than 3. They are respectively the hypotenuse and a side of a Pythagorean triangle. Show that 12 divides the other side, r .