SPC July 2019

Student Problems

Students up to the age of 19 are invited to send solutions to either or both of the following problems to Stan Dolan, 126A Harpenden Road, St Albans, Herts., AL3 6BZ.

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 September 20th 2019. Please give your School year, the name and address of your School or College, and the name of a teacher through whom the award will be made. Please print your own name clearly! The names of all successful solvers will be published in the November edition.

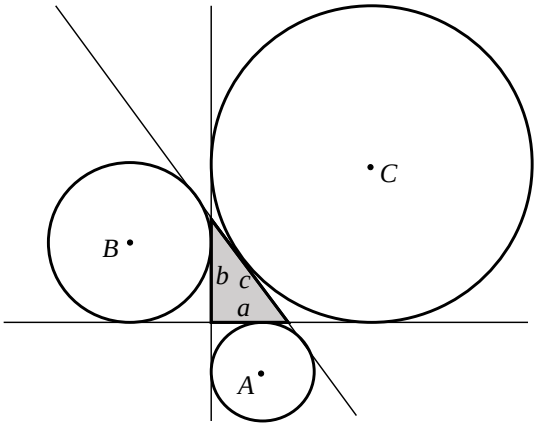
The MA and the *Gazette* comply fully with the provisions of the 2018 GDPR legislation. Submissions **must** be accompanied by the SPC permission form which is available on the Mathematical Association website

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 2019.3 (**Paul Stephenson**)

The right-angled triangle shown shaded in the diagram has sides of lengths *a*, *b* and (hypotenuse) *c*. Also shown in the diagram are the three excircles of the shaded triangle and the excentres *A*, *B* and *C*. Find the area of triangle *ABC*.



Problem 2019.4 (**Stan Dolan**)

If a 5-digit number, *n*, is a multiple of 271 then so are all numbers given by cyclic permutations of the digits of *n*.

For example, 91327 is a multiple of 271 and therefore so are 79132, 27913, 32791 and 13279.

Explain this property of 271 and generalise your result.