# Problem Corner

Solutions are invited to the following problems. They should be addressed to **Nick Lord** at **Tonbridge School, Tonbridge, Kent TN9 1JP** (e-mail: **njl@tonbridge-school.org**) and should arrive not later than 10 December 2020.

Proposals for problems are equally welcome. They should also be sent to Nick Lord at the above address and should be accompanied by solutions and any relevant background information.

104.E (Stan Dolan)

Consider the products obtained by multiplying pairs of numbers from a Pythagorean triple. For the (3, 4, 5) triple, the two largest products of 15 and 20 are both the areas of the right-angled triangles with rational sides shown in the Figure.
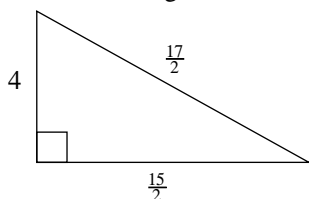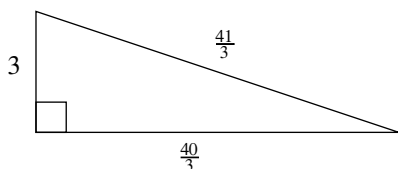
Area 15   Area 20

Is this result true for all Pythagorean triples?

104.F (Martin Lukarevski)

Let m be an arbitrary integer and let $k = 3m + 1$. Find all integer solutions x and y of the equation

$$(x + y - k)(x + y + k) = 1 + xy.$$

104.G (Michael Fox)

A line r passes through the midpoints of the direct common tangents d and d' of two given circles u and v. A circle w with centre W touches u and v, the contacts being either both external or both internal. Prove that lines drawn through W perpendicular to d and d' meet r in points J and K that lie on the circle w.

Is there a corresponding property if w, still touching both u and v, surrounds u but excludes v?