Maths Workshop
September 2020

Problems

1. In how many ways can 8 people be arranged into pairs?

2. Find all pairs of integers such that their product is 7 times their sum.

3. Let $f : \mathbb{R} \to \mathbb{R}$ be a function such that $f(f(x)) = x^3 + 1$ for all real x. Determine how many real solutions the equation $f(x) = 0$ can have.

4. Does there exist a convex polygon that can be partitioned into non-convex quadrilaterals?

5. Point P lies inside $\triangle ABC$, such that: $\angle PAB = 24°$, $\angle PBA = 27°$, $\angle PBC = 15°$ and $\angle PCB = 39°$. Show that $\triangle ABC$ is isosceles.

6. Below are 4 nets of cubes. Is it possible to stack these four cubes into a $1 \times 1 \times 4$ stack so that each 1×4 face of the stack contains all four colours?