www.artofproblemsolving.com/community/c3236496
by parmenides51

1   Four right triangles, each with the sides 1 and 2, are assembled to a figure as shown.
How large a fraction does the area of the small circle make up of that of the big one?
`https://1.bp.blogspot.com/-XODK1XKCS0Q/XzXDtcA-xAI/AAAAAAAAMWA/zSLPpf3IcXOrgaRtOxm_`
`F2begnVdUargACLcBGAsYHQ/s0/2010%2BMohr%2Bp1.png`

2   Prove that for any integer n there exist integers a, b and c such that $n = a^2 + b^2 - c^2$.

3   Can 29 boys and 31 girls be lined up holding hands so no one is holding hands with two girls?

4   It is stated that 2^{2010} is a 606-digit number that begins with 1. How many of the numbers $1, 2, 2^2, 2^3, ..., 2^{2009}$ start with 4?

5   An equilateral triangle ABC is given. With BC as diameter, a semicircle is drawn outside the triangle. On the semicircle, points D and E are chosen such that the arc lengths BD, DE and EC are equal. Prove that the line segments AD and AE divide the side BC into three equal parts.
`https://1.bp.blogspot.com/-hQQV-Of96Ls/XzXCZjCledI/AAAAAAAAMV0/SwXa4mtEEm04onYbFGZiTc5NS`
`s0/2010%2BMohr%2Bp5.png`