

Few Problems - 2

by Gonit Sora - Saturday, December 17, 2016

<http://gonitsora.com/few-problems-2/>

1. For which $n \in \mathbb{N}$, does $n+1 \mid \binom{2n}{n}$ hold?
2. For a polynomial $p(x) = a_n x^n + \dots + a_0$ with integral coefficients, i.e. $a_i \in \mathbb{Z}$ for all $1 \leq i \leq n$ with $a_n \neq 0$, if $p(\frac{r}{s}) = 0$ where r, s are coprime integers with $s \neq 0$ then show that:
 - i. $r \mid a_0$
 - ii. $s \mid a_n$
3. Let ABC be a triangle with side-lengths a, b, c corresponding to sides BC, CA and AB respectively and let m_a, m_b and m_c be the lengths of the medians from vertices A, B and C respectively. Then show that $m_a + m_b + m_c < a + b + c < \frac{4}{3}(m_a + m_b + m_c)$
4. Construct an angle of 60° . Give reasoning as to why your construction works.
5. We call a number good if it is divisible by 5 but not by 25. How many five digit good numbers are there?

Featured Image Courtesy: [Shutterstock](#)

PDF generated from <http://gonitsora.com/few-problems-2/>.

This work is licensed under a Creative Commons Attribution-ShareAlike 4.0 International License.