

Name: _____

School: _____

1. Find the smallest natural number that is divisible by 2017 and whose decimal notation begins with 2016. **(12 Marks)**

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- 2** An acute-angled triangle ABC is such that $\angle A = 60^\circ$. A billiard ball goes from vertex A along the bisector of angle A , reflects about the side BC according to the law "the angle of reflection equals the angle of incidence" and continues along a straight line without any further reflections. Prove that the path of the ball contains the circumcenter of triangle ABC . **(12 Marks)**

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3. Is it possible that the sum and the product of 2017 integers are both equal to 2017?

(12 Marks)

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4. Compute $\sin^6 \alpha + \cos^6 \alpha$, if $\sin \alpha + \cos \alpha = m$? **(12 Marks)**

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5. For which values of n and m the number $10^{2n}+10^n +1$ is divisible by 10^m-1 ?

(12 Marks)