

I - Rioplatense Mathematical Olympiad, Level 3 1990

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by parmenides51

- 1 How many positive integer solutions does the equation have

$$\left\lfloor \frac{x}{10} \right\rfloor = \left\lfloor \frac{x}{11} \right\rfloor + 1?$$

($\lfloor x \rfloor$ denotes the integer part of x , for example $\lfloor 2 \rfloor = 2$, $\lfloor \pi \rfloor = 3$, $\lfloor \sqrt{2} \rfloor = 1$)

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- 2 Some of the people attending a meeting greet each other. Let n be the number of people who greet an odd number of people. Prove that n is even.
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- 3 Let $ABCD$ be a trapezium with bases AB and CD such that $AB = 2CD$. From A the line r is drawn perpendicular to BC and from B the line t is drawn perpendicular to AD . Let P be the intersection point of r and t . From C the line s is drawn perpendicular to BC and from D the line u perpendicular to AD . Let Q be the intersection point of s and u . If R is the intersection point of the diagonals of the trapezium, prove that points P, Q and R are collinear.
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