**Flanders Math Olympiad 1995**

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by Peter, Arne

**1** Four couples play chess together. For the match, they're paired as follows: ("man Clara" indicates the husband of Clara, etc.)

$$Bea \Longleftrightarrow Eddy$$

$$An \Longleftrightarrow man\ Clara$$

$$Freddy \Longleftrightarrow woman\ Guy$$

$$Debby \Longleftrightarrow man\ An$$

$$Guy \Longleftrightarrow woman\ Eddy$$

Who is $Hubert$ married to?

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**2** How many values of $x \in [1, 3]$ are there, for which $x^2$ has the same decimal part as $x$?

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**3** Points $A, B, C, D$ are on a circle with radius $R$. $|AC| = |AB| = 500$, while the ratio between $|DC|, |DA|, |DB|$ is $1, 5, 7$. Find $R$.

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**4** Given a regular $n$-gon inscribed in a circle of radius 1, where $n > 3$.
Define $G(n)$ as the average length of the diagonals of this $n$-gon.

Prove that if $n \to \infty, G(n) \to \frac{4}{\pi}$.

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