Quiz 7

1. Guido Grandi, a father who bequeathes a gem to his two sons who each may keep the bauble one year in alteration. It belongs to each son for one half.
2. mme. Du Châtelet translated and Voltaire wrote Lettres sur les anglais
3. Lagrange proved that every integer is a sum of four or less squares
4. $\begin{pmatrix} 1 & 2 & 3 & 4 & 5 & 6 & 7 & 8 & 9 \\ 9 & 8 & 7 & 5 & 6 & 4 & 3 & 2 & 1 \end{pmatrix}$

$\begin{pmatrix} 1 & 9 \\ 9 & 1 \end{pmatrix}\begin{pmatrix} 2 & 8 \\ 8 & 2 \end{pmatrix}\begin{pmatrix} 3 & 7 \\ 7 & 3 \end{pmatrix}\begin{pmatrix} 4 & 5 & 6 \\ 5 & 6 & 4 \end{pmatrix}$

smallest $i = \text{lcm}(2, 2, 2, 3) = 6$

5. Start with $\begin{pmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 13 \end{pmatrix}$ end with $\begin{pmatrix} 3 & 2 & 1 \\ 4 & 5 & 6 \\ 7 & 8 & 13 \end{pmatrix}$

is impossible because every legal one move the inversion is odd and taxi cab distance doesn't change so inversion + taxi cab = odd number = invariant but the invariant is an even number thus a contradition since even ≠ odd so it is impossible