

Dutch Mathematical Olympiad 1985

Second Round

September 13

1. For some p , the equation $x^3 + px^2 + 3x - 10 = 0$ has three real solutions a, b, c such that $c - b = b - a > 0$. Determine a, b, c , and p .
2. Among the numbers $11n + 10^{10}$, where $1 \leq n \leq 10^{10}$ is an integer, how many are squares?
3. In a factory, square tables of size 40×40 are tiled with four tiles of size 20×20 . All tiles are the same and decorated in the same way with an asymmetric pattern such as the letter J . How many different types of tables can be produced in this way?
4. A convex hexagon $ABCDEF$ is such that each of the diagonals AD, BE, CF divides the hexagon into two parts of equal area. Prove that these three diagonals are concurrent.