

**Dutch Mathematical Olympiad 1985**

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- 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  $p$ .

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- 2 Among the numbers  $11n + 10^{10}$ , where  $1 \leq n \leq 10^{10}$  is an integer, how many are squares?

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- 3 In a factory, square tables of  $40 \times 40$  are tiled with four tiles of size  $20 \times 20$ . 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?

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- 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.

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