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- 1 The width of rectangle  $ABCD$  is twice its height, and the height of rectangle  $EFCG$  is twice its width. The point  $E$  lies on the diagonal  $BD$ . Which fraction of the area of the big rectangle is that of the small one?

<https://1.bp.blogspot.com/-aeqefhbBh5E/XzcBjhgg7sI/AAAAAAAAAMXM/B0qSgWDBuqc3ysd-m0itP1Lar0s0/2004%2BMohr%2Bp1.png>

- 2 Show that if  $a$  and  $b$  are integer numbers, and  $a^2 + b^2 + 9ab$  is divisible by 11, then  $a^2 - b^2$  divisible by 11.

- 3 The digits from 1 to 9 are placed in the figure below with one digit in each square. The sum of three numbers placed in the same horizontal or vertical line is 13. Show that the marked place says 4.

<https://cdn.artofproblemsolving.com/attachments/a/f/517b644caf59bbc57701662f21d57465855d.png>

- 4 Find all sets  $x, y, z$  of real numbers that satisfy

$$\begin{cases} x^3 - y^2 = z^2 - x \\ y^3 - z^2 = x^2 - y \\ z^3 - x^2 = y^2 - z \end{cases}$$

- 5 Determine for which natural numbers  $n$  you can cover a  $2n \times 2n$  chessboard with non-overlapping  $L$  pieces. An  $L$  piece covers four spaces and has appearance like the letter  $L$ . The piece may be rotated and mirrored at will.