Austria Beginners' Competition 2004

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by parmenides51

1 Find the smallest four-digit number that when divided by 3 gives a four-digit number with the same digits.
(Note: Four digits means that the thousand Unit digit must not be 0.)

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2 For what pairs of integers (x, y) does the inequality $x^2 + 5y^2 - 6 \leq \sqrt{(x^2 - 2)(y^2 - 0.04)}$ hold?

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3 Determine the value of the parameter m such that the equation $(m-2)x^2 + (m^2 - 4m + 3)x - (6m^2 - 2) = 0$ has real solutions, and the sum of the third powers of these solutions is equal to zero.

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4 Of a rhombus $ABCD$ we know the circumradius R of ΔABC and r of ΔBCD. Construct the rhombus.
