Lesson 3: More tilings and some algebra.

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Problem 1.
What’s the biggest number of $1 \times 4$ rectangles that can be fit into a $6 \times 6$ square without overlaps?

Problem 2.
99 $2 \times 2$ squares were cut out of a $29 \times 29$ board. Prove that it is possible to cut out at least one more.

Problem 3.
Prove that 8999999 is not a prime number.

Problem 4.
Expand $(a + b - 2c)^3$.

Problem 5.
Factor the following polynomials:

a) $ac + ad + bc + bd$.
b) $ac + bc - ad - bd$.
c) $1 + a + a^2 + a^3$.
d) $1 + a + a^2 + a^3 + \ldots + a^{14}$.
e) $x^4 - x^3 + 2x - 2$. 