Math Challenge Problem

for early November, 2013

Peculiar Product

$$1 \cdot 2 \cdot 3 \cdot 4 + 1 = 25 = 5^2$$
$$2 \cdot 3 \cdot 4 \cdot 5 + 1 = 121 = 11^2$$
$$3 \cdot 4 \cdot 5 \cdot 6 + 1 = 361 = 19^2$$

Notice the interesting pattern suggested by the calculations above: the product of four consecutive positive integers appears to be one less than a perfect square. In fact it appears to be the square of a *prime* number! Does this pattern continue?

The Challenge: Is the product of four consecutive positive integers plus 1 always a perfect square? Is the perfect square always the square of a prime number? Prove your answers.

Submit solutions to Ross 2239G or to `oscar.levin@unco.edu` by **Friday, November 22**.

New this semester: PRIZES!
A winner will be randomly selected from all correct answers received for each challenge problem to receive a fun math prize of his or her choice.
Prizes include funky Rubik's style cubes, math puzzle books, math games, even a math coloring book. So submit your answer TODAY!