Math 109, Spring 2018

Mathematical Reasoning , HW 6

Due May 15th by 10AM in Roman Kitsela's box

From Hammack's `Book of Proof`:

- Exercises Ch. 4 (p. 100): *6, 24, 26*[1]
- Exercises Ch. 5 (p. 110): *A (4, 12) and B (18, 24, 28)*
- Exercises Ch. 6 (p. 118): *A (8, 10)*
- Exercises Ch. 7 (p. 129): *10, 26, 30*

Problem I. Let p be a prime number, and let $k < p$ be a positive integer. Show that p divides the binomial coefficient $\binom{p}{k}$. Give an example showing this is false without the assumption that p is prime.

Problem II. Is the number below divisible by 4?

$$44444253748585425365744444444526253447498292715132435474848392972.$$

Why or why not?

[1] Additional question; is every even integer a difference of two squares?