Math 255 - Spring 2017
Homework 4

This homework is due on Monday, February 13.

1. Prove that if p is a prime, then $\sqrt{p}$ is irrational.

2. Give an example of integers a, b and n, with $n > 1$, such that $a^2 \equiv b^2 \pmod{n}$ but $a \not\equiv b \pmod{n}$.

3. Give an example of integers a, b, i, j and n, with $n > 1$, such that $a \equiv b \pmod{n}$ and $i \equiv j \pmod{n}$ but $a^i \not\equiv b^j \pmod{n}$.

4. What is the remainder when the sum

$$1^5 + 2^5 + 3^5 + \cdots + 99^5 + 100^5$$

is divided by 4?