Assignment 4

Make sure to write complete proofs. Try to avoid skipping steps. Write clear sentences.

1. True or False: If p, q are prime, then $\gcd(p, q)$ is equal to either p or q.
2. Show that if $p > 3$ is a prime number then the remainder of diving p by 6 is either 1 or 5. Provide examples to show that both remainders are indeed possible.
3. Suppose that M is a number that is relatively prime to 6 and is also a perfect square (i.e. it is $M = n^2$ of some integer n). Show that M divided by 6 leaves remainder 1.
4. Suppose that M is a perfect square. Show that its remainder when divided by 4 must be 0 or 1.
5. Use the previous problem to show that the number 1403 cannot possibly be the sum of two perfect squares.