

UBC MATH 312 SELECTED TEXTBOOK PROBLEMS

10/10/12

- ① Show that $2^n > n^2$ whenever n is an integer greater than 4.
- ② Show that the integer n is even if and only if $n - 2 \left[\frac{n}{2} \right] = 0$.
- ③ Find one million consecutive composite integers.
- ④ Show that if a, b, c are integers with $\gcd(a, b) = \gcd(a, c) = 1$, then $\gcd(a, bc) = 1$.
- ⑤ Show that if p is a prime, $a \in \mathbb{Z}$, $n \in \mathbb{N}$, then $p \mid a^n \implies p \mid a$.
- ⑥ Show that if $a, b, c \in \mathbb{N}$ s.t. $(a, b) = 1$ and $ab = c^n$ for $n \in \mathbb{N}$, then there exist $d, e \in \mathbb{N}$ such that $a = d^n$ and $b = e^n$.
- ⑦ Compute 2^{200} modulo 47.
- ⑧ Show that if \bar{a} is an inverse of a modulo m and \bar{b} is an inverse of b modulo m , then $\bar{a}\bar{b}$ is an inverse of ab modulo m .