Math 441, Fall 2017 ***HOMEWORK #1*** ***Peter Gylys-Colwell***

Exersise §1, 9

a. For any even integer n we can write it as the product $n = 2k$ for some $k \in \mathbb{Z}$. Therefore $n^2 = (2k)^2 = 4k^2$ and therefore 4 divides n^2

b. For any even integer n we can write it as the product $n = 4k$ for some $k \in \mathbb{Z}$. Therefore $n^3 = (2k)^3 = 8k^3$ and therefore 8 divides n^3

c. In the prime factorization of twice and odd cube, $2k^3$ where k odd, we know 2 does not divide k and therefore does not divide k^3 and so there is only 2^1 in the prime factorization of $2k^3$. Therefore 8 cannot divide $2k^3$ since $8 = 2^3$ does not divide the powers of 2 in the prime factorization of $2k^3$

d. Suppose for contradiction $\sqrt[3]{2} = \frac{a}{b}$ where a, b are relatively prime. Then we have $2b^3 = a^3$

Exersise 10

Exersise 13

Exersise 1

Exersise 2