Worksheet # 5

MATH 294 ESP Workshop

Spring 2016

Problem 1. Prove for every natural number n,
$$n^3 + (n+1)^3 + (n+2)^3$$
is divisible by 9.

Problem 2. Let A and B be sets. The product $A \times B$ is the set of all ordered pairs (a, b) where $a \in A$ and $b \in B$. Prove that $A \times B = \emptyset$ if and only if $A = \emptyset$ or $B = \emptyset$. Compare this is a similar rule when A and B are real numbers.

Problem 3. Let a be an integer. Prove that if $a|(4n+3)$ and $a|(2n+1)$ for some n then $a = \pm 1$.