

10 pts possible

1. (2 pts.) Prove that if n^2 is even then n is even, where n is any natural number.

Pf Suppose n is odd. Then $n = 2k+1$ for some $k \in \mathbb{Z}$
So $n^2 = (2k+1)^2 = 4k^2 + 4k + 1 = 2(2k^2 + 2k) + 1$. Thus
 n^2 is odd. The result follows.

2. (4 pts.) Suppose $A = \{a, b, c\}$ and $B = \{b, \{c\}\}$. Mark the statement TRUE or FALSE (circle one)

a. $c \in A-B$. ☒ TRUE ☐ FALSE

b. $|P(A \times B)| = 64$. ☒ TRUE ☐ FALSE

c. $\emptyset \in P(B)$. ☒ TRUE ☐ FALSE

d. $\{b, \{c\}\} \in P(B)$ ☒ TRUE ☐ FALSE

3. (4 pts.) Is the following function 1-1 and/or onto? Briefly justify your answers.

$g: \mathbb{N} \rightarrow \mathbb{N}$ defined by $g(n) = n^2$

g is 1-1 no range element is hit twice
 $g \mapsto 0, 1, 4, 9, 16, \dots$
 g is not onto 2 is not hit.