Assignment 1

MA08 Applied Algebra Deadline 05:00 PM, Wednesday, 20190619

1. Describe the set by listing its elements.
   (a) $\{x \in \mathbb{R} \mid x^2 = 3\}$
   (b) $\{x \in \mathbb{Z} \mid x^2 = 3\}$
   (c) $\{x \in \mathbb{Z} \mid x^2 < 26\}$
   (d) $\{x \in \mathbb{Z} \mid x \text{ is odd number and } x^2 < 26\}$
2. If $A \cap B = A \cap C$, can we say $B = C$?
3. If $A = \{a, b, c\}$, $B = \{1, 2\}$, list the elements in $A \times B$.
4. Let $A = \{1, 2, 3\}$, $B = \{2, 4, 6\}$. For the following relation between A and B given as a subset of $A \times B$, decide whether it is a function mapping A into B. If it is a function, decide whether it is one-to-one and whether it is onto B.
   (a) $\{(1, 4), (2, 6), (2, 2)\}$
   (b) $\{(2, 2), (1, 6), (3, 4)\}$
   (c) $\{(1, 6), (2, 6), (3, 6)\}$
5. Find gcd(435, 377).
6. Prove that $n - 1$ and $2n - 1$ are relatively prime, for all integers $n > 1$.
7. True or False:
   (a) $105 \equiv 27 \pmod 2$.
   (b) $15 \equiv 27 \pmod 4$.
   (c) $1024 \equiv 2048 \pmod{50}$.

   Notice: Please write Your Name and Student ID when you submit.