

## Math 206 — Sets

**Problem 1.** Let  $A = \{1, 2, 3, 4\}$ . Which of the following are true mathematical statements?

- a.  $3 \in A$
- b.  $\{3\} \in A$
- c.  $5 \in A$
- d.  $2 \in a$
- e.  $2 \notin A$
- f.  $\emptyset \in A$

**Problem 2.** Let  $A = \{1, 2, 3, 4\}$ ,  $B = \{1, 2, 3, 4, 5, 6\}$ ,  $S = \{2n : n \in \mathbb{Z}\}$ . Which of the following are true?

- a.  $A \subseteq B$
- b.  $B \subseteq A$
- c.  $A \in B$
- d.  $\{3\} \subseteq A$
- e.  $S \not\subseteq \mathbb{Z}$
- f.  $S \subsetneq \mathbb{Z}$
- g.  $\emptyset \subseteq A$

**Problem 3.** Let  $C = \{x \in \mathbb{N} : x = y^2 \text{ for some } y \in \mathbb{R}\}$ . Prove that  $C = \mathbb{N}$ .

**Problem 4.** Let  $D = \{(2n + 1)^3 : n \in \mathbb{Z}\}$ ,  $E = \{2n + 1 : n \in \mathbb{Z}\}$ . Prove that  $D \subsetneq E$ .