Problem 1. Write words that say what the following notation means.

(a) $a \in A$

(b) $b \notin A$

(c) $B \subset A$

(d) $\varnothing$

Problem 2. Suppose we divide 13 into 345, to obtain a quotient and a remainder.

(a) What is the dividend?

(b) What is the divisor?

(c) What is the quotient?

(d) What is the remainder?

Problem 3. Suppose we divide b into a, and get d as the quotient and c as the remainder. Which of the following equations is always true? Circle the correct answer.

- $a = bc + d$
- $b = ac + d$
- $a = bd + c$
- $b = ad + c$

Problem 4. For each statement, write **T** in the blank if the statement is true, and write **F** in the blank if the statement is false.

(a) _____ $\frac{2}{3} \in \mathbb{Z}$

(b) _____ $3 \notin \mathbb{N}$

(c) _____ $\frac{3}{2} \in \mathbb{Q}$

(d) _____ $-3 \in \mathbb{Q}$

(e) _____ $4 \notin \mathbb{N}$

(f) _____ $0 \in \mathbb{Q}$

(g) _____ $0.1 \notin \mathbb{Z}$

(h) _____ $\frac{-5}{2} \notin \mathbb{Q}$

(i) _____ $\sqrt{2} \notin \mathbb{Q}$

(j) _____ $\sqrt{5} + 2 \in \mathbb{R}$

(k) _____ $\{1, 3\} \subset \{1, 2, 3\}$

(l) _____ $\{1, 3, 1\} \subset \{1, 2, 3\}$

(m) _____ $\{2, 3, 5\} \subset \mathbb{Z}$

(n) _____ $\mathbb{Z} \subset \{1, 2, 3, 4, 5\}$

(o) _____ $\{-2, 0, -2\} \subset \mathbb{N}$

(p) _____ $\{1/2\} \in \mathbb{Q}$

(q) _____ $\mathbb{N} \subset \mathbb{Q}$

(r) _____ $\{1\} \in \{1, 2, 3\}$

(s) _____ $\{1.5, 2.5\} \subset \mathbb{Q}$

(t) _____ $\{2, 3, 5\} \subset \{1, 3, 5\}$

Problem 5. Let $A = \{x \in \mathbb{N} \mid x \leq 10\}$. Let $B = \{x \in \mathbb{N} \mid x = 2n + 1 \text{ for some } n \in A\}$. Let $C = \{x \in A \mid x = 2n + 1 \text{ for some } n \in A\}$.

(a) Write A using correct roster notation.

(b) Write B using correct roster notation.

(c) Write C using correct roster notation.