$\sim$	•	0.4
( )	$\mathbf{uiz}$	34
·	uız	$\mathbf{v}$

Name:
-------

## You must show your work to get full credit.

**1.** Let A be the set of all squares of odd integers and  $B = \{x \in \mathbb{Z} : x \equiv 1 \pmod{4}\}.$ 

(a) List four elements of A.

(b) List four elements of B.

(c) Prove  $A \subseteq B$ .

(d) Prove  $B \not\subseteq A$ .

**2.** Let

$$A = \{6u - 4v : u, v \in \mathbb{Z}\}$$

B =Set of even integers.

(a) List four elements of A.

\_\_\_\_

(b) List four elements of B.

\_\_\_\_

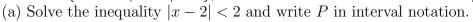
Show A = B. This is done in two steps:

(c) Prove  $A \subseteq B$ .

(d) Prove  $B \subseteq A$ .

(e) Write the punch line.

**3.** Let  $P = \{x \in \mathbb{R} : |x-2| < 1\}$ , and let S be the closed interval S = [0, 5]. Prove  $P \subseteq S$ .



$$P =$$

(b) Show  $P \subseteq S$ .

- **4.** The **power set**, denoted by  $\mathcal{P}(A)$  of a set A is the set whose elements are all the subsets of A.
  - (a) What is the power set of  $\emptyset$ ?

$$\mathcal{P}(\varnothing) = \underline{\hspace{1cm}}$$

(b) What is the power set of  $\{1, 2, 3\}$ ?

$$\mathcal{P}(\{1,2,3\}) =$$
\_\_\_\_\_\_

(c) What is  $(\{1\})$ ?

$$\mathcal{P}(\mathcal{P}(\{1\})) = \underline{\hspace{1cm}}$$