

**MAT-207: Discrete Mathematics – Assignment 3**

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1. Which of the following sets are well defined? Justify your response in a word or two.
  - 1.1. The set of football teams.
    - a) Well defined.
  - 1.2. The set of integers which are products of two primes.
    - a) Not well defined.
  - 1.3. The set of game positions in chess.
    - a) Not well defined.
  - 1.4. The set of laws in the USA.
    - a) Well defined.
  - 1.5. The set of integers which are the products of at least three different primes.
    - a) Not well defined.
  - 1.6. The set of ways a rubic's cube can be scrambled.
    - a) Not well defined.
2. Find three distinct elements in each of the following sets.
  - 2.1.  $P(P(\{a, b\}))$
  - 2.2.  $P_2(P(\mathbb{Z}))$
  - 2.3.  $P_3(P_2(P_1(\mathbb{Z})))$
  - 2.4.  $P(P(P(\phi)))$

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3. List all the elements in  $P(\{a, b, c, d\})$

4. List all the elements in  $P_2(\{a, b, c, d, e\})$

5. Write each of the following in set notation, without words if possible:

5.1.  $A = \{1, 2, 3, 4, 5\}$

5.2.  $B = \{1, 3, 5, 7, 9\}$

5.3.  $C = \{-2, -1, 0, 1, 2\}$

6. Which of these sets are equivalent?

$$A = \{1, 3, 5, 7\} \quad B = \{3, 7, 5, 1\} \quad C = \{a, e, i, o, u\} \quad D = \{a, b, c, d\} \quad E = \{b, c, d, a\}$$

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7. Let  $A = \{x \in \mathbb{Z} \mid x^2 - 5x + 6 = 0\}$  and  $B = \{x \in \mathbb{Z} \mid x = n^2 - n \text{ for some } n \in \mathbb{Z}\}$ . Are A and B equivalent? Show your work to support your answer.

8. Let A be a finite set. Is  $A \subseteq P(A)$  true, false, or cannot tell?