

1. Let $A = \{3, 4, 6, 7, 10\}$ and $B = \{2, 5, 6, 10\}$. Label the following statements as true or false.

- (a) $A \subseteq B$
- (b) $3 \notin B$
- (c) $A \cap B \subseteq A \cup B$
- (d) $\{3, 4, 3, 6, 3, 7, 3, 3, 10\} = A$
- (e) $\emptyset \subseteq B$

2. Let $A = \{3, 4, 6, 7, 10\}$ and $B = \{2, 5, 6, 10\}$. Find each of the following.

- (a) How many subsets does A have? You do NOT have to list them.
- (b) $A \cap B =$
- (c) $A \cup B =$
- (d) List all two-element subsets of $A \cup B$.
- (e) List all subsets of $B = \{2, 5, 6, 10\}$.

3. Suppose that X and Y are sets such that $|X| = 4$ and $|Y| = 3$.

- (a) Is it possible that $|X \cup Y| = 4$?
- (b) Is it possible that $|X \cup Y| = 3$?
- (c) Is it possible that $|X \cap Y| = 4$?
- (d) Is it possible that $|X \cap Y| = 3$?
- (e) Is it possible that $|X \cap Y| = 2$ and $|X \cup Y| = 6$?

4. How many different 5-digit numbers can be formed using the digits 1, 2, 3, 4, and 5, without repetition? (You don't have to list all these numbers.)

5. If I have 3 different pairs of shoes, 2 dresses, and 2 jackets, how many different outfits are possible to wear? (An outfit consists of one pair of shoes, one dress, and one jacket).

6. We toss a coin twice in a row. List all possible outcomes. (For example, one possible outcome is HT , i.e. head for the first, tail for the second toss.)