Assignment 1
Sets

1. Let $A = \{1, 2, 4\}$ and $B = \{2, 3, 4, 5\}$. Find each of the following sets.

(a) $A \cup B$
   $A \cup B = \{1, 2, 3, 4, 5\}$

(b) $A \cap B$
   $A \cap B = \{2, 4\}$

(c) $A - B$
   $A - B = \{1\}$

(d) $B - A$
   $B - A = \{3, 5\}$

2. Find the following cardinalities:

(a) $|A|$ when $A = \{4, 5, 6, \ldots, 32\}$
   $|A| = 29$

(b) $|A|$ when $A = \{x \in \mathbb{Z} : -2 \leq x \leq 20\}$
   $|A| = 23$

3. Find a set of the largest possible size that is a subset of both $\{1, 2, 3, 4, 5\}$ and $\{2, 4, 6, 8, 10\}$.

$$\{1, 2, 3, 4, 5\} \cap \{2, 4, 6, 8, 10\} = \{2, 4\}$$

4. Find a set of the smallest possible size that has both $\{1, 2, 3, 4, 5\}$ and $\{2, 4, 6, 8, 10\}$ as subsets.

$$\{1, 2, 3, 4, 5\} \cup \{2, 4, 6, 8, 10\} = \{1, 2, 3, 4, 5, 6, 8, 10\}$$

5. Let $A = \{a, b, c\}$. Find $P(A)$.

a	b	c
0	0	0
0	0	1
0	1	0
0	1	1
1	0	0
1	0	1
1	1	0
1	1	1

$$P(A) = \{\varnothing, \{a\}, \{b\}, \{c\}, \{a, b\}, \{a, c\}, \{b, c\}, \{a, b, c\}\}$$

6.   Consider the sets A and B where A = $\{3, |B|\}$ and B = $\{1, |A|, |B|\}$. What are the sets?

$$A = \{2, 3\} \text{ and } B = \{1, 2\}$$