

Homework Assignment #1 (Sets)

- 1 Given the universal set $U = \{1, 2, 3, 4, 5, 6, 7, 8\}$, and sets $A = \{2, 4\}$, $B = \{1, 2, 8\}$, and $C = \{1, 2, 5, 6\}$, calculate the following:

a. $A \cap C$

b. $A \cup B$

c. B'

d. $B - C$

e. $C \cap B'$

f. $|A' \times B|$

2 Set builder notations:

- a.** List elements in the following sets given by set builder notations:
 $\{x : x \in N \text{ and } x^2 < 64\}$

$$\{x \in Z : x^2 < 64\}$$

$$\{3x : x \in Z \text{ and } x \leq 5\}$$

- b.** Use set build notation to define the set of odd natural numbers.

- c.** The set of even numbers that are also perfect squares is : $\{x \in N : x = _ \}$.

- 3** A furniture store allows the customers to customize desks as follows. When buying a desk, the customer can choose the desk top from a set of options (e.g., map, oak, glass, ...) denoted as set A , choose the type of legs from a set of options denoted as set B (e.g., map, oak, metal,...). Can you write a set expression to represent the set of different desks one can custom make? How many different kinds of desks can be ordered from this store?

4 Draw a Venn Diagram to visualize the following set, assuming set A, B, C have intersections, and are not equal to each other. $(A \cap C - B) \cup (B - A - C)$.

5 Among the 20 students in a class, there are 13 students who have been to California, there are 8 students who have been to Florida, there are 5 students who have been to California and Florida. How many students have not been to California or Florida? (Hint: Draw Venn Diagram and/or apply Inclusion/Exclusion principle.)