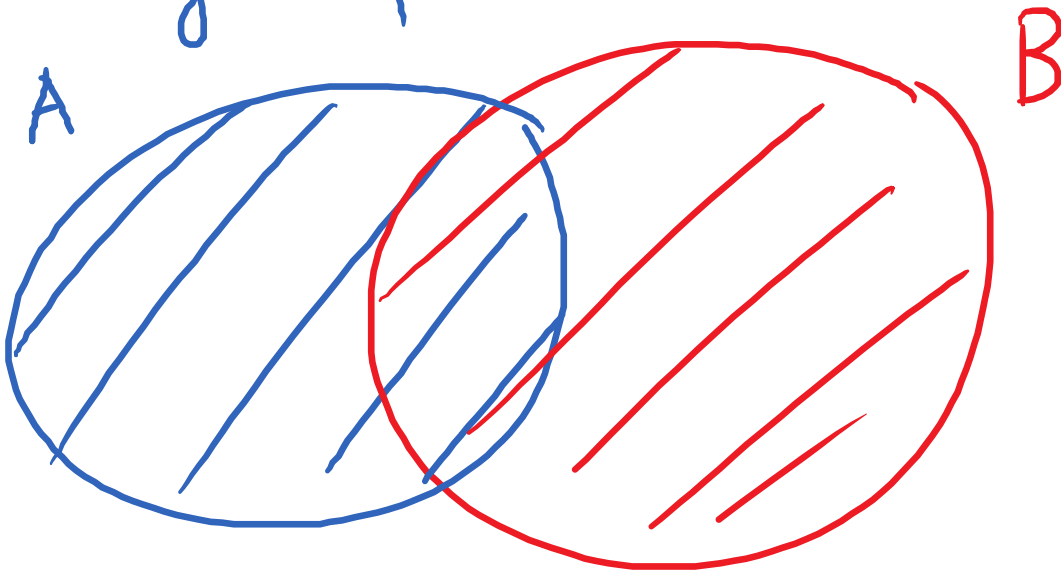


Venn Diagram for the union



② Intersection of sets.

A, B: sets.

The intersection of 2 sets A and B is the set of all elements that are common to both A and B.

Notation: Intersection of A and B: $A \cap B$

E.g. $A = \{1, 2, \dots, 10\}$

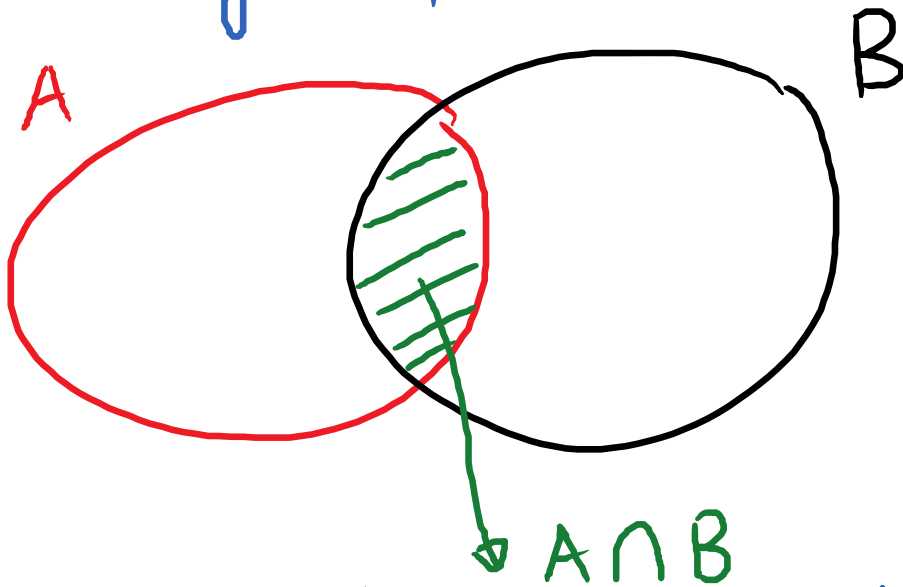
$$B = \{1, 3, 5, 7, 9, 11, 13, 15, 17\}$$

$$A \cap B = \{1, 3, 5, 7, 9\}$$

$$A = \{a, b, c\} ; B = \{1, 2, 3, 4\}$$

$$A \cap B = \emptyset$$

Venn Diagram for the intersection:

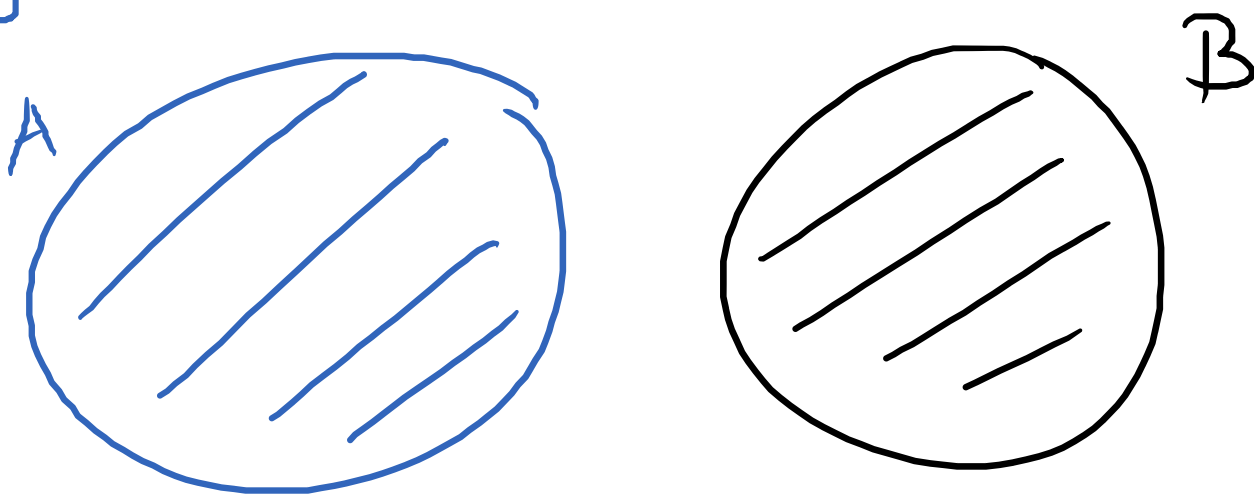


Ex. $A = \{x \mid x \text{ is a month that starts with a J}\}$
 $B = \{x \mid x \text{ is a month that ends with a Y}\}$

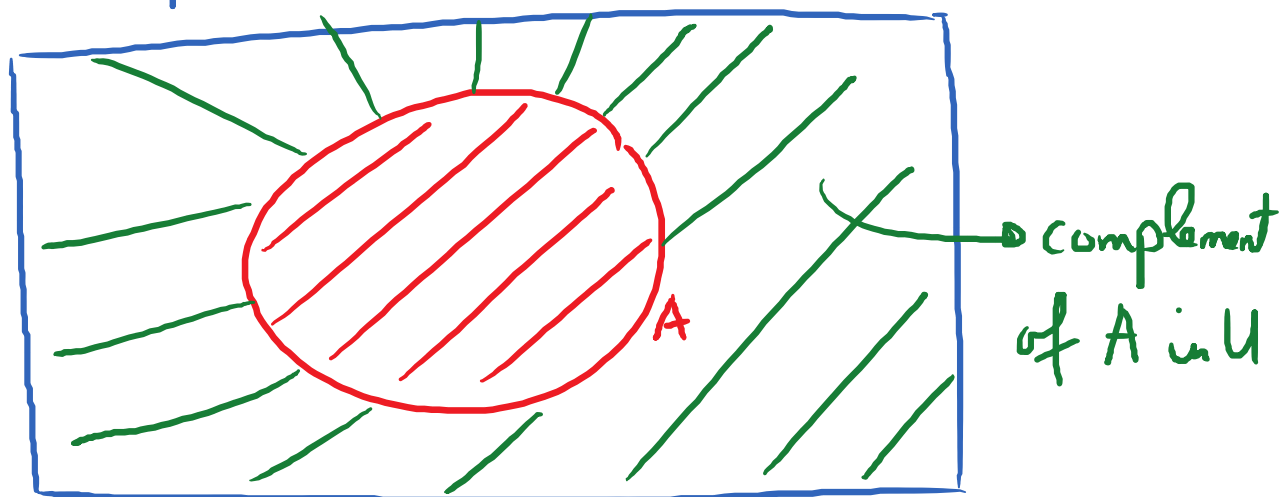
Find $A \cup B = \{ \text{Jan, Feb, June, July, May} \}$

and $A \cap B = \{ \text{Jan, July} \}$

If 2 sets have empty intersection, i.e., they have nothing in common, they are called disjoint set.



③ The complement of a set.



$A = \{x \mid x \text{ is a month that starts with a J}\}$

$U = \{x \mid x \text{ is a month in the year}\}$

Complement of A in $U = \{ \text{Feb, Mar, Apr, May, Aug, ...} \}$

July - Aug, Sept

Oct, Nov, Dec

If A is a subset of the set U , the complement of A in U is the set of elements that are in U but not in A .

Notation: A' : complement of A in U .

(read as A prime)

$$A' = \{x \mid x \in U \text{ but } x \notin A\}$$

E.g. $U = \{1, 2, 3, \dots, 10\}$

$$A = \{x \mid x \text{ is an odd number less than } 10\}$$

$$A' = \{2, 4, 6, 8, 10\}$$

Notation: A is a set.

$$n(A) = \# \text{ of elements in } A.$$

$$A = \{1, 2, 3, 4, 5\} ; n(A) = 5$$

$U = \{x \mid x \text{ is a month in the year}\}$

$$n(U) = 12.$$

$X = \{x \mid x \text{ is a state in the U.S.}\}$

$$n(X) = 50.$$

Some applications.

A marketing company did a survey of 1000 commuters. They found that:

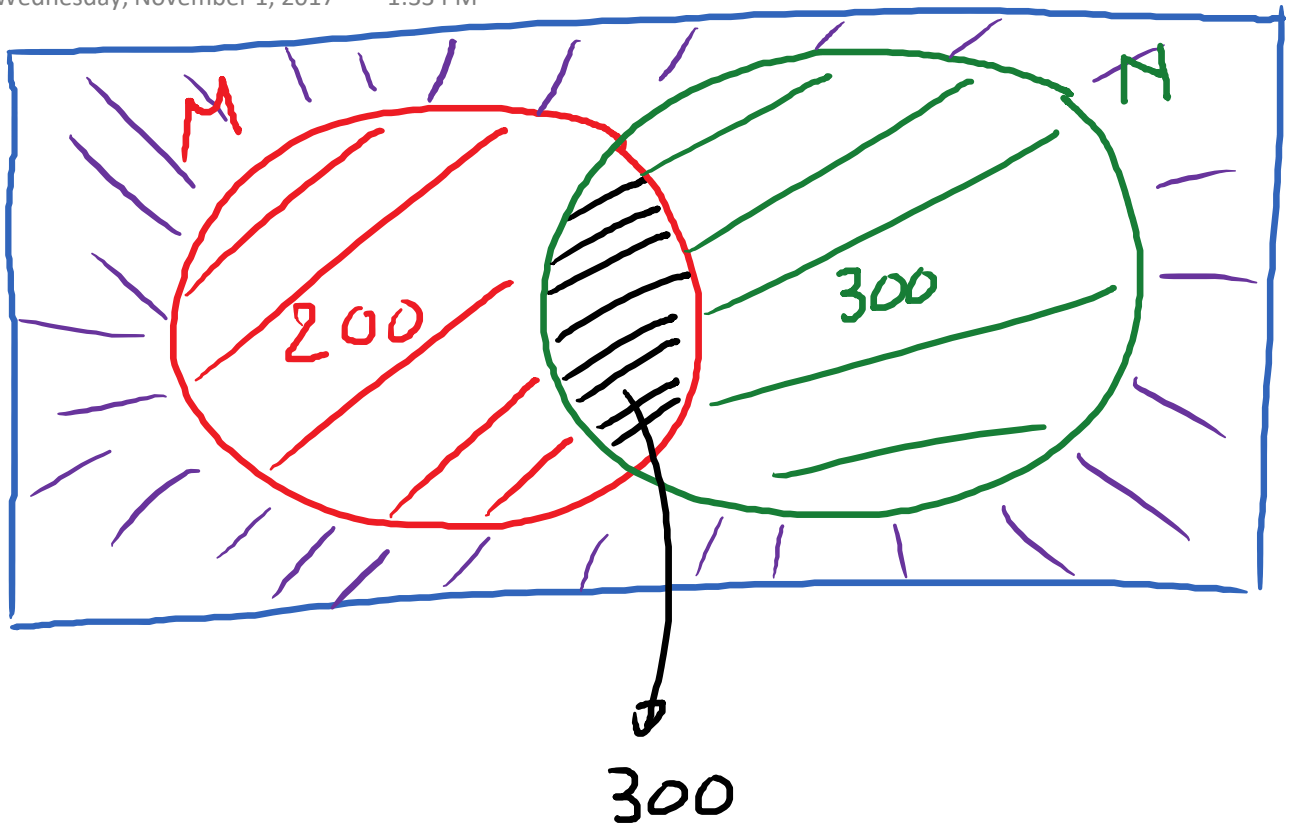
600 listen to the news

500 listen to music.

300 listen to both.

Find the number of people who listen to the news but do not listen to music.

U 1000



Answer: 300.

listen to neither news or music = 200.