

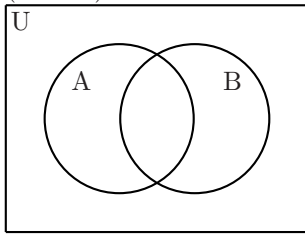
Review for Exam 1  
Math 102

Complete the following exercises for a review. Questions on the exam will be similar to questions on this review, questions from the homework assignments and the suggested exercises.

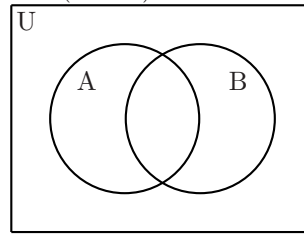
- Use proper set notation and the listing method to express each as a set.
  - The set of integers between -2 and 5, not inclusive.
  - The set of multiples of 4 between 2 and 19.
  - The set of integers which when squared equal 81.
  - The set of integers which when squared equal 82.
- Express each set using set builder notation.
  - $\{2, 4, 6, 8, \dots\}$
  - $\{1, 4, 9, 16, 25, 36\}$
  - $\{\text{Sunday, Monday, Tuesday, Wednesday, Thursday, Friday, Saturday}\}$
- Determine  $n(A)$  for the following sets.
  - $A = \{x : 1 < x \leq 10\}$
  - $A = \{x : x \text{ is a letter in our alphabet}\}$
  - $A = \{\{2, 3\}, 4, \{\emptyset\}, 12\}$
- List all subsets of  $\{1, 2, 3\}$ . Be sure to use good notation.
- Classify each of the following as true or false.
  - $\{1, 5, 7\} = \{1, 5, 7\}$ .
  - $\{3, 7, 10\}$  and  $\{4, 8, 12\}$  are equivalent.
  - $a \in \{a, b, c\}$
  - $\{a\} \in \{a, b, c\}$ .
  - $\{a\} \subseteq \{a, b, c\}$ .
  - $\{a\} \subset \{a, b, c\}$ .
  - $\{a\} \subset \{a, b, c\}$ .
  - $\{1, 5, 7\} \subset \{1, 5, 7\}$ .
  - $\{1, 5, 7\} \subseteq \{1, 5, 7\}$ .
  - $\{\emptyset\}$  and  $\{3\}$  are equivalent.
- Assume  $A = \{1, 2, 7, 8, 9\}$ ,  $B = \{2, 4, 6, 8\}$  and  $C = \{5, 7, 9\}$ . Let the universal set  $U = \{1, 2, 3, 4, 5, 6, 7, 8, 9\}$ . Determine the following sets.
  - $A \cup B$
  - $A \cap C$
  - $A \cap B$
  - $A \cap (B \cup C)$
  - $B \cap C$
  - $A'$
  - $A' \cup B'$
  - $(A \cap B) \cup (A \cap C)$
  - $(A \cup B)'$
  - $(B \cap C)'$
  - $A - C$
  - $(A - C) \cap (A - B)$

7. In each Venn Diagram Below, shade the region associated with the set.

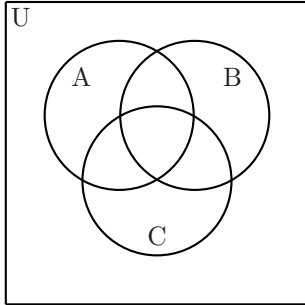
(a)  $(A \cap B') - A$



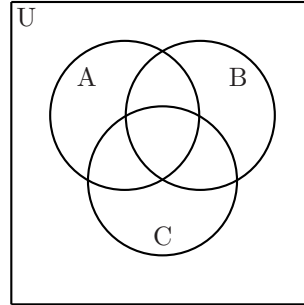
(c)  $A \cup (B \cup A)'$



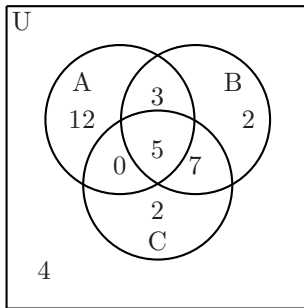
(b)  $A \cup (B' \cap C')$



(d)  $(B \cap C) \cup (A - B)$



8. The number of elements is written in each region of the following Venn diagram. Find the following.



(a)  $n(A \cap B)$

(c)  $n(A - C)$

(e)  $n(A \cap B \cap C)$

(b)  $n(A \cup C)$

(d)  $n((A \cup C) - (A \cap B))$

(f)  $n((A \cap C) - B)$

9. A group of 100 people touring Europe includes 42 people who speak French, 55 who speak German, and 17 who speak neither language. Draw a Venn diagram to help you determine how many people speak both languages.

10. A survey of 100 people asked whether people had a cellphone, a blue ray player, or cable internet. Partial results are as follows. Draw a Venn diagram and use it to answer the questions below.

- 15 people had all three.
- 39 people had both a cell phone and cable internet.
- Everyone who had a blue ray player had one of the other devices.
- 33 people had both a cell phone and a blue ray player.
- 37 total people had a blue ray player.
- 57 people had cable internet.
- 10 people had none of the devices.

- (a) How many people only had a cellphone?  
(b) How many people only had cable internet?  
(c) How many people did not have a cellphone?