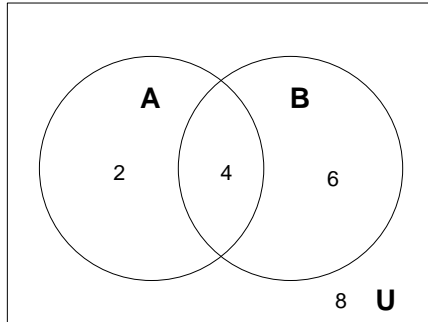


Surveys and Cardinal Numbers

Contemporary Math (MAT-130)

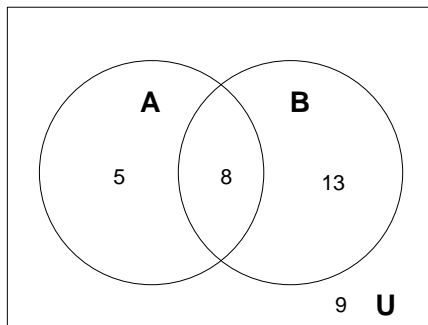
I. Use the numerals in the Venn diagrams to give the cardinality of each set:

1.



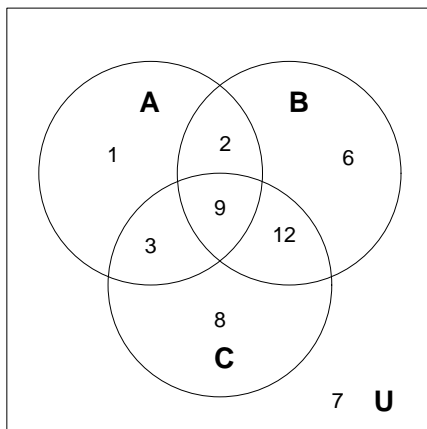
- a. $A \cap B$
- b. $A \cup B$
- c. $A \cap B'$
- d. $(A \cup B)'$

2.



- a. $A' \cup B'$
- b. $A' \cap B$
- c. $(A' \cap B)'$
- d. U

3.

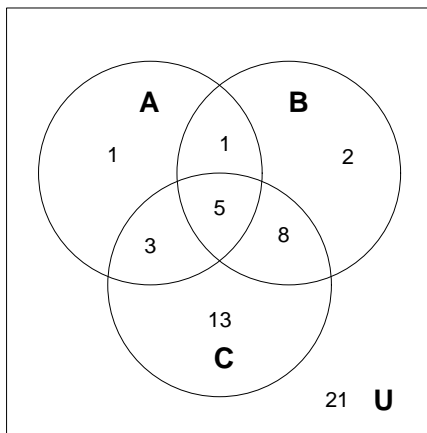


- a. $A \cap B \cap C$
- b. $A \cap B \cap C'$
- c. $A \cap B' \cap C$
- d. $A' \cap B \cap C$
- e. $A \cap B' \cap C'$
- f. $A' \cap B \cap C'$
- g. $A' \cap B' \cap C$
- h. $A' \cap B' \cap C'$

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4.



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

II. Make use of an appropriate formula:

- Find $n(A \cup B)$ if $n(A) = 5$, $n(B) = 6$, and $n(A \cap B) = 3$
- Find $n(A \cap B)$ if $n(A) = 7$, $n(B) = 14$, and $n(A \cup B) = 18$
- Find $n(A)$ if $n(B) = 9$, $n(A \cup B) = 14$, and $n(A \cap B) = 2$
- Find $n(B)$ if $n(A) = 19$, $n(A \cup B) = 34$, and $n(A \cap B) = 7$

III. Draw a Venn diagram and use the information to fill in the number of elements in each region:

- $n(A) = 12$, $n(B) = 7$, $n(A \cap B) = 5$, $n(U) = 17$
- $n(A) = 20$, $n(A \cup B) = 35$, $n(A - B) = 9$, $n(A' \cap B') = 21$
- $n(A) = 25$, $n(B) = 31$, $n(C) = 34$, $n(A \cap B) = 8$, $n(A \cap C) = 10$,
 $n(B \cap C) = 14$, $n(A \cap B \cap C) = 3$, $n(U) = 70$
- $n(A \cup B \cup C) = 52$, $n(A \cap B \cap C) = 8$, $n(A \cap B' \cap C) = 11$,
 $n(A' \cap B \cap C) = 1$, $n(A' \cup B' \cup C') = 47$, $n(A) = 34$, $n(B) = 31$,
 $n(U) = 54$

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5. $n(A \cap B \cap C) = 11$, $n(A \cap B) = 17$, $n(A \cap C) = 11$, $n(B \cap C) = 18$, $n(A) = 25$, $n(B) = 30$, $n(A \cup B \cup C) = 42$, $n(U) = 45$
6. $n(U) = 45$, $n(C) = 20$, $n(A) = 20$, $n(A \cap B \cap C) = 1$, $n(A \cup B \cup C) = 38$, $n(B \cap C) = 7$, $n(A \cup B) = 10$
7. $n(U) = 55$, $n(A \cup B \cup C) = 5$, $n(A \cap B \cap C) = 3$, $n(A' \cap B' \cap C) = 10$, $n(A \cap C) = 10$, $n(C) = 27$, $n(A \cup C) = 8$, $n(B \cap C) = 37$

IV. Use Venn diagrams to answer each question:

1. At the Cerullo Learning Assistance Center there are 150 tutors.

100 tutor Math
75 tutor English
55 tutor both subjects

- a. How many are Math tutors only?
 - b. How many are English tutors only?
 - c. How many tutors do not tutor Math or English?
2. An English professor surveyed his class of 20 students to see which of the following sentences was correct. "The sun comes up everyday" or "The sun comes up every day."

10 students thought "everyday" was correct and "every day" was wrong
2 students thought both were correct
1 student did not answer

- a. How many students thought that "everyday" was correct?
 - b. How many students thought that "every day" was correct?
 - c. How many students thought that only "every day" was correct?
3. 100 people were surveyed to determine what kind of movies they liked.

77 liked comedies
84 liked action movies
30 liked horror movies
67 liked comedies and action movies

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25 liked action movies and horror movies

22 liked comedies and horror movies

20 liked all three

- How many liked only comedies?
- How many liked only action movies?
- How many liked horror or action movies?
- How many did not like any of the three?

4. College seniors were surveyed to determine what type of alcohol they preferred.

27 liked beer and wine but not mixed drinks

48 liked wine and mixed drinks but not beer

83 like mixed drinks but not beer

114 liked beer and wine

167 liked beer

182 liked mixed drinks

177 liked wine

31 did not like any

- How many liked beer and mixed drinks?
- How many liked mixed drinks and wine?
- How many liked all three?
- How many people were surveyed?
- How many only liked beer?

5. 500 high school athletes were asked what sports they played.

320 played soccer

250 played basketball

297 played baseball

194 played soccer and basketball

150 played basketball and baseball

80 played soccer and baseball but not basketball

115 played all three sports

- How many did not play any of the sports?
- How many played only one sport?
- How many played only two sports?

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- d. How many played at least two sports?
 - e. How many played a sport that starts with the letter B?
 - f. How many played soccer or baseball?
6. People were asked what tourist destinations they would like to visit.

3 people wanted to go to the Empire State Building only

26 people wanted to go to Disneyland only

15 people wanted to go to the Grand Canyon only

72 people did not want to go to the Grand Canyon

103 people did not want to the Empire State Building

66 people did not want to go to Disneyland

31 people did not want to go to any destination

150 people were surveyed

- a. How many people wanted to go to Disneyland and the Grand Canyon?
- b. How many people wanted to go to all three destinations?
- c. How many wanted to go to Disneyland?
- d. How many wanted to visit exactly two destinations?
- e. How many wanted to go to the Empire State Building?

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SOLUTIONS

I.

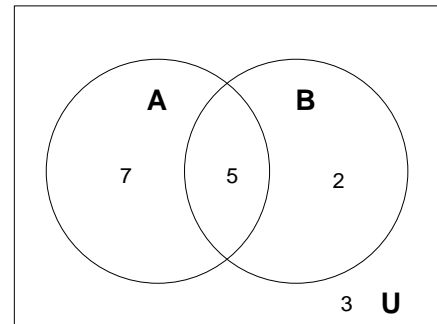
1.
 - a. 4
 - b. 12
 - c. 2
 - d. 8
2.
 - a. 27
 - b. 13
 - c. 22
 - d. 35
3.
 - a. 9
 - b. 2
 - c. 3
 - d. 12
 - e. 1
 - f. 6
 - g. 8
 - h. 7
4.
 - a. 20
 - b. 31
 - c. 30
 - d. 21
 - e. 49
 - f. 54
 - g. 14
 - h. 23

II.

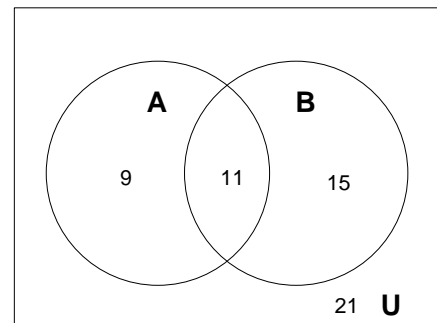
1. 8
2. 3
3. 7
4. 22

III.

1.



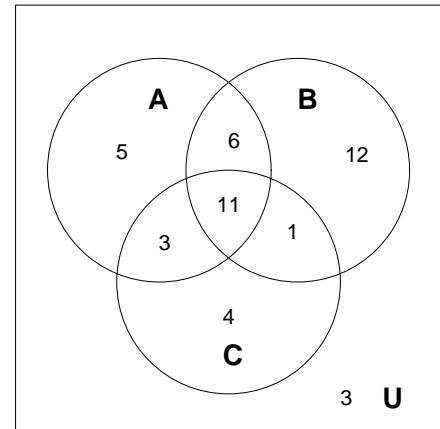
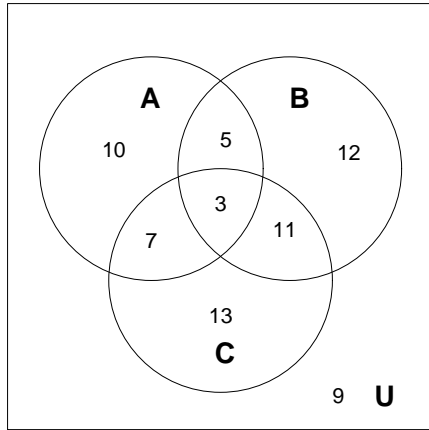
2.



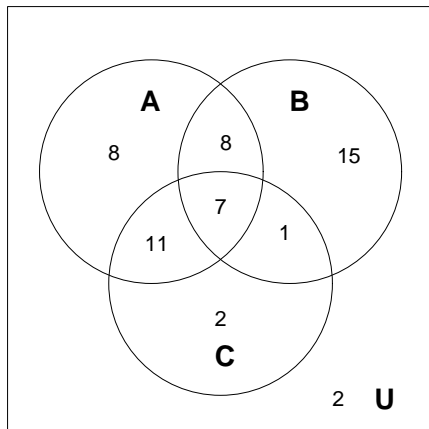
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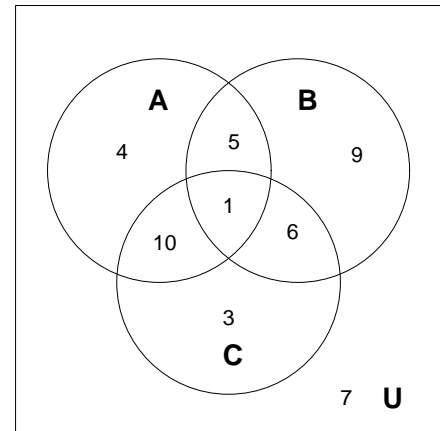
3.



4.



6.

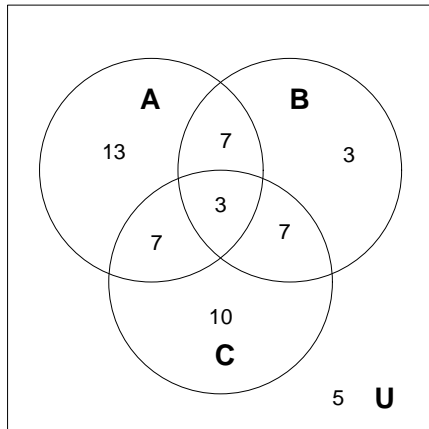


5.

7.

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5. d. 296
e. 41
- a. 57
b. 134
c. 194
d. 309
e. 397
f. 422
6. a. 46
b. 15
c. 84
d. 60
e. 47

IV.

1. a. 45
b. 20
c. 30
2. a. 12
b. 9
c. 7
3. a. 8
b. 12
c. 89
d. 3
4. a. 99
b. 135
c. 87