

## Math 141 Week-in-Review 5 Problem Set

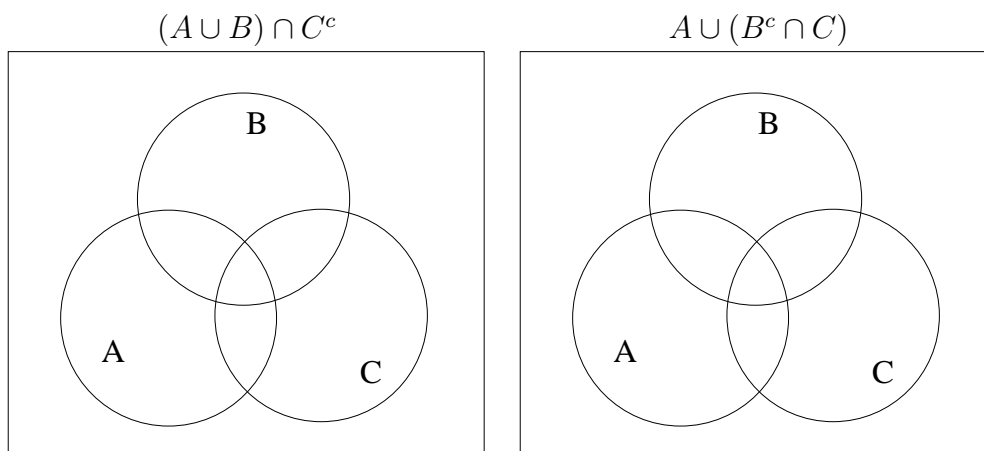
1. Let  $A = \{1, 3, 5, 7\}$ ,  $B = \{3, 5\}$ , and  $C = \{3, 7, 5, 1\}$ . Determine whether the following statements are True or False.

- (a) TRUE    FALSE     $A = C$
- (b) TRUE    FALSE     $A \subset C$
- (c) TRUE    FALSE     $B \subseteq A$
- (d) TRUE    FALSE     $3 \in B$
- (e) TRUE    FALSE     $\emptyset \subset C$
- (f) TRUE    FALSE     $\{1, 5\} \subseteq A$
- (g) TRUE    FALSE     $5 \subset B$
- (h) TRUE    FALSE     $\{1\} \in C$

2. Let  $U = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}$ ,  $A = \{x | x \in U \text{ and } x \text{ is a multiple of } 3\}$ ,  $B = \{2, 3, 7, 10\}$ , and  $C = \{1, 4, 5, 6, 7, 8\}$ . Find the following sets.

- (a)  $A \cap C$
- (b)  $(B \cup C)^c$
- (c)  $B \cap (A \cup C)$
- (d)  $A^c \cup (B \cap C)$
- (e)  $C^c \cap (A \cup B)^c$

3. Shade the appropriate regions in the Venn diagrams corresponding to the following sets.



4. Let  $U$  be the universal set of all students at Texas A&M.

$$C = \{x \in U | x \text{ listens to country music}\}$$

$$R = \{x \in U | x \text{ listens to rock music}\}$$

$$P = \{x \in U | x \text{ listens to pop music}\}$$

Write the following sets in words:

- (a)  $C \cap P^c$

(b)  $R^c \cup P$

Write the set that represents the following statements:

- (a) The set of students who listen to at least one of the three types of music listed.
  - (b) The set of students who listen to neither country nor rock.
  - (c) The set of students who listen to rock or pop but not country.
5. In a survey of 100 students, it was found that 64 students own an iPod and 52 students own a laptop. 7 students own neither a laptop nor an iPod.
- (a) How many students own a laptop or an iPod?
  - (b) How many students own both a laptop and an iPod?
  - (c) How many people own only an iPod?
  - (d) How many students own exactly one of the two?
6. 200 college students were polled about what kind of games (Monopoly, Connect Four, & Guess Who) they played growing up. The results are given below.
- 104 students played Monopoly.  
89 students played Connect Four.  
62 students played Guess Who.  
37 students played Monopoly and Connect Four.  
29 students played Monopoly and Guess Who.  
22 students played Connect Four and Guess Who.  
12 students played all three games growing up.
- (a) How many students played none of these games growing up?
  - (b) How many students played at least one of these games?
  - (c) How many students played Monopoly and Connect Four, but not Guess Who?
  - (d) How many students played exactly one of these games growing up?
7. A survey was done of 250 people about whether they have visited the continents of Europe, Africa, or South America. The following information was found.
- 45 people have only been to Europe.  
20 people have only been to Africa.  
107 people have been to South America.  
21 people have been to Europe and South America, but not Africa.  
95 people have been to exactly 1 of these three continents.  
67 people have been to Africa or South America, but not Europe.  
66 people have been to both Europe and Africa.
- (a) How many people have been to Europe or Africa, but not South America?
  - (b) How many people have been to all three?
  - (c) How many people have only been to South America?
  - (d) How many people have been to exactly 2 of the three?

8. A sandwich shop has 4 choices of bread, 5 kinds of meat, 3 types of cheese, and 6 types of dressing. However, they are stingy and you can only choose one of each type of item. How many different sandwiches are possible, assuming you choose one of each type of item?
9. On a 20 question test, 5 of the questions are True/False and the other 15 are multiple choice. Each multiple choice problem has 5 choices. How many ways are there to complete the test, assuming every question is answered?
10. How many 5-digit numbers are possible if
  - (a) there are no restrictions placed on the numbers?
  - (b) no repetitions are allowed?
  - (c) the last digit must be even?
  - (d) the last digit must be 3 or 7 and no repetitions are allowed?
  - (e) the last digit must be 2, 4, or 5, the first digit cannot be 0, and no repetitions are allowed?

All instructors may not have completely covered Section 6.4 yet. The remaining questions deal with this section. In this week's review, I will deal with more basic counting problems. In next week's exam review, I will do more difficult counting problems.

11. I have 12 pictures that I want to put in a photo album.
  - (a) In how many ways can the 12 pictures be arranged in the photo album?
  - (b) If the photo album only has slots for 10 pictures, in how many ways can the photos be put into the album?
12. How many different ways are there to arrange the letters in the phrase ICE CREAM CAKE with no spaces?
13. Cold Stone Ice Cream has 17 different types of toppings you can mix in with your ice cream. How many ways are there to pick 4 toppings to put in my ice cream?
14. A zoo has 15 elephants and 18 monkeys. 3 elephants and 5 monkeys are to be relocated to another zoo. How many ways are there to pick which animals to relocate?
15. In a box of 25 golf balls, I know that 6 of them are green. Suppose I pick a sample of 5 golf balls at random from the box.
  - (a) How many samples are possible?
  - (b) How many samples would contain no green balls?
  - (c) How many samples would contain exactly 2 green balls?