

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.

1. Use proper set notation and the listing method to express each as a set.

(a)  $\{-1, 0, 1, 2, 3, 4\}$

(b)  $\{4, 8, 12, 16\}$

(c)  $\{-9, 9\}$

(d)  $\emptyset$

2. Express each set using set builder notation.

(a)  $\{x : x \geq 2 \text{ and } x \text{ is even}\}$

(c)  $\{x : x \text{ is a day of the week}\}$

(b)  $\{x : x \text{ is a perfect square between 1 and 36}\}$

3. Determine  $n(A)$  for the following sets.

(a)  $n(A) = 9$

(c)  $n(A) = 4$

(b)  $n(A) = 26$

4.  $\emptyset, \{1\}, \{2\}, \{3\}, \{1, 2\}, \{1, 3\}, \{2, 3\}, \{1, 2, 3\}$

5. Classify each of the following as true or false.

(a) true

(f) true

(b) true

(g) false

(c) true

(h) true

(d) false

(e) true

(i) true

6. 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)  $\{1, 2, 4, 6, 7, 8, 9\}$

(e)  $\emptyset$

(i)  $\{3, 5\}$

(b)  $\{7, 9\}$

(f)  $\{3, 4, 5, 6\}$

(j)  $\{1, 2, 3, 4, 5, 6, 7, 8, 9\}$

(c)  $\{2, 8\}$

(g)  $\{1, 3, 4, 5, 6, 7, 9\}$

(k)  $\{1, 2, 8\}$

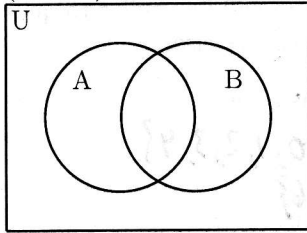
(d)  $\{2, 7, 8, 9\}$

(h)  $\{2, 7, 8, 9\}$

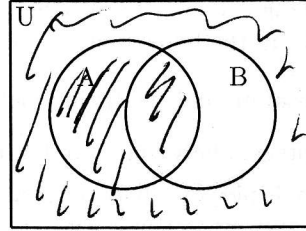
(l)  $\{1\}$

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

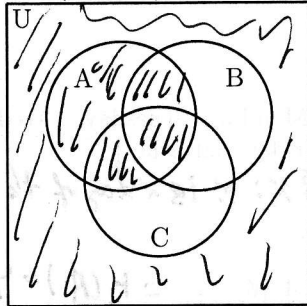
(a)  $(A \cap B') - A = \emptyset$



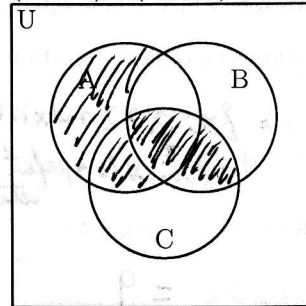
(c)  $A \cup (B \cup A)'$



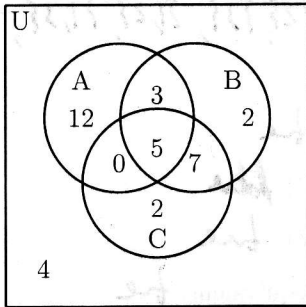
(b)  $A \cup (B' \cap C')$



(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)  $n(A \cap B) = 8$

(c)  $n(A - C) = 15$

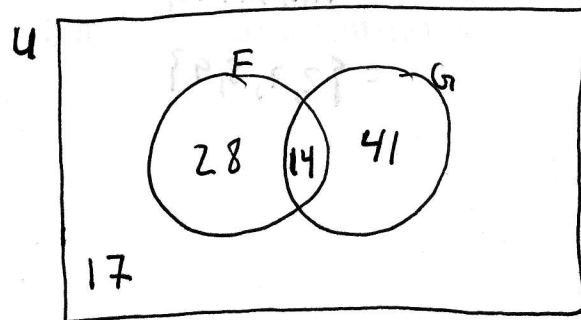
(e)  $n(A \cap B \cap C) = 5$

(b)  $n(A \cup C) = 29$

(d)  $n((A \cup C) - (A \cup B)) = 2$

(f)  $n((A \cap C) - B) = 0$

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.



14 people  
speak both  
languages

Use  $n(F \cup G) = n(F) + n(G) - n(F \cap G)$

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? 15  
(b) How many people only had cable internet? 14  
(c) How many people did not have a cellphone? 28

Let  $A$  be the set of people who have cable internet.  
Let  $B$  be the set of people who have a blue ray player.  
Let  $C$  be the set of people who have a cellphone.

