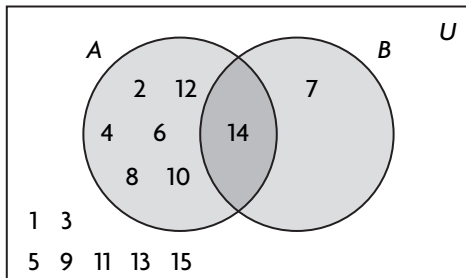


CHAPTER 1 TEST

1. a) Draw a Venn diagram to show these sets:
- The universal set $U = \{x \mid -10 \leq x \leq 10, x \in \mathbb{I}\}$
 - $N = \{x \mid -10 \leq x \leq -1, x \in \mathbb{I}\}$
 - $P = \{x \mid 1 \leq x \leq 10, x \in \mathbb{I}\}$
 - $E = \{x \mid x = 2a, 1 \leq x \leq 5, a \in \mathbb{I}\}$
- b) List the elements in each set in the Venn diagram.
 c) List the disjoint sets, if there are any.
 d) Is any set a subset of the other sets? Explain.
 e) Is $P' = N$? Explain.
2. Each number in this Venn diagram is an element.



How many elements are in the following sets? Express your answers in set notation.

- a) set A
 b) set B
 c) both set A and set B
 d) neither set A nor set B
 e) the universal set U
3. Consider the following sets:
- $A = \{x \mid x \leq 12, x \text{ is a prime number}\}$
 - $B = \{x \mid 1 < x \leq 10, x \text{ is an even number}\}$
- Determine $n(A \cup B)$. Show your solution.
4. A telephone company surveyed 96 people about their telephone use.
- 84 people use a cellphone.
 - 68 people use a land line.
 - All 96 people use a telephone.
- How many people use both a cellphone and a land line?

Name _____

Date _____

5. The campers at a summer camp were asked to choose an activity.

- 28 campers wanted to go canoeing.
- 45 campers wanted to go swimming.
- 20 campers wanted to do both.
- 11 campers did not want to do either.

How many campers were at the camp?

6. The owner of an ice cream parlour surveyed 60 people as they left.

- 34 people had vanilla ice cream.
- 28 people had chocolate sauce on their ice cream.
- 13 people had neither vanilla ice cream nor chocolate sauce.

How many people had vanilla ice cream and chocolate sauce? Represent your solution using a Venn diagram.

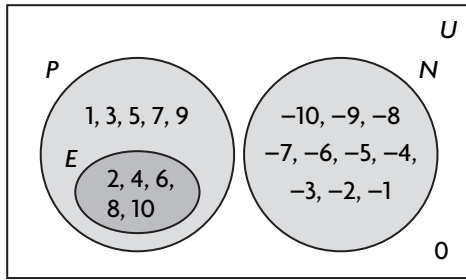
7. As a trial for one year, Grade 12 students at a particular high school were required to take at least one of physics, chemistry, or biology.

- 37 students took physics.
- 62 students took chemistry.
- 68 students took biology.
- 27 students took physics and chemistry.
- 15 students took physics and biology.
- 33 students took chemistry and biology.
- 12 students took all three sciences.

How many students were in Grade 12 that year?

CHAPTER 1 TEST ANSWERS

1. a) and b)



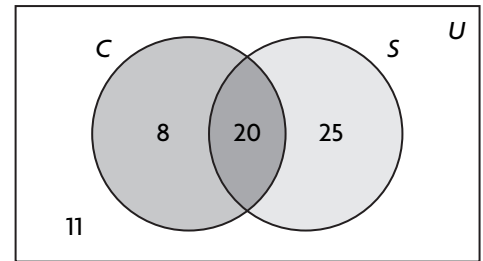
- c) Sets P and N are disjoint, as are sets E and N .
- d) $E \subset P$
- e) No. They are not equal because zero does not belong to either set. P' includes all the negative numbers in set N , plus zero.

- 2. a) $n(A) = 7$ d) $n((A \cup B)') = 7$
- b) $n(B) = 2$ e) $n(U) = 15$
- c) $n(A \cap B) = 1$

3. $A = \{2, 3, 5, 7, 11\}$, $B = \{2, 4, 6, 8, 10\}$
 $n(A) = 5$, $n(B) = 5$, $n(A \cap B) = 1$
 $n(A \cup B) = n(A) + n(B) - n(A \cap B)$
 $n(A \cup B) = 5 + 5 - 1$
 $n(A \cup B) = 9$

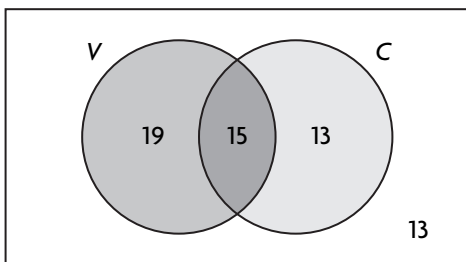
4. Let C represent using a cellphone, and let L represent using a land line:
 $n(C) + n(L) = 152$
 This is 56 more than the number of people surveyed, so 56 people use both.

5. I drew a Venn diagram and wrote 20 where the sets for canoeing and swimming overlap. I wrote 11 outside those sets, for campers who did not want to do either activity. Since 28 campers wanted to canoe, then there were $28 - 20$ or 8 campers who only wanted to canoe. Since 45 campers wanted to swim, then there were $45 - 20$ or 25 campers who only wanted to swim. I added the numbers in the four regions. There were $11 + 8 + 20 + 25$ or 64 campers at the camp.

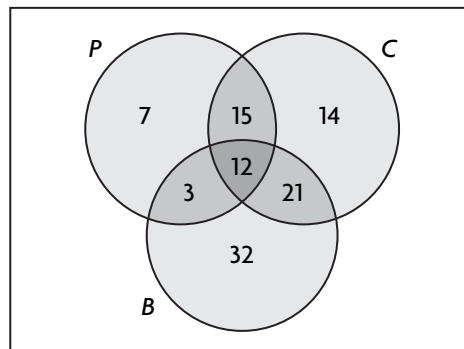


Venn at right shows number of elements in each region.

6. 15 people had vanilla ice cream and chocolate sauce. Venn shows number of elements in each region:



7. Venn shows number of elements in each region:



Therefore, 104 students were in Grade 12 that year.