

Test yourself

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Homework Q2 and Q3



T&T2 Test yourself



T&T2 Test yourself.pp...



Test yourself 3

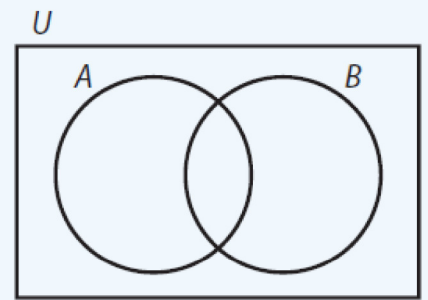
Test yourself 3

1. (a) $U = \{1, 2, 3, \dots, 10\}$, $A = \{1, 3, 5, 7\}$ and $B = \{5, 7, 8, 9\}$.

List the elements of these sets:

- (i) $A \cap B$ (ii) $(A \cup B)'$.

(b) Copy this Venn diagram and shade in the region that represents $A' \cap B$.



(c) X and Y are sets in the universal set U .

If $\#U = 50$, $\#X = 28$, $\#Y = 34$ and $\#(X \cup Y) = 43$, draw a Venn diagram to illustrate this information.

Now find

(i) $\#(X \cap Y)$

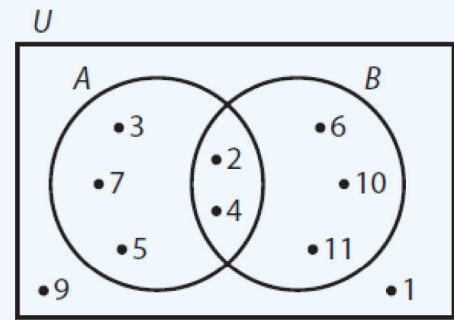
(ii) $\#(X \setminus Y)$

(iii) $\#(X \cup Y)'$

(iv) $\#X'$

2. (a) Based on the given Venn diagram, write down the elements of these sets:

- (i) A (ii) $A \setminus B$
(iii) A' (iv) $(A \cup B)'$

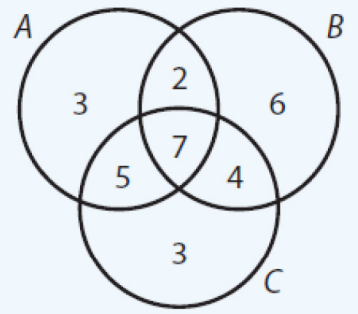


- (b) 50 soccer fans were asked which of three soccer matches – A , B and C – they had seen over a given weekend.
- 5 said they had seen all three matches;
 - 16 had seen both A and B ;
 - 15 had seen both B and C ;
 - 8 had seen match B only;
 - a total of 23 had seen match C and a total of 25 had seen match A ;
 - 2 people did not see any of the matches.

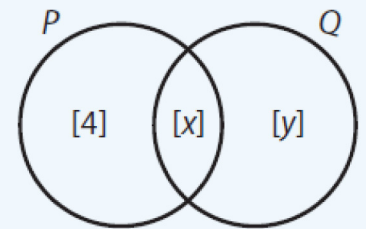
Draw a Venn diagram to illustrate this information and then answer these questions:

- (i) How many people had seen match B ?
- (ii) How many people had seen both match A and C but not B ?
- (iii) How many people had seen match A only?

3. (a) The given Venn diagram shows the number of elements in each of the sets A , B and C . Use the Venn diagram to write down
- (i) $\#(A \cup B)$
 - (ii) $\#[(A \cup B) \setminus C]$
 - (iii) $\#[(B \cap C) \setminus A]$
 - (iv) $\#[A \cup B \cup C]$

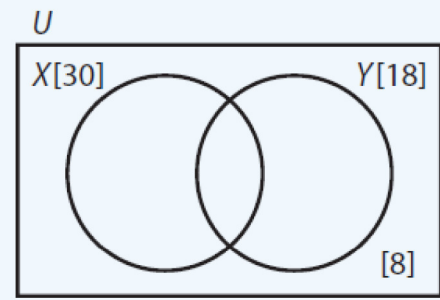


- (b) In the given Venn diagram, the number in the brackets represents the number of elements in that region.
If $\#(P \cup Q) = 22$ and $\#Q = 3(\#P)$,
find the values of x and y .



(c) In the given Venn diagram, $\#X = 30$, $\#Y = 18$ and $\#(X \cup Y)' = 8$.

- (i) What is the greatest possible value of $\#U$?
- (ii) What is the least possible value of $\#U$?
- (iii) If $\#U = 44$, find $\#(X \cap Y)$.

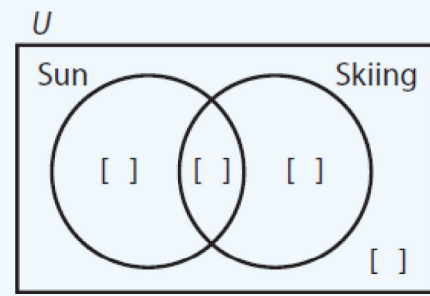


4. (a) $A = \{1, 2, 3, 6, 8, 10, 12\}$, $B = \{3, 4, 5, 6\}$ and $C = \{3, 5, 8, 10\}$.

Investigate if $A \cap (B \cup C) = (A \cap B) \cup (A \cap C)$.

What property of sets does your investigation prove or disprove?

(b) In a survey 100 people were asked if they had been on a sun holiday or a skiing holiday the previous year. 60 had been on a sun holiday, 15 had been on a skiing holiday and 30 had been on neither. Copy the given Venn diagram and insert the appropriate numbers in the brackets.



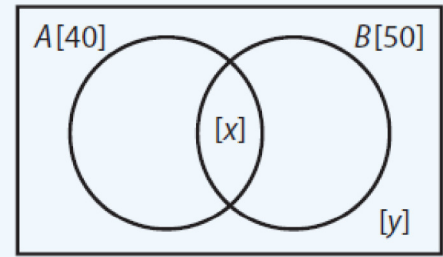
(c) In the given Venn diagram,

$$\#U = 80, \#A = 40, \#B = 50,$$

$$\#(A \cap B) = x \text{ and } \#(A \cup B)' = y.$$

- (i) What is the maximum value of x ?
- (ii) What is the minimum value of x ?
- (iii) What is the maximum value of y ?
- (iv) What is the value of x when $y = 4$?

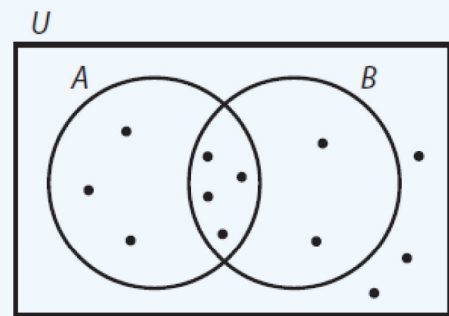
$$\#U = 80$$



5. (a) In the given Venn diagram, each dot represents an element of the set.

Now write down

- (i) $\#A$ (ii) $\#(A \cup B)$
(iii) $\#U$ (iv) $\#(A \cap B)'$



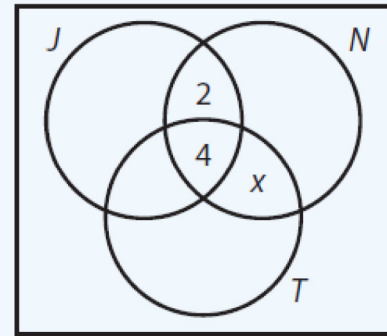
(b) A number of people were asked which of the three papers – *The Journal* (J), *The News* (N) and *The Tribune* (T) – U they had bought the previous week.

Some of the results are shown in the Venn diagram on the right.

Copy and complete the Venn diagram given that

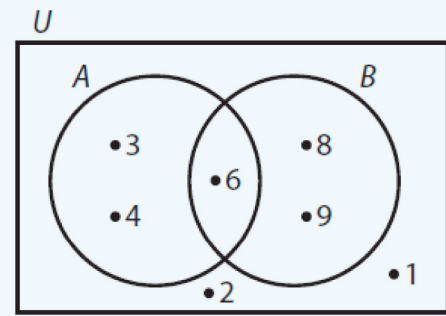
- (i) 20 people bought *The News*
- (ii) 23 people bought *The Journal*
- (iii) 10 people bought *The Journal* and *The Tribune*
- (iv) 8 people bought *The Tribune* only.

Given that there were 40 people in the survey who bought *The Tribune* or *The Journal* or both, find the value of x .



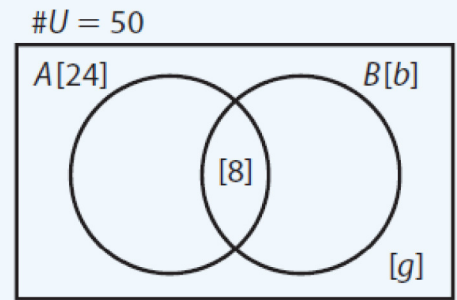
6. (a) In the Venn diagram on the right, which **one** of the following statements is true?

- (i) $6 \in (A \setminus B)$
- (ii) $\#A = 2$
- (iii) $\#(A \cup B) = 2$
- (iv) $\#(A \cup B)' = 2$



(b) In the given Venn diagram,
 $\#U = 50$, $\#A = 24$, $\#B = b$,
 $\#(A \cap B) = 8$ and $\#(A \cup B)' = g$.

- (i) What is the value of g when $b = 30$?
- (ii) What is the maximum value of g ?
- (iii) What is the minimum value of b ?
- (iv) What is the maximum value of b ?



Answers

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1. (a) (i) {5, 7} (ii) {2, 4, 6, 10}
- (c) (i) 19 (ii) 9
- (iii) 7 (iv) 22
2. (a) (i) {2, 3, 4, 5, 7} (ii) {3, 5, 7}
- (iii) {1, 6, 9, 10, 11} (iv) {1, 9}
- (b) (i) 34 (ii) 3 (iii) 6
3. (c) (i) 27 (ii) 11 (iii) 4 (iv) 30
- (b) $x = 2, y = 16$
- (c) (i) 56 (ii) 38 (iii) 12
4. (a) Intersection of sets is distributive over union
- (b) From left: 55, 5, 10, 30
- (c) (i) 40 (ii) 10 (iii) 30 (iv) 14

Answers

5. (a) (i) 7 (ii) 9 (iii) 12 (iv) 8
(b) Repeat Q
6. (a) (iv) is true
(b) (i) 4 (ii) 26 (iii) 8 (iv) 34
(c) 9
7. (i) $u = a + b - c + d$
(ii) $d = u - a - b + c$
(iii) $B \subset A$ (iv) a