

Example 4: If $U = \{a, b, c, d, e, f, g\}$ and $A = \{a, b, f\}$, $B = \{c, d, e, g\}$ Find:

$$1) A \cup B = \{a, b, f, c, d, e, g\} = U$$

$$2) A \cap B = \{\phi\}$$

USA \longrightarrow 50 States

Partition:

a) Union is all or: $A \cup B = U$

b) Nothing in Common or: $A \cap B = \phi$

Example 5: Mark has two sets of courses to choose from:

Set A = {Chemistry, Math, English} = {C, M, E} $\longrightarrow n(A) = 3$

Set B = {French, History, Geology} = {F, H, G} $\longrightarrow n(B) = 3$

Find:

a) the number of courses that are in A and B.

~~0~~ 0

b) the number of courses that are in A or B.

6 ✓

Example 6: Mike has two sets of courses to choose from:

Set A = {Chemistry, Math, English, History} = {C, M, E, H} \longrightarrow 4

Set B = {Math, English, French} = {M, E, F} \longrightarrow 3

Find:

a) the number of courses that are in A and B. $\Rightarrow n(A \cap B)$

$$n(A \cap B) = 2$$

$$A \cap B = \{M, E\}$$

b) the number of courses that are in A or B. $\Rightarrow n(A \cup B)$

$$n(A \cup B) = \underline{4} + \underline{3} - 2 = 5$$

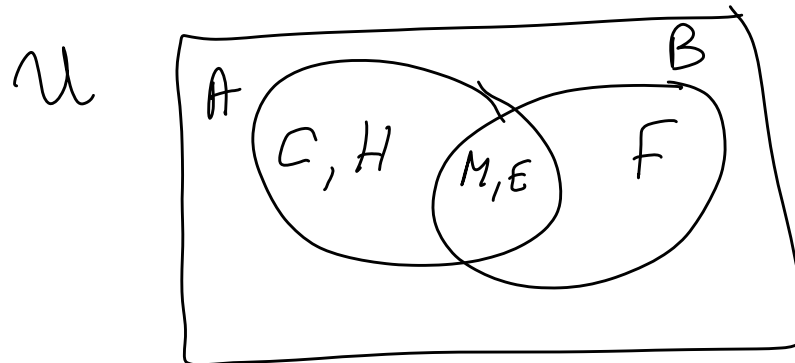
$$A \cup B = \{C, M, E, H, F\}$$

c) the number of courses that are in A only. = 2

$$n(A \cap B') = 2$$

$$A \cap B' = \{C, H\}$$

$$n(A \cup B) = n(A) + n(B) - n(A \cap B)$$



Example 7: In a survey of 80 people, it was found that:

45 read the Sport magazine (S)

40 read the Time magazine (T)

10 read both magazines (T & S)

Find the number of people that read:

$$S, T \longrightarrow 2^n = 2^2 = 4$$

a) Time only

30

b) Sport only

35

c) neither magazine

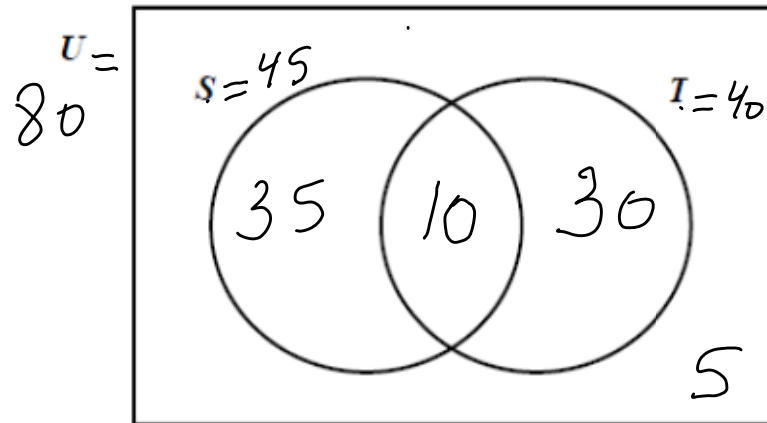
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d) either magazine

$$35 + 30 + 10 = 75$$

$$n(S \cup T) = 45 + 40 -$$

$$\begin{array}{c} 10 \\ \hline = 75 \end{array}$$



Example 8: In a survey of 200 people, it was found that:

- 150 listen to Rock music (R)
- 80 listen to Slow music (S)
- 55 listen to Classic music (C)
- 60 listen to Rock and Slow music (R & S)
- 25 listen to Classic and Slow music (C & S)
- 40 listen to Rock and Classic (R & C)
- 15 listen to all (R & S & C)

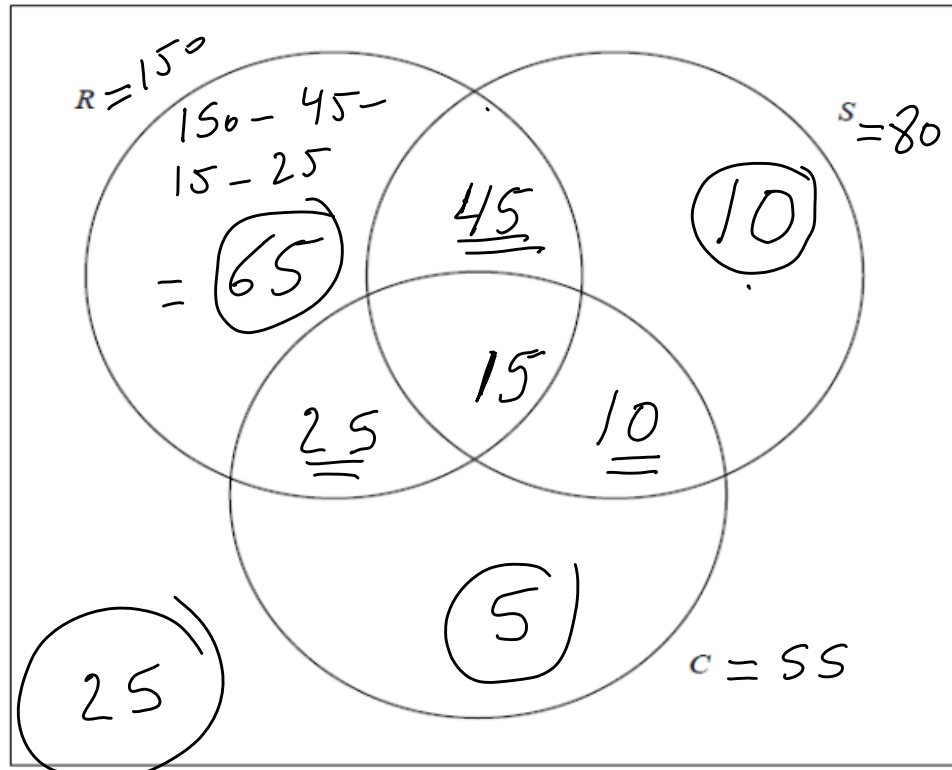
$2^3 = 8$

Find the number of people that listen to:

- a) Rock only
- b) 2 kind of music
- c) Rock and Slow but not Classic
- d) none

65 80 — — 45 25

$n = 200$



175
7 areas

Example 9: In a survey , it was found that:

55 students took History (*H*)

45 students took English (*E*)

25 students took Geography (*G*)

7 students took English and History but not Geography

5 students took Geography and History but not English

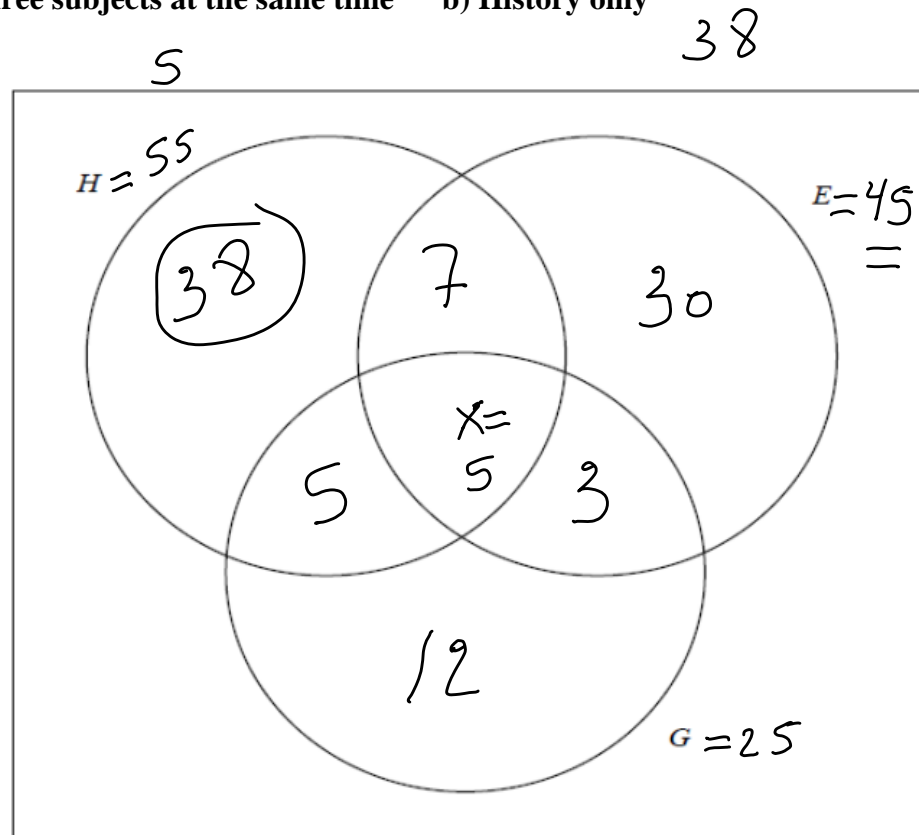
3 students took Geography and English but not History

30 students took English only

Find the number of students that took:

- a) the three subjects at the same time b) History only

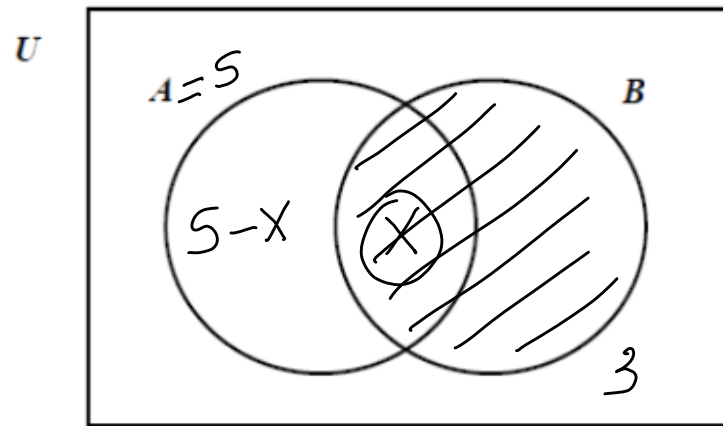
$$2^3 = 8$$



$$45 = 30 + 7 + 3 + X$$

$$X = 5$$

Example 10: If A and B are subsets of U and: $n(A) = 5$, $n(B) = 7$, $n(A' \cap B') = 3$. Find $n(A \cap B)$.



$x =$

$$\begin{aligned} \text{outside } B &= 7 \\ (5-x) + 3 &= 7 \\ 8-x &= 7 \\ 1 &= x \end{aligned}$$