Set $S: \{a, b, c, d, e\}$

$a \in S$

$p \notin S$

$S: \{x \mid x \in \mathbb{Z}^+, x < 5\}$.

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

$\{a, b, d, f\}$ $\{f, a, d, b\}$

A B

$A = B$

$\{a, b, d, a\}$

$= \{a, b, d\}$

Cardinality of set S: denoted by $|S|$ no. of elements in a set

$A: \{a, b, g, h, k, m\}$

$S: \{g, h, k\}$

$S \subseteq A$

Singleton $\{1\}$ $\{1, \alpha, a, b, \infty\}$.

Set by itself $\{.\}$ $\{a, \{.\}\}$

$A \cup B$, A OR B

$A \cap B$, A AND B.

Subsets

$\{.\}$ null set $\subset A$

$\subset S$.

26 - like football

23 → like swimming 6

38 5

$A = \{1, 6, a, d, f, 8\}$

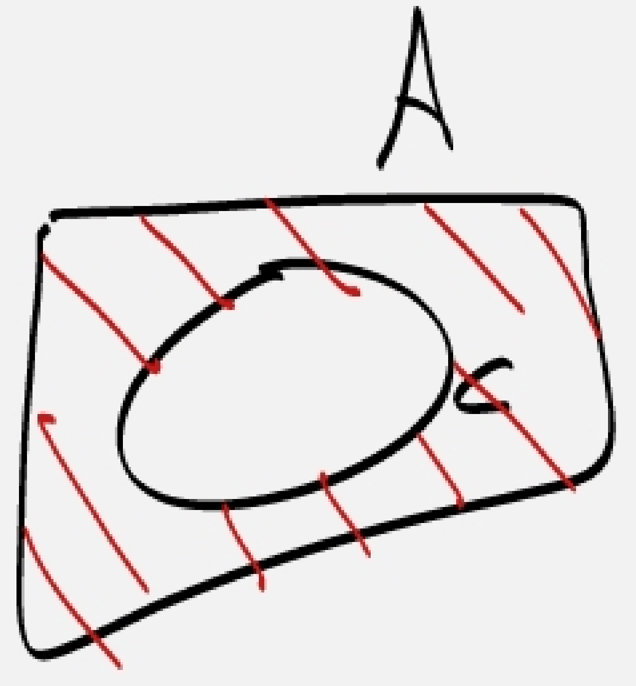
$B = \{d, 6, 8, 7, 9\}$

$A \cup B = \{\underline{1, 6, a, d, f, 8, 7, 9}_{8}\}$

$A \cap B = \{\underbrace{d, 6, 8}_{3}\}$

$C = \{6, a, 8\}$

$C \subseteq A$.



C^c

$C^c \cap C = \phi$

$C^c \cup C = A$

Prove that set A = set C

$A \subseteq C$

$C \subseteq A$

$\Rightarrow A = C$

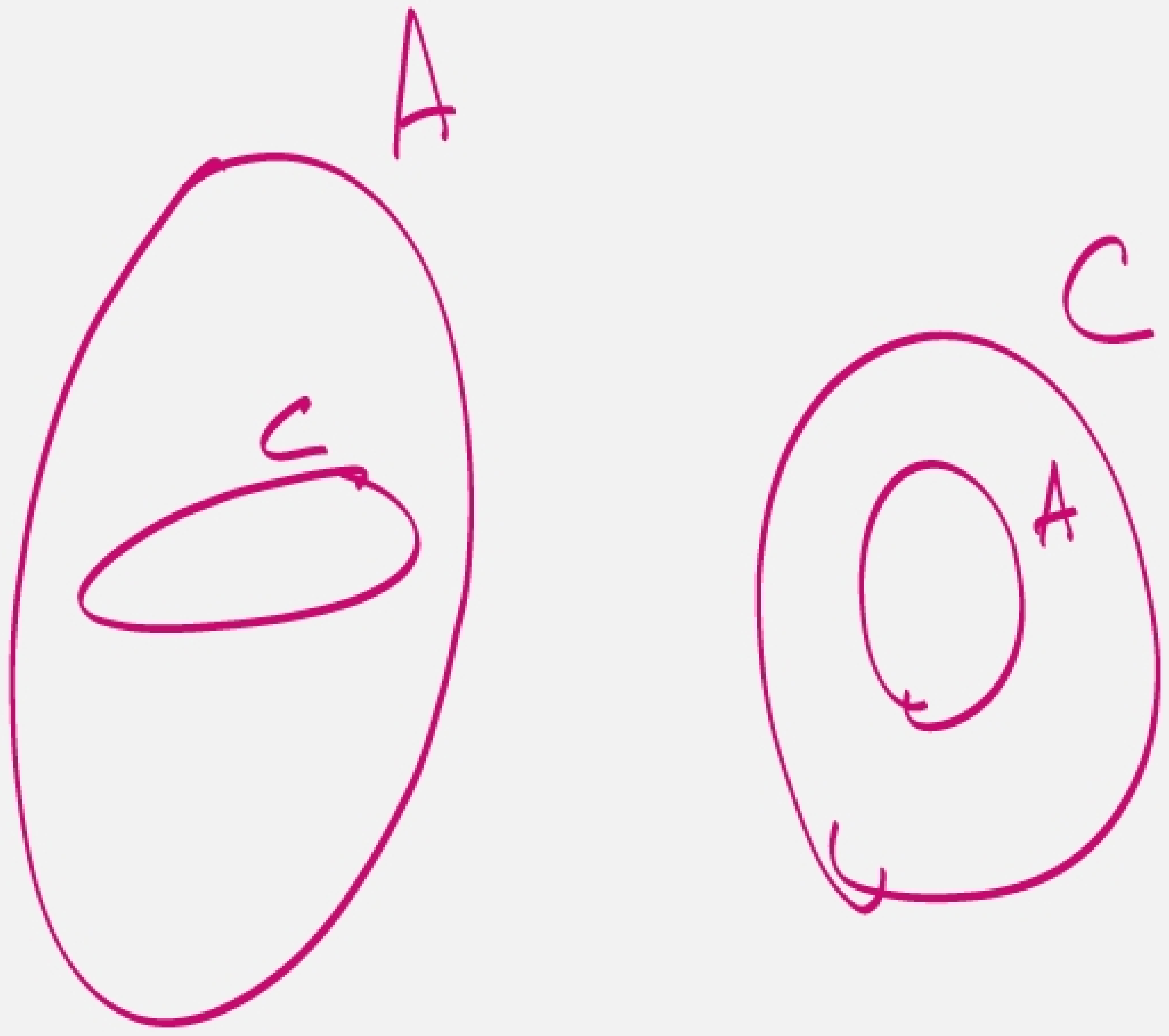
39

16

=

age(shashank) $\leq$ age(Nelson)

age(Nelson) $\leq$ age(shashank)



$C \subseteq A$ $\Rightarrow A = C$.

$A \subseteq C$

A, B, C

$|A \cup B \cup C|$

$= |A| + |B| + |C|$
$- |A \cap B| - |B \cap C| - |A \cap C|$

$A^c \cap ((B \cap C)^c)^c$

$A^c \cap (B \cap C)$ $[A \cup (B \cap C)^c]^c$

Let $a \in S_1$

Show $a \in S_2$

$S_1 \subseteq S_2$

$S_1 \subseteq S_2$

$S_2 \subseteq S_1$

De Morgan Laws $S_1 \subseteq S_2$

$\underbrace{(A \cup B)^c}_{S_1} = \underbrace{A^c \cap B^c}_{S_2}$

$a \in (A \cup B)^c$

$a \notin (A \cup B)$

$a \notin A, \ a \notin B$

$a \in A^c, \ a \in B^c$

$a \in A^c \cap B^c$

b

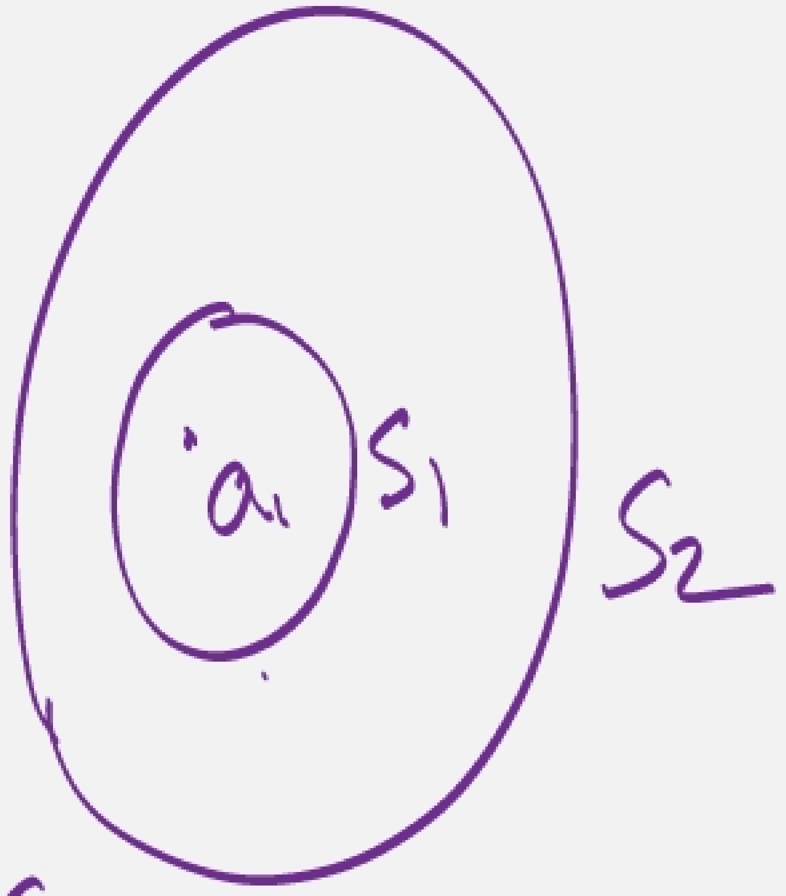
$b \in A^c \cap B^c$

$b \in A^c, \ b \in B^c$

$b \notin A, \ b \notin B$

$b \notin A \cup B$

$b \in (A \cup B)^c$



$A = \{a, b, 6, 4, 9, X\}$

$B = \{a, 9, Z, Y\}$

$A - B = \{b, 6, 4, X\}$

$B - A = \{Z, Y\}$

$A - B \neq B - A$

$(A - B) \cap (B - A) = \phi$

$(A - B) \cup (B - A)$

$\overset{a}{A} - \overset{b}{B} = A \cap B'$

$a \in A$

$a \notin B$

$a \in B'$

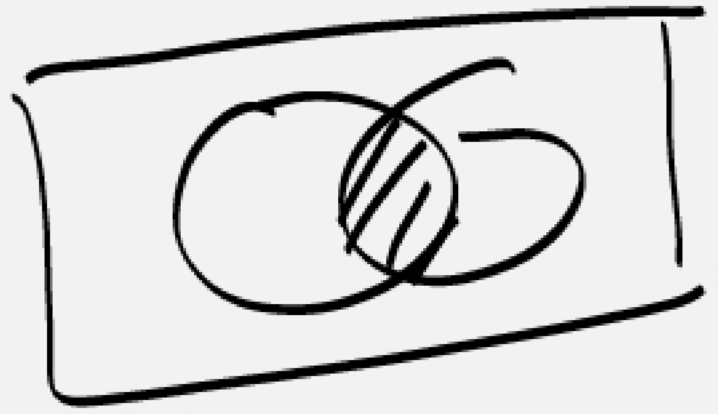
$a \in (A \cap B')$

$b \in A$

$b \in B'$

$b \notin B$

$b \in (A - B)$



$A - B = A \cap B^c$

S_1 S_2 $S_1 \subset S_2$

S_2

$a \in (A - B)$

$a \in A$

$a \notin B$

$a \in B^c$

$a \in (A \cap B^c)$

$(A - B) = (A \cap B^c)$

$\{b, 6, 4, X, Z, Y\}$

Symmetric difference

$A \Delta B = (A - B) \cup (B - A)$

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

$$(1+1)^n = \binom{n}{0} + \binom{n}{1} + \binom{n}{2} \cdots \binom{n}{n} = 2^n$$

S	Sh	E	subsets
0	0	0	
1	0	0	
0	1	0	
0	1	1	
1	1	1	

Power set $|S|$

$3 \to 8 \quad 2^3$

$2^{|S|}$

$\{S, Sh, E\}$

ϕ $\{S\}$ $\{Sh\}$ $\{E\}$

$\{S, E\}$ $\{Sh, S\}$