$(A \cup B) \setminus (A \cap B)$

$=$

$(A \cup B) \cap \boxed{(A \cap B)^c}$

$=$

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

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

$\cancel{(A \cap A^c)} \cup \underline{(A \cap B^c)}$

$\cancel{\emptyset}$

$(A \setminus B) \cup (B \setminus A)$

$=$

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

(Relation $R \subseteq A \times A$):

- reflexive : aRa
- symmetric : $aRb \Rightarrow bRa$
- transitive : $aRb,\ bRc \Rightarrow aRc$

Define equivalence classes:

$[a] = \{ b \in A \mid aRb \}$ ← Equiv. class containing a.

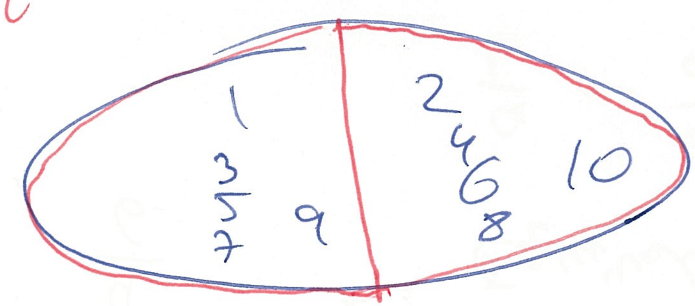
Representative

reflexive $\Rightarrow a \in [a]$

symmetric $\Rightarrow b \in [a]$ then $a \in [b] \Rightarrow [a] = [b]$

If $b, c \in [a] \Rightarrow bRc$ (transitivity)

Equiv. classes give a partition of the set A



Relation: $aRb \;:\Longleftrightarrow\; a-b$ even

then $2R8$, $2\not R7$

this is equiv. rel:

reflexive: $a-a=0$ even $\Rightarrow aRa$.

symmetric: If $aRb \Rightarrow a-b$ even $\Rightarrow b-a$ even $\Rightarrow bRa$

transitive: aRb and $bRc \Rightarrow$ $a-b$ even, $b-c$ even. $\Rightarrow a-c = a-b+b-c$ even $\Rightarrow aRc$

$[1] = \{ b \in A \mid \underbrace{bR1}_{b-1 \text{ even}} \}$

$[5]$

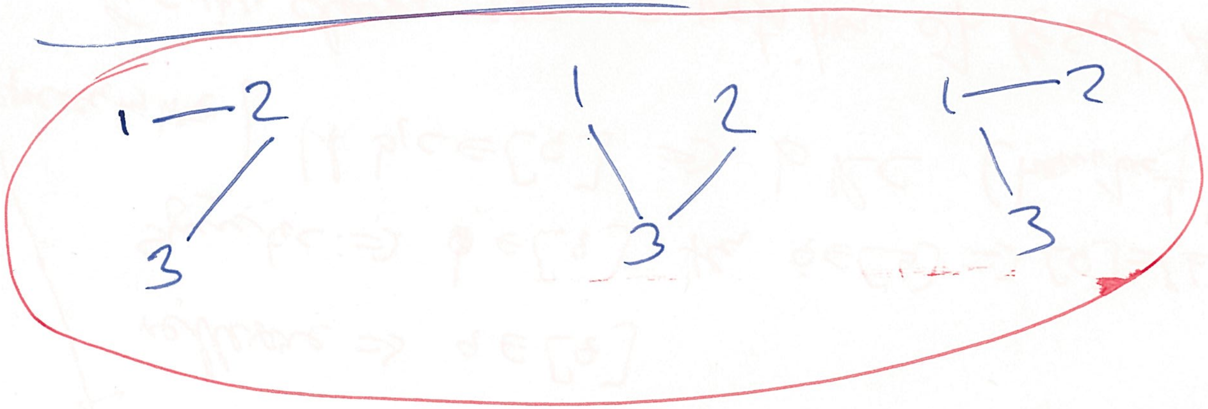
$= \{1, 3, 5, 7, 9\}$ ← That cannot be all

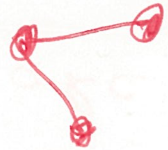
$[8] = \{2, 4, 6, 8, 10\}$

''

$[2] = [6]$

$$\frac{a}{b} \sim \frac{c}{d} \text{ if } ad = bc$$





$$1 \leftrightarrow 2 \leftrightarrow 3 \quad 4 \quad 5$$

1 2 3 4 5