Quiz 6 : 5-11-2022 Aamir K.

① Draw the directed graph for R where $A = \{3,4,5,6,7,8\}$, $\forall x,y \in A$, $xRy \leftrightarrow 2(x-y)$

$3R3 \leftrightarrow 2(3-3) = 0$, $3 \not R 3$

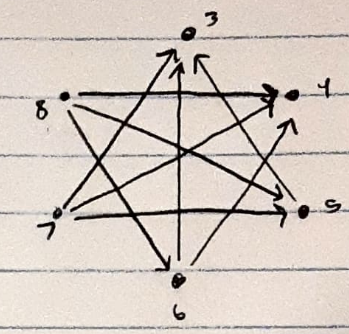
$3R4 \leftrightarrow 2(3-4) = -2$, $3 \not R 4$

$3R5 \leftrightarrow 2(3-5) = -4$, $3 \not R 5$

$3R6 \leftrightarrow 2(3-6) = -6$, $3 \not R 6$

$3R7 \leftrightarrow 2(3-7) = -8$, $3 \not R 7$

$3R8 \leftrightarrow 2(3-8) = -10$, $3 \not R 8$



$5R3 \leftrightarrow 2(5-3) = 4 \in A$

so $5R3$

* Basically, $xRy \leftrightarrow 2(x-y) \in A$.

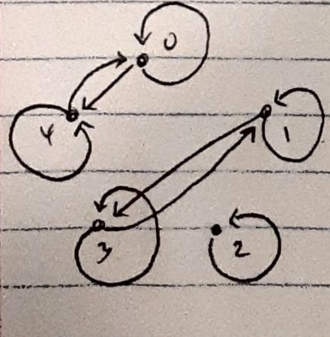
② Reflexive: R is reflexive $\leftrightarrow \forall x \in A, xRx$

Symmetric: R is symmetric $\leftrightarrow \forall x,y \in A, xRy \rightarrow yRx$

Transitive: R is transitive $\leftrightarrow$

$\forall x,y,z \in A, xRy \wedge yRz \rightarrow xRz$

③



$[0] = \{x \in A \mid xR0\}$

$= \{0,4\}$

$[1] = \{x \in A \mid xR1\}$

$= \{1,3\}$

$[2] = \{x \in A \mid xR2\}$

$= \{2\}$

$[3] = \{1,3\}$

$[4] = \{0,4\}$

Our distinct equivalence classes:

$\{0,4\}$, $\{1,3\}$, and $\{2\}$