Check Relations for R ?

diff relations.

① Reflexive :

of $(a,a) \in R$, for all $a_1 \in A$.

$R = \{\}$, no a,a, type cases there. So

(not Reflexive). ⊗

② Irreflexive :

no $a,a \in R$

$R = \{\}$ -> so that it is Irreflexive. (↳)

③ Symmetric

cond? -> $(a,b) \in R$, then $(b,a) \in R$

or you can say

$(a,b) \notin R$, then $(b,a) \notin R$

$R_1 = \{\}$ ← satisfied this cond? so we can called it is Symmetric.

④ Transitive

cond? → $(a,b) \in R$, $(b,c) \in R$, then $(a,c) \in R$

↳ or we can say.

↳ $(a,b) \notin R$, $(b,c) \in R$, then $(a,c) \notin R$

↳ $(a,b) \in R$, $(b,c) \notin R$, then $(a,c) \notin R$

↳ $(a,b) \notin R$, $(b,c) \notin R$, then $(a,c) \notin R$

$R = \{\}$ ← satisfied,

Part-2

⑤ Antisymmetric

Cond? -> $(a,b) \in R$, & $(b,a) \in R$, then $a = b$

or we can ~~tell~~ say

$(a,b) \notin R$, & $(b,a) \notin R$, then $a \neq b$

$R_2 = \{\}$ ← satisfied ↑ cond?.

So that R_2 -> Antisymmetric.

⑥ Asymmetric Relation

Cond? -> $(a,b) \in R$ ~~a=b~~ but $(b,a) \notin R$

then called Asymmetric.

$R_2 \to \{\}$

here there is no $a,b \notin R$

So no need to check the cond? &

it is asymmetric relation

gate qs

out of giving below option which one is ~~Antisym~~ Asymmetric relation. if $A \leftarrow \{1,2,3\}$

① ϕ ✓

② A×A ✗

③ $\{(1,1),(2,2),(3,3)\}$ ✗

④ $\{(1,2),(2,3),(1,3)\}$ ✓

⑤ $\{(1,2),(2,1),(2,3)\}$ ✗

⑥ $\{(1,1),(2,2),(1,2),(2,1)\}$ ✗

$a,b \in A$
$a,b \in R$
$b,a \notin R$

diff antisymmetric & Asymmetric ... the diagonal element (1,1) (2,2) (3,3).