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9.5 HomeWork

Exercise 1:

a) equivalence relation
b) Not transitive
c) equivalence relation
d) Not transitive
e) Not symmetric

Properties : Reflexive, symmetric & transitive.

Exercise 15:

- We know that $a+d=b+c$ is the same as : ....
  $d+a=c+b$ and that mean $((c,d),(a,b)) \in R$
  Because, $d+a=c+b$ is same as $c+b=a+d$.
  So, R is symmetric.
- We know that a couple (x,y) : $x+y=y+x$
  So, R is reflexive, $((x,y),(x,y)) \in R$
- Let $((a,b),(c,d)) \in R$ and $((c,d),(e,f)) \in R$
  $\Rightarrow a+d=b+c$ and $c+f=d+e$
  $\Rightarrow a=b+c-d$ and $f=d+e-c$

So, $a+f=b+\cancel{c}-\cancel{d}+\cancel{d}+e-\cancel{c}=b+e$

So, $((a,b),(e,f)) \in R$

So, R is transitive

Then, we proved R is an equivalence relation.

Exe 21 - 23:

21. No, not transitive.
22. Yes.
23. No not transitive.

Exe 24:

a) No, because not symmetric.
b) Yes.
c) Yes.

Exe 41:

a) No.
b) Yes.
c) Yes.
d) No.

Exe 48:

a) $\{(a,a),(a,b),(b,a),(b,b),(c,d),(c,c),(d,c),(d,d),(e,e),(e,f),(e,g),(f,e),(f,f),(f,g),(g,e),(g,f),(g,g)\}$

b) $\{(a,a),(b,b),(c,c),(c,d),(d,c),(d,d),(e,f),(e,e),(f,e),(f,f),(g,g)\}$

c) $\{(a,a),(a,b),(a,c),(a,d),(b,a),(b,b),(b,c),(b,d),(c,a),(c,b),(c,c),(c,d),(d,a),(d,b),(d,c),(d,d),(e,e),(e,f),(e,g),(f,e),(f,f),(f,g),(g,e),(g,f),(g,g)\}$

d) $\{(a,a),(a,c),(a,e),(a,g),(c,a),(c,c),(c,e),(c,g),(e,a),(e,c),(e,e),(e,g),(g,a),(g,c),(g,e),(g,g),(b,b),(b,d),(d,b),(d,d),(f,f)\}$