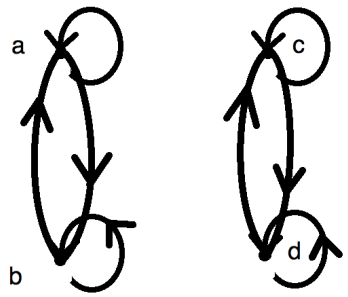
More Relations

R_1 is a relation on $A = \{1, 2, 3, 4\}$
defined by
$\{(a, b) | \max(a, b) = b\}$

R_2 is a relation on $\mathbb{Z}$
defined by
$\{(a, b) | a \leq b\}$

R_3 is a relation on $A = \{a, b, c, d\}$
defined with the directed graph to the right



1. For each of the relations R_i above, determine if R_i has the properties listed. If the relation does not have the indicated property, identify an ordered pair (or set of ordered pairs) that exhibits the failure.

	R_1	R_2	R_3	
reflexive				
symmetric				
antisymmetric				
transitive				

2. Find the symmetric closer of R_1.

3. Find the reflexive closure of R_2.

4. Find the transitive closure of the relation R_4 on the set $A = \{1, 2, 3, 4\}$ defined by $\{(2, 1), (1, 3), (3, 2)\}$.

5. Identify any R_i that are equivalence relations. Identify the equivalence classes.

6. Identify any R_i that are posets.

7. Identify any R_i that are totally ordered.

8. Create a relation that an equivalence relation and forms a poset.