

$$R_1 = \{(1,1), (1,3), (2,2), (3,1)\}$$

$$R_2 = \{(1,1), (2,2), (2,1), (1,2)\}$$

3. What is $R_2 \circ R_1$?

1 pt.

$$\{(a, c) \mid \exists b (a, b) \in R_1 \wedge (b, c) \in R_2\}$$

$$= \{(1,1), (1,2), (2,2), (2,1), (3,1), (3,2)\}$$

4. What is $R_2 \cap R_1$?

1 pt.

$$\{(1,1), (2,2)\}$$

5. Draw a directed bipartite graph that represents R_1 .

0.5 pts.

