1. Perform the following set operations and display the results:

a) R1 U R2 : [(1, 2), (1, 1), (1, 4), (3, 3), (2, 2), (1, 3)]

b) R1 ∩ R2 : [(1, 1)]

c) R1 - R2 : [(2, 2), (3, 3)]

d) R2 - R1 : [(1, 2), (1, 3), (1, 4)]

2. Display S ◦ R:

=> S ◦ R = [(1, 0), (1, 1), (2, 1), (2, 2), (3, 0), (3, 1)]

3. Display R ◦ R

=> R ◦ R = [(1, 1), (1, 4), (2, 1), (2, 4), (3, 1), (3, 4)]

4. For the relation R = {(x, y) | x + y = 0} on the set {-10, ..., -1, 0, 1, ..., 10}:

Set A = {0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, -10, -9, -8, -7, -6, -5, -4, -3, -2, -1}

List of tuples R = [(0, 0), (1, -1), (2, -2), (3, -3), (4, -4), (5, -5), (6, -6), (7, -7), (8, -8), (9, -9), (10, -10), (-10, 10), (-9, 9), (-8, 8), (-7, 7), (-6, 6), (-5, 5), (-4, 4), (-3, 3), (-2, 2), (-1, 1)]

a) Show R as a set of ordered pairs.
=> R = [(5, -5), (-10, 10), (-3, -3), (-3, 3), (-8, -8), (2, 2), (-7, -7), (-4, 4), (-1, -1), (-2, -2), (7, 7), (-1, 1), (3, -3), (4, -4), (3, 3), (-6, -6), (-6, 6), (10, -10), (-5, 5), (2, -2), (8, 8), (-7, 7), (-10, -10), (-5, -5), (8, -8), (9, -9), (4, 4), (5, 5), (0, 0), (9, 9), (-9, -9), (1, 1), (1, -1), (6, -6), (7, -7), (-9, 9), (-8, 8), (10, 10), (-4, -4), (6, 6), (-2, 2)]

b) Show whether R is reflexive or not.
=> R is reflexive: False

c) Show whether R is symmetric or not.
=> R is symmetric: True

d) Show whether R is antisymmetric or not.
=> R is antisymmetric: False

e) Show whether R is transitive or not.
=> R is transitive: False