Example questions

For each of the three relations defined below:
- Draw a graph (circles and arrows) corresponding to the relation
- Say whether the relation is:
    + reflexive, irreflexive, neither
    + symmetric, anti-symmetric, neither
    + transitive, not-transitive

Relation 1, r_1, on the set of people {Leon, Jill, Maria, Tim, Kate}
   r_1 = {(Leon, Kate), (Kate, Leon), (Kate, Kate), (Maria, Jill), (Jill, Maria),
      (Maria, Maria), (Tim, Leon), (Leon, Tim)}
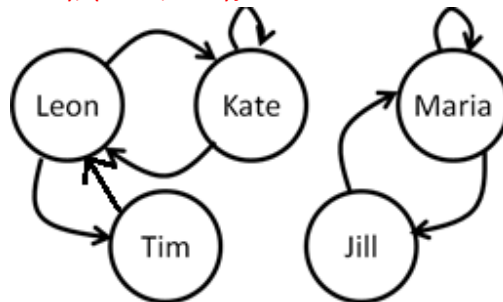
Not reflexive, symmetric, not transitive

Relation 2, r_2, on the set of food {pizza, fries, hotdog, burger, soda}
   r_2 = {(soda, soda), (soda, hotdog), (soda, pizza), (burger, fries), (fries, burger),
      (fries,fries), (pizza, fries), (pizza, burger) }

Relation 3, r_3, on the set of numbers {1,2,3,4,5,6,7,8}
   r_3 = {(1, 1), (1,4), (1,8), (3, 3), (4, 4), (4,8), (5, 5), (5,8), (8, 8)}

Write out the set of ordered pairs in the following relations on the integers $\mathbb{Z}$:
(x,y) is in the relation if and only if y > 3x

(x,y) is in the relation if and only if 3x-y=4

(x,y) is in the relation if and only if $\frac{x}{y}$=5

(x,y) is in the relation if and only if x-3=2y
{…, (-3,-3), (-1,-2), (1,-1), (3,0), (5,1), …}

Consider the following relations on the set of all people and say whether the resulting relations
are: reflexive, irreflexive, or neither; symmetric, anti-symmetric, or neither; transitive or not
Has as many siblings as
Reflexive, symmetric, transitive
Is shorter than
Has bought food at the same restaurant as
Took the same Spring 2014 classes as