

Example questions

For each of the three relations defined below:

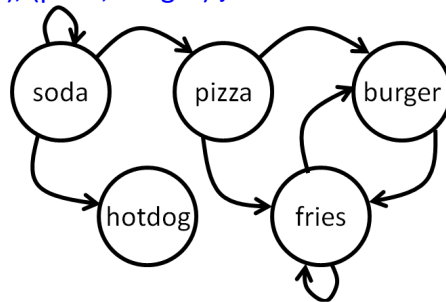
- Draw a graph (circles and arrows) corresponding to the relation
- Say whether the relation is:
 - + reflexive, irreflexive, neither
 - + symmetric, anti-symmetric, neither
 - + transitive, not-transitive

Relation 1, r_1 , on the set of people {Leon, Jill, Maria, Tim, Kate}

$$r_1 = \{(Leon, Kate), (Kate, Leon), (Kate, Kate), (Maria, Jill), (Jill, Maria), (Maria, Maria), (Tim, Leon), (Leon, Tim)\}$$

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

$$r_2 = \{(soda, soda), (soda, hotdog), (soda, pizza), (burger, fries), (fries, burger), (fries, fries), (pizza, fries), (pizza, burger)\}$$



Not reflexive, not symmetric, not transitive

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 $y > 3x$

{...

$(-1,-2), (-1,-1), (-1,0), \dots$

$(0,1), (0,2), (0,3), \dots$

$(1,4), (1,5), (1,6), \dots,$

...}

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

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

{..., $(-10,-2), (-5,-1), (5,1), (10,2), \dots$ }

(x,y) is in the relation if and only if $x-3=2y$

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

Is shorter than

Has bought food at the same restaurant as

Took the same Spring 2014 classes as

Reflexive, symmetric, transitive