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Exercise 1

- Write the relation R as $(x,y) \in R$

(a) The relation R on {1, 2, 3, 4} defined by $(x,y) \in R$ if $x^2 \geq y$.

(b) The relation R on {1,2,3,4,5} defined by$(x,y) \in R$ if 3 divides x-y.

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Exercise 2

- Find range and domain for:

(a) The relation R on {1, 2, 3, 4} defined by $(x,y) \in R$ if $x^2 \geq y$.

(b) The relation R = { (1,2), (2,1), (3,3), (1,1), (2,2)} on X = {1, 2, 3}

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Exercise 3

Draw the diagraph of the relation:

(a) R = { (a,c), (b, d), (a,b), (c,d) }

(b) The relation R on {1, 2, 3, 4} defined by $(x,y) \in R$ if $x^2 \geq y$

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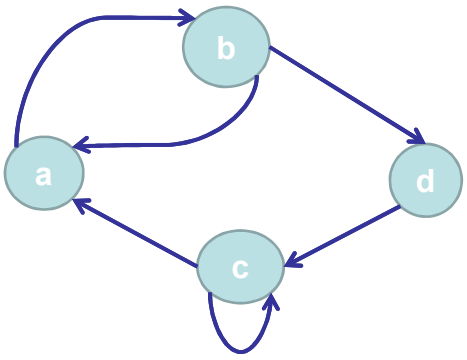
Exercise 4

Write the relation as a set of ordered pair.



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Exercise 5

- Let A={ 1, 2, 3, 4 } and *R* be a relation on *A*.
  R = { (1,2),(1,3),(1,4),(2,3),(2,4),(3,4) }

(a) What is *R* (represent)?

(b) What is matrix representation of *R*?

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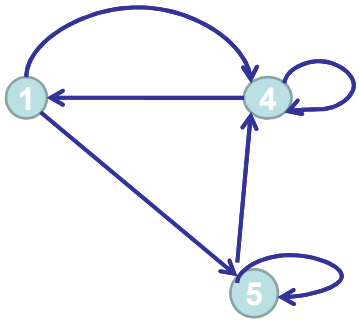
Exercise 6

- Let *A* = {1, 4, 5} and let *R* be given by the digraph shown below.
- Find M_R and *R*



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Exercise 7

- An airline services the five cities c_1, c_2, c_3, c_4 and c_5.
- Table below gives the cost (in dollars) of going from c_i to c_j. Thus the cost of going from c_1 to c_3 is \$100, while the cost of going from c_4 to c_2 is \$200

To from	c_1	c_2	c_3	c_4	c_5
c_1		140	100	150	200
c_2	190		200	160	220
c_3	110	180		190	250
c_4	190	200	120		150
c_5	200	100	200	150	

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- If the relation R on the set of cities $A = \{c_1, c_2, c_3, c_4, c_5\}$: $c_i \, R \, c_j$ if and only if the cost of going from c_i to c_j is defined and less than or equal to \$180.

Find:

i) R.

ii)Matrices of relations for R.

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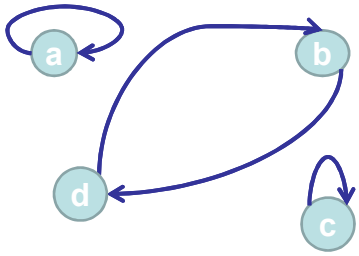
Exercise 8

(i) The relation R on $X=\{a,b,c,d\}$ given by the below diagraph. Is R a reflexive relation?



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Exercise 9

Let A = { 1,2,3,4). Construct the matrix of relation of R. Then, determine whether the relation is reflexive, not reflexive or irreflexive.

(i) R = { (1,1), (1,2), (2,1), (2,2), (3,3), (3,4), (4,3), (4,4))

(ii) R = { (1,3), (1,1), (3,1), (1,2), (3,3), (4,4)}

(iii) R ={ (1,2), (1,3), (3,1), (1,1), (3,3), (3,2), (1,4), (4,2), (3,4)}

(iv) R ={ (1,2), (1,3), (3,2), (1,4), (4,2), (3,4)}

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Exercise 10

Let A = { 1,2,3,4). Construct the matrix of relation of *R*. Then, determine whether the relation is symmetric, asymmetric, not symmetric or antisymmetric.

(i) R = { (1,1), (1,2), (2,1), (2,2), (3,3), (3,4), (4,3), (4,4))

(ii) R = { (1,3), (1,1), (3,1), (1,2), (3,3), (4,4)}

(iii) R ={ (1,2), (1,3), (1,1), (3,3), (3,2), (1,4), (4,2), (3,4)}

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Exercise 11

Let A = { 1,2,3,4). Construct the matrix of relation of *R*. Then, determine whether the relation is symmetric, asymmetric, not symmetric or antisymmetric.

(iii) R ={ (1,2), (1,3), (1,1), (3,3), (3,2), (1,4), (4,2), (3,4)}

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Exercise 12

The relation R on the set {1,2,3,4,5} defined by the rule $(x,y) \in R$ if $x+y \leq 6$

(i) List the elements of R

(ii) Find the domain of R

(iii) Find the range of R

(iv) Is the relation of R reflexive, symmetric, assymmetric, antisymmetric, transitive, and/or equivalence relation or partial order?

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Exercise 13

The relation R on the set {1,2,3,4,5} defined by the rule $(x,y) \in R$ if 3 divides $x-y$

(i) List the elements of R

(ii) Find the domain of R

(iii) Find the range of R

(iv) Is the relation of R refelxive, symmetric, assymmetric, antisymmetric, transitive, and/or equivalence relation or partial order?

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Exercise 14

The relation R on the set {1,2,3,4,5} defined by the rule $(x,y) \in R$ if $x=y-1$

(i) List the elements of R
(ii) Find the domain of R
(iii) Find the range of R
(iv) Is the relation of R reflexive, symmetric, assymmetric, antisymmetric, transitive, and/or equivalence relation or partial order?