1. List equivalent names for the following:

    (a). Relation

    (b). Attribute

    (c). Tuples

2. What is a composite key?

3. List at least two advantages and disadvantages of surrogate keys.

4. Who was the person to propose the relational data model?

5. Consider the following relation:

Table 1: Course Relation

Title	Room	Time	Instructor
Calculus 1	Jones Hall 110	1:00	Dr. Smith
Calculus 1	Ramsey Hall 236	2:00	Dr. Adams
Calculus 2	Jones Hall 120	3:00	Dr. Williams
History 111	Lambert Hall 325	1:00	Dr. Roberts
History 111	Lambert Hall 325	3:00	Dr. Roberts
History 111	Lambert Hall 217	1:00	Dr. Perry

    (a). What is the degree of the relation?

    (b). What is the carnality of the relation?

    (c). What are the attributes of the relation?

6. Let $A = \{2, 3, 6, 9, 12\}$ and $B = \{1, 3, 5, 7, 9\}$ be sets. Find the following:

    (a). $A \cup B$

    (b). $A \cap B$

    (c). $A - B$

    (d). $B - A$

7. Let $A = \{a, b, c\}$, $B = \{1, 3\}$, and $C = \{1, c\}$ be sets. Find the following:

    (a). $A \times B$

(b). $B \times A$

(c). $A \times C$

(d). $A \times B \times C$

8. Let the universal set $U = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}$ and $A = \{2, 6, 9, 19\}$. Compute A^c.

9. Consider the relation shown in Table 2.

   (a). Determine the cardinally of R.

   (b). What are the attributes of R?

   (c). What is the dimension of R?

10. Consider the relation shown in Table 2.

Table 2: Relation R

A	B	C	D
1	23	9	a
2	65	7	h
3	7	3	e
4	11	2	y
5	97	13	u
6	52	3	p
7	87	5	g
8	467	1	p
9	3	4	k
10	23	9	a

$R =$

(a). Write a rename operator that reverses the column names.

(b). Write a rename operator to rename the relation S and renames the attributes V, X, Y, Z.

(c). Write a selection operator for $B > 50$ and show the results.

(d). Write a projection operator for B and D. Show the results.