**Logo

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**San Francisco Bay University**

**CS200 - Discrete Logic**

**Homework Assignment #1**

**Due day: 9/28/2022**

**Instruction:**

1. **The answer to each question must be right after the problem, which should be kept in the answer sheet**
2. **Only typing answers including math calculations can be accept, no scanned handwriting**
3. **The answer sheet must be in MS word file**
4. **Push Excel file for the graph plot and the program source code to Github if necessary**
5. **Overdue homework submission could not be accepted.**
6. **Take academic honesty and integrity seriously (Zero Tolerance of Cheating & Plagiarism)**
7. For every equation *E*, if *E* is quadratic then *E* has at most two real solutions.
   1. All quadratic equations **have at most two real solutions**.
   2. Every quadratic equation **has at most two real solutions.**
   3. If an equation is quadratic, then it **has at most two real solutions.**
   4. If *E* ***is quadratic equation***, then *E* ***has at most two real solutions.***
   5. For every quadratic equation *E*, **has at most two real solutions.**
8. There is a real number whose product with every real number equals zero.
   1. Some **real number** has the property that its **product with every number equals zero**.
   2. There is a real number a such that the product of a **with every number equals zero.**
   3. There is a real number a with the property that for every real number b,

**ab = 0.**

1. **Let , and . Find each of the following sets.**

*R x (S x T) = {(a, (x, p)), (a, (x, q)), (a, (x, r)), (a, (y, p)), (a, (y, q)), (a, (y, r))}*



1. **Let  . List all the strings of length *5* over *T* that have exactly one *y***
2. Let *A={4,5,6}* and *B={5,6,7}* and define relations *R , S ,* and *T* from *A* to *B* as follows: For every  :

( means that .

means that is an integer.

1. Draw arrow diagrams for *R, S*, and *T*
2. Indicate whether any of the relations *R, S,* and *T* are functions.

**a)**

Thus, the relation

A B

4

5

6

5

6

7

Thus, the relation is an integer is:

A B

4

5

6

5

6

7

A B

4

5

6

5

6

7

**b)** None of the relations R, S, and T are functions.

* The relation R is not a function because element 4 in the domain has no image.
* The relation S is not a function because
* The relation T is not a function because element 5 in the domain has no image.

1. Let *A = {0,1,2}* and let *S* be the set of all strings over *A* . Define a relation *L* from *S* to to  as follows: For every string *s* in *S* and every nonnegative integer *n*,

means that the length of *s* is *n*.

Then *L* is a function because every string in *S* has one and only one length. Find *L(0201)* and *L(12)* .

1. Define functions *H* and *K* from *R* to *R* by the followingformulas: For all *x ∈ R*,

and

Does *H = K*? Explain why and verify them by the curve plots in Excel

Ans:

That’s because the domains H and K have matching domain and output values.

Graphical user interface, chart, line chart

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