PRACTICE 1

Exercise 1:
Let $S = \{a, b\}$ and $T = \{1, 2, 3\}$.

1. What is $S \cap T$?
2. What is $T \cap S$?
3. What is $S \cup T$?
4. What is $T \cup S$?
5. What is $S - T$?
6. Provide two subsets of $T$.
7. What are $|S|$ and $|T|$ equal to?
8. How many subsets does $T$ have?
9. How many subsets does $S$ have?
10. Compute $S \times T$?
11. Compute $T \times S$?
12. Is $A \times B = B \times A$ for all sets $A$ and $B$?
13. What are $|S \times T|$ and $|T \times T|$ equal to?
14. Is $|A \times B| = |B \times A|$ for all sets $A$ and $B$?
15. Define a relation from $S$ to $S$ by a set.
16. Define a relation from $S$ to $T$ by a set.
17. Define a relation from $T$ to $S$ by a set.
18. How many relation from $S$ to $S$ are there?
19. How many relation from $S$ to $T$ are there?
Exercise 2:

Let $S = \{(a, b)\}$ and $T = \{1, 2, 3\}$.

1. What is $S \times T$?
2. What is $T \times S$?
3. What is $S \times S$?
4. What is $T \times T$?

Exercise 3:

1. Represent the relation $Student$ by a table.
   
   $Student = \{(111, Leon, Paris, 18), (121, Dave, Chicago, 15), (122, John, New York, 13), (110, Paul, Paris, 19), (75, John, Hong Kong, 18), (150, Caesar, Boston, 22)\}$

2. The number of items of the relation $Student$ equals the number of ...... of the table.

3. Is it true that:
   
   “The name of the student with id 75 is John. He is from Hong Kong and he’s 18 years old.”?

4. Is it true that:
   
   “The name of the student with id 150 is John. He is from Boston and he’s 22 years old.”

5. Provide names for the attributes of the relation $Student$.
   
   The number of attributes of the relation $Student$ equals the number of ...... of the table.

6. Provide the domain of each of the attributes.