**INVESTIGATE**:

**KEY WORDS**

**Ordered Pairs:** Use braces {(x, y)} to list the values, or elements, in a set. {(1,3), (2,5)}

**Domain:** the set of all values of the **independent** variable (x) of a relation.

**Range:** the set of all values of the **dependent** variable (y) of a relation.

**Relation:** a set of ordered pairs; values of the independent (x) variable are paired with values of the dependent (y) variable.

**Function:** It is a special relation in which “x” value cannot match with more than one “y” value.

The ages and soccer practice of four students are listed.

|  |  |  |
| --- | --- | --- |
| **Student** | **Age** | **Soccer Practice Day** |
| Jay | 15 | Tuesday |
| Joe | 16 | Tuesday |
| Jen | 15 | Thursday |
| Jill | 17 | Saturday |

**Determine** whether or not the **relations** below are **functions**.

**a)** students and the day for soccer practice

**b)** ages and the day for soccer practice

**Method 1: ORDERED PAIRS (Set Notation)**

|  |  |
| --- | --- |
| **a) students and the day for soccer practice**  *Write the relation as a set of ordered pairs.*  {(Jay, Tue),    *Read the definition of* ***domain*** *and* ***range.*** *List below.*  **Domain = { }**  **Range = { }**  *Read the definition of* ***relation*** *and* ***function****.*  **Conclusion:** Is this relation a function? **Justify.** | **b) ages and the day for soccer practice**  *Write the relation as a set of ordered pairs.*  {(15, Tue),    *Read the definition of* ***domain*** *and* ***range.*** *List below.*  **Domain = { }**  **Range = { }**  *Read the definition of* ***relation*** *and* ***function****.*  **Conclusion:** Is this relation a function? **Justify.** |

**Method 2: MAPPING DIAGRAM**

|  |  |
| --- | --- |
| **a) students and the day for soccer practice**  *google “mapping diagram” and draw the mapping diagram of the relation below.*  **Domain =**  **Range =**  **Conclusion:** Is this relation a function? **Justify.** | **b) ages and the day for soccer practice**  *google “mapping diagram” and draw the mapping diagram of the relation below.*  **Domain =**  **Range =**  **Conclusion:** Is this relation a function? **Justify.** |

**Method 3: GRAPHING (Vertical Line Test)**

**VLT:** *If any vertical line intersects the graph of a relation more than once, then the relation is not a function.*

|  |  |
| --- | --- |
| **a) students and the day for soccer practice**  *Plot the dependent and independent values below.*  **Conclusion:** Is this relation a function? **Justify.** | **b) ages and the day for soccer practice**  *Plot the dependent and independent values below.*  **Conclusion:** Is this relation a function? **Justify.** |

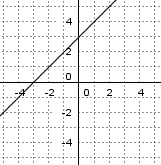
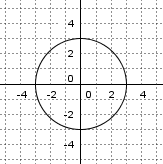
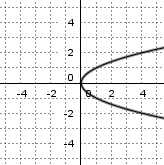
**“All functions are \_\_\_\_\_\_\_\_\_\_\_\_\_, but not all relations are functions.”**

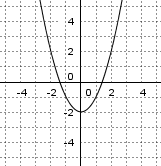
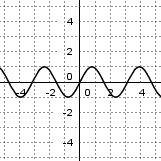
**Method 4: EQUATION**

|  |
| --- |
| If a relation is a function, **substituting** any value for will result in only one value of . Do you think all of the following relations are functions?  a) b)  c) |

**PRACTICE**

1) Looking at these graphs, which ones are functions?





2) State if the following set of ordered pairs is a relation or function? **Justify.**

b) b)

**3.** Use the mapping diagram:

1. write the set of ordered pairs of the relation
2. state if the relation is a function

i) ii)

**Domain** = { **Domain** = {

**Range**  = { **Range**  = {

**4.** Draw a mapping diagram of with a domain of . Is this a function?

**5.** Draw a mapping diagram of with a range of . Is this a function?

**6.** Make an example of a mapping diagram of a function, and one that is not a function.

**7.** Draw an example of a graph that is a function and one that is not a function.