**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 $x$ will result in only one value of $y$. Do you think all of the following relations are functions?a) $y=2x+1$ b) $x^{2}+y^{2}=25$ c) $y=2x^{2}-3x+1$ |

**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) $\{(1, 3), (2, 4), (3, 5), (4, 6)\}$ b) $\{(1, 3), (1, 4), (2, 5), (3, 6)\}$

**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 $y=5$ with a domain of $D=\{1,2,3,4,5,6\}$. Is this a function?

**5.** Draw a mapping diagram of $x=3$ with a range of $R=\{1,2,3,4,5,6\}$. 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.