**Is it a Function?**

**Functions**

In order for a relation to be a function, each \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ must be mapped to one \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

1. Identify whether or not each relation is a function.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| ***x*** | –2 | –1 | 0 | 1 | –2 |
| ***y*** | 4 | –1 | 3 | 2 | 1 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| ***x*** | –2 | –1 | 0 | 1 | 2 |
| ***y*** | 0 | 5 | 6 | 0 | 3 |

(a) (b)

(c)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **State** | Maine | New Hampshire | Vermont | Massachusetts | Rhode Island | Connecticut |
| **Capital** | Augusta | Concord | Montpelier | Boston | Providence | Hartford |

**3**

**9**

**4**

**–9**

**0**

**1**

**2**

**–12**

**24**

**6**

(d) (e)

(f)

Football

Golf

Tennis

Tiger Woods

Eli Manning

Serena Williams

(g) {(2, 3), (4, 3), (-1, 0), (6, 1), (-2, 8)}

(h) {(3, 4), (5, -2), (7, -1), (3, 3), (1, 5)}

**Domain and Range**

The domain of a function is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

The range of a function is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. For each function in Exercise 1, identify the domain and range.

|  |  |  |
| --- | --- | --- |
| **Letter of the function** | **Domain** | **Range** |
| a |  |  |
| b |  |  |
| c |  |  |
| d |  |  |
| e |  |  |
| f |  |  |
| g |  |  |
| h |  |  |

1. Create your own function below and explain why it is a function.
2. Give an example of a relation that is not a function and explain why not.
3. Identify whether or not each graph represents a function.

|  |  |
| --- | --- |
| (a) | (b) |
| (c) | (d) |

1. For each of the graphs in Exercise 5, find three ordered pairs and display them in a table.

(a)

|  |  |
| --- | --- |
| ***x*** | ***y*** |
|  |  |
|  |  |
|  |  |

(c)

|  |  |
| --- | --- |
| ***x*** | ***y*** |
|  |  |
|  |  |
|  |  |

(b)

|  |  |
| --- | --- |
| ***x*** | ***y*** |
|  |  |
|  |  |
|  |  |

(d)

|  |  |
| --- | --- |
| ***x*** | ***y*** |
|  |  |
|  |  |
|  |  |

1. You are at an altitude of 250 feet in a hot-air balloon. You turn the burner on high and rise at a rate of 20 feet per minute for 5 minutes. Your altitude *h* after you have risen for *t* minutes is

given by the function *h* = 250 + 20*t.*

1. Make a table to show the altitude as a function of the number of minutes you have traveled.
2. Graph your data points—make sure to label the units on your axes.
3. Does it make sense to connect the points on the graph? Explain.

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|  |  |
| --- | --- |
| **# of minutes** | **Altitude**  **( in feet)** |
| 0 |  |
| 1 |  |
| 1.5 |  |
| 2 |  |
| 3 |  |
| 4 |  |
| 5 |  |

1. After 5 minutes, you turn the burner to low. This gives just enough heat to keep the balloon from falling but not enough to make it rise any higher. Plot a point on the graph to show how high the balloon is after 6 minutes.
2. Does it make sense to connect the point plotted in part (d) to the rest of the graph? Explain.
3. What is the domain of the function?
4. What is the range of the function?
5. As a scuba diver dives deeper and deeper into the ocean, the pressure of the water on his body steadily increases. The pressure at the surface of the water is 14.7 pounds per square inch (psi). The pressure increases at a rate of 0.445 psi for each foot you descend.
6. Write an equation that represents the pressure *P* as a function of the depth *d*.
7. Complete the table below. Show all of your workin the space below.

|  |  |
| --- | --- |
| **Depth**  **(# of feet)** | **Pressure (psi)** |
| 0 |  |
| 20 |  |
| 40 |  |
| 60 |  |
| 80 |  |
| 100 |  |

1. Make a graph of the function. Make sure you label your axes with the correct units.

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1. Describe in words why this is a function.