**Coordinate Graphing of Real-World Problems**

There are many situations in life that involve two sets of numbers that are related to each other. For example, If you know the price of one ticket for a show, you can calculate the cost for any number of people to attend. Similarly, if you know how much gas will cost for one gallon, you can calculate how many gallons you will be able to purchase with the money in your wallet.

Often, the hardest part of figuring out a complicated problem with lots of data is keeping it all organized so you don't lose track of what you are doing. Using a function table, or "T-chart" can help you organize information.

A function table has two columns, because it is used to show the relationship between two different strings of numbers. Each function table has a rule, called a "function" that generates a pattern for one string of numbers (often named by the variable "Y") when another string of number (often named by the variable "X") is used.

The examples below start with one that shows how a function table can be used to figure out how much it would cost for "x" number of people to attend an afternoon movie that costs $5 per person.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Using "x" as a place holder for an unknown number allows us to generalize the information and write a rule, or function, that works for any number of people. By plugging in a value for x in the function above the table, the corresponding value for y can be determined. In this case, Y is the total cost of going to the movies.****Each ticket costs $5, so start plugging in the values for X, one at a time.**

|  |  |  |
| --- | --- | --- |
| 5x = y  |  |  |
| **X** | **Y** |  |  |
| 1 | 5 | left pointing arrow | **$5 x 1 person = $5**  |
| 2 | 10 | left pointing arrow | **$5 x 2 person = $10**  |
| 3 | 15 | left pointing arrow | **$5 x 3 person = $15**  |
| 4 | 20 | left pointing arrow | **$5 x 4 person = $20**  |

 |
| **If the evening show costs $9, we could make a second table, like this:**

|  |  |  |
| --- | --- | --- |
| 9x = y  |  |  |
| **X** | **Y** |  |  |
| 1 | 9 | left pointing arrow | **$9 x 1 person = $9**  |
| 2 | 18 | left pointing arrow | **$9 x 2 person = $18**  |
| 3 | 27 | left pointing arrow | **$9 x 3 person = $27**  |
| 4 | 36 | left pointing arrow | **$9 x 4 person = $36**  |

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While function tables come in handy for small problems like figuring out the cost of a group of people attending a movie together, their real value can be seen when applying patterns to very large numbers. Small problems typically have many ways to be solved. Pictures can be used, or tally marks. Numbers can be added repeatedly. But no one wants to draw 218 pictures of something, or count out 1,053 tally marks, to solve a problem. When you understand a pattern dealing with a small number, the pattern can also be applied to help you figure out a much larger number.

So, how does your information get from a function table to a visual display on a coordinate graph? Let's look another example.

|  |
| --- |
| **To figure out how many books you can read in x number of days if you read two books per day, first make a function table:** |
|

|  |  |  |
| --- | --- | --- |
| 2x = y  |  |  |
| **X** | **Y** |  |  |
| 0 | 0 | = | **(0,0)** |
| 1 | 2 | = | **(1,2)** |
| 2 | 4 | = | **(2,4)** |
| 3 | 6 | = | **(3,6)** |
| 4 | 8 | = | **(4,8)** |
| 5 | 10 | = | **(5,10)** |
| 6 | 12 | = | **(6,12)** |

 | coordinate grid with line 2x = y plotted |
| **Each corresponding pair of numbers on the same level of the function table is used to write an ordered pair. The first number tells you how many units to move across the horizontal line (x axis). The second number tells you how many units to move up the vertical line (y axis). Draw a point where the lines cross. Join the points to form a line.**  |

**Recap**

* **Real-life situations can be represented using a function table and a coordinate graph.**
* **The terms that are on the same level of a function table are related to each other, and can be written as an ordered pair.**
* **The first number in an ordered pair tells the number to move left or right on the x axis.**
* **The second number in an ordered pair tells the number to move up or down on the y axis.**