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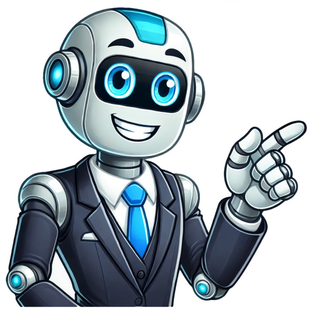

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Practice the basics of fraction addition and subtraction or challenge yourself with the insane level. We welcome your feedback, comments and questions about this site or page. Please submit your feedback or enquiries via our Feedback page. What is a function table? Are there different types of function tables? What sort of function tables questions are there? Have you got any function table worksheets for me to try? How do I answer function table questions? Where can I find some examples of different function tables? Find out more below. A function table is a way of showing how a set of inputs is related to a set of outputs. Function tables are often used to generate a set of outputs from a set of inputs following a given rule. They can also be used to find an input from an output, or to find a rule for a given set of inputs and outputs. In fact, function tables are sometimes called input and output tables, or function machines. Function machines can be very simple and easy for quite young children to understand; they can also be incredibly complex and used at a much higher level for college students. They are a great way to explore algebra and also to learn about inverse of an expression. Here is an example of a simple in and out function table. We can see that the rule for the function is subtract 3. We can see that each output is 3 less than the corresponding input. If we wanted to write this using algebra, we could say that: for any input x. All function tables are based around inputs and outputs. The headings on some tables may be different, for example you might get x and y, or you might get x and f(x). But these other headings are just a different way of having inputs and outputs. The main differences in function tables are the types of function. Here are some examples of some of the function types you might get in a table: Functions with rules rather than algebraic expressions: simple one-step rules: add 4, subtract 1, multiply by 5, etc two-step functions: add 3 then double, halve it then subtract 2, etc Algebraic functions: linear functions of the form f(x) = mx + c for some numbers m and c. quadratic functions where the value of x has an exponent of 2, such as f(x) = x2 + 4 other functions where you might have different exponents or other mathematical operators. Function table questions fall into 3 different categories: finding the output if we know the input and the rule (or function). finding the input if we know the output and the rule (or function). finding the rule or function if both the inputs and outputs are known. We have created a range of different worksheets for you to practice all these skills. We have created a support page to help you to answer a range of questions involving function tables. Each of the three different types of question above are included in our worked examples which are solved step-by-step. How to do Function Tables Support Page We have a range of function table worksheets from 3rd grade and upwards. The worksheets involve finding missing inputs and outputs, as well as finding the missing function. The easier worksheets involve using rules rather than algebraic functions; the harder worksheets use algebraic functions. The harder worksheets are more suitable for middle and high school level. Here are some examples of different function tables to show you what is a function table and how they work. We can see that the rule is Multiply by 2. This is a one-step function as only one operator is used. Looking at the rows of the table, we can see: when the input is 3, the output is 3 x 2 = 6 when the input is 2, the output is 2 x 2 = 4 when the input is 0, the output is 0 x 2 = 0 when the input is 4, the output is 4 x 2 = 8 when the input is 5, the output is 5 x 2 = 10. We can see that the rule is Subtract 4 then divide by 3. This is a two-step function as two different operators are used. The function table has been set out horizontally with the input and output in rows rather than columns. Looking at the columns of the table, we can see: when the input is 16, the output is 16 − 4 = 12; 12 ÷ 3 = 4 when the input is 25, the output is 25 − 4 = 21; 21 ÷ 3 = 7 when the input is 10, the output is 10 − 4 = 6; 6 ÷ 3 = 2 when the input is 40, the output is 40 − 4 = 36; 36 ÷ 3 = 12 when the input is 49, the output is 49 − 4 = 45; 45 ÷ 3 = 15 If we were to rewrite this rule using algebra, we could write any of the following for the input, x: \[ y = (x - 4) \div 3 \] \[ y = {1 \over 3} (x - 4) \] \[ f(x) = {{x - 4} \over 3} \] We can see that the rule is \[ f(x) = {1 \over 2} x \]. We could also write the rule as \[ f(x) = { x \over 2} \] This is a one-step function as just one operator is used. We can also see that the inputs start at 0 and count up by ones to 5. This is common in function tables, especially when using the tables for graphing the function. Looking at the columns of the table, we can see: when the input is 0, the output is half of 0 = 0. when the input is 1, the output is half of 1 = ½ when the input is 2, the output is half of 2 = 1 when the input is 3, the output is half of 3 = 1 ½ If we were to rewrite this equation as a rule, then the rule would be either: We can see that the rule is \[ f(x) = 20 - x \]. This is a one-step function as just one operator is used. You will notice that the inputs to this table include fractions, and that the answers included negative numbers. Looking at the columns of the table, we can see: when the input is 16, the output is 20 − 16 = 4. when the input is 3, the output is 20 − 3 = 17 when the input is 11, the output is 20 − 11 = 9 when the input is 5 ½ , the output is 20 − 5 ½ = 14 ½ when the input is 8 ½ , the output is 20 − 8 ½ = 11 ½ when the input is 22, the output is 20 − 22 = -2 If we were to rewrite this equation as a rule, then the rule would be: Subctract the number from 20 We can see that the rule is \[ f(x) = 2x + 1 \]. This is a two-step function as two operators are used. You will notice that the inputs to this table include fractions, and that the answers included negative numbers. Looking at the columns of the table, we can see: when the input is 0, the output is (2 x 0) + 1 = 1. when the input is 1, the output is (2 x 1) + 1 = 3 when the input is 2, the output is (2 x 2) + 1 = 5 when the input is 3, the output is (2 x 3) + 1 = 7 when the input is 4, the output is (2 x 4) + 1 = 9 when the input is 5, the output is (2 x 5) + 1 = 11 If we were to rewrite this equation as a rule, then the rule would be either: double then add 1 multiply by 2 then add 1 Take a look at some more of our resources similar to these. If you are looking for some 6th grade algebra worksheets to use with your child to help them understand simple equations then try our selection of basic algebra worksheets. There are a range of 6th grade math worksheets covering the following concepts: Generate the algebra - and write your own algebraic expressions; Calculate the algebra - work out the value of different expressions; Solve the algebra - find the value of the term in the equation. Use the distributive property to factorize and expand different expressions How to Print or Save these sheets  Need help with printing or saving? Follow these 3 steps to get your worksheets printed perfectly! How to Print or Save these sheets  Need help with printing or saving? Follow these 3 steps to get your worksheets printed perfectly! Sign up for our newsletter to get free math support delivered to your inbox each month. Plus, get a seasonal math grab pack included for free! The Math Salamanders hope you enjoy using these free printable Math worksheets and all our other Math games and resources. If you have any questions or need any information about our site, please get in touch with us using the 'Contact Us' tab at the top and bottom of every page. Download Article Recognizing when a table is (or isn't) a function is easier than you think Download Article Cramming for a math test? Struggling with a homework assignment on tables and functions? If this sounds like you, you're not alone. Tables and functions can be hard to wrap your head around, and understanding how they work can make a big difference in your grade. The tricky part is that some tables are functions and some aren't. So how do you tell the difference? It may sound like a hard question, but don't sweat. There are a few dead giveaways that tell you whether a table is a function, and they're easy to spot if you know where to look. Here's a step-by-step guide on how to tell when a table is a function—and when it's not. A function describes the relationship between an input variable (x) and an output variable (y). A table provides a list of x values and their y values. A table is a function if a given x value has only one y value. Multiple x values can have the same y value, but a given x value can only have one specific y value. 1 Tables are created by inputting numbers into functions. Let's use the function y = 2x + 1 as an example. This function tells us the relationship between the input variable (x) and the output variable (y).[1] If we input a value for x, we get a specific value for y. The table above shows x values and their y values. An x value of 1 gives us 2*1 + 1. Therefore, if x=1, y=3. An x value of 2 gives us 2*2 + 1. Therefore, if x=2, y=5. And so on. 2 Each column represents a group of numbers called a "set." Sets of numbers are presented using { }. The set of x values is called the domain, while the set of y values produced by the function is called the range.[2] [3] [4] In our example, the domain is {1, 2, 3, 4, 5}. The range is {3, 5, 7, 9, 11}. A set of possible y values is known as the "codomain." [5] This is different from the range, because the range is the actual set of y values. For our example, you can say that the codomain is {1, 3, 5, 7, 9, 11, 13, 15, 17} because these are possible values for y. Meanwhile, the range is {3, 5, 7, 9, 11} because these are the actual values in our table. Advertisement 1 A table is a function if each x value has a specific y value. In our previous example, we created a table using the function y = 2x + 1. But what if we only have a table of numbers? How can we tell that that table came from a function? To figure this out, we'll need to compare the x values (domain) with the y values (range). Let's look at some examples. 2 Example 1 Compare the x values with the y values in the table above. Remember that each x value can only have one possible y value. Is this table a function? Yes. In this table, no x value has more than one possible y value. Therefore, this table is a function. 3 Example 2 Look closely at the table above. Remember that each x value can only have one possible y value. Is this table a function? Yes. An x value of 3 appears twice, but it always has a y value of 11. This table is a function. 4 Example 3 Think carefully this time. Does each x value have a specific y value? Yes. The x value of 9 always has a y value of 5 and never something else. Likewise, the x value of 13 always has a y value of 5 and never something else. This is fine because multiple x values can have the same y value, but a given x value can only have one specific y value. Therefore, this table is a function. Advertisement 1 A table is not a function if a specific x value has more than one y value. For example, let's say we have a table where an x value of 11 appears twice. The first x value of 11 has a y value of 20. The second x value of 11 has a y value of 16. In this case, the table is not a function because an x value of 11 has more than one y value. Let's look at some examples in the tables below. 2 Example 1 In this case, we see that an x value of 3 has a few different y values: 3, 6 and 7. Likewise, an x value of 4 has y values of 2, 19, and 0. This table is not a function since a specific x value can only have one possible y value. 3 Example 2 You can see that an x value of 5 has two y values: 6 and 11. Since a given x value can only have one specific y value, this table is not a function. 4 Example 3 Note how an x value of 10 always has a y value of 3, but an x value of 20 has two different y values: 8 and 14. Remember: a specific x value can only have one possible y value. Since 20 has more than one possible y value, it breaks this rule. This means that the table is not a function. Advertisement Ask a Question Advertisement This article was reviewed by Grace Imson, MA and by wikiHow staff writer, Johnathan Fuentes. Grace Imson is a math teacher with over 40 years of teaching experience. Grace is currently a math instructor at the City College of San Francisco and was previously in the Math Department at Saint Louis University. She has taught math at the elementary, middle, high school, and college levels. She has an MA in Education, specializing in Administration and Supervision from Saint Louis University. This article has been viewed 50,539 times. Co-authors: 5 Updated: June 20, 2024 Views: 50,539 Categories: Algebra Print Send fan mail to authors Thanks to all authors for creating a page that has been read 50,539 times. "This article helped me prepare for my Algebra EOC. I am forever grateful for this learning tool. Thank you, wikiHow!"..." more Share your story In mathematics, a table is a way of organizing and displaying data in a structured format. It is a set of rows and columns that are used to represent information in a clear and concise manner. A table can be used to represent a wide range of mathematical concepts, including but not limited to: functions, sequences, and statistical data. One of the most basic types of tables is a function table. A function table is used to represent the relationship between two variables. It contains two columns, one for the input values and one for the corresponding output values.The input values are typically represented on the left-hand side of the table, while the output values are represented on the right-hand side. The input values are plugged into the function, and the corresponding output values are calculated and recorded in the table.An example of a function table is the table that represents the function f(x) = 2x+3, where x is the input value and f(x) is the output value.Figure 1 – A functional table representing f(x) = 2x+3Another type of table is a sequence table. A sequence table is used to represent a sequence of numbers, such as the Fibonacci sequence or the prime numbers. It contains one column for the term number and another column for the corresponding term value.The term number represents the position of the term in the sequence, and the term value represents the value of the term at that position. An example of a sequence table is the table that represents the Fibonacci sequence, where the first column represents the term number and the second column represents the term value.Figure 2 – A sequence table representing the Fibonacci seriesA third type of table is a statistical table. A statistical table is used to represent statistical data, such as a frequency distribution or a cumulative frequency distribution. It contains a column for the data values and a column for the corresponding frequencies. The data values represent the different categories of data, while the frequencies represent the number of occurrences of each category.An example of a statistical table is a table that represents the number of students in a class who scored a certain grade on a test, where the first column represents the grade and the second column represents the frequency of that grade.In addition to these basic types of tables, there are many other types of tables that can be used in mathematics. For example, a multiplication table is used to represent the results of multiplication facts for a given number.A probability table is used to represent the probability of different outcomes for a given event. And a truth table is used to represent the logical relationships between different statements.Types of TablesMultiplication TablesA multiplication table, also known as a times table, is a table that lists the results of multiplying numbers by one another. It is a fundamental tool used in mathematics to help students learn and memorize the basic facts of multiplication.Multiplication tables are typically arranged in a grid format with the multiplicand (the number being multiplied) listed on the top or left side of the table and the multiplier (the number used to multiply the multiplicand) listed on the bottom or right side of the table.The use of multiplication tables can be traced back to ancient civilizations, such as the Egyptians and the Greeks, where they used multiplication tables to perform calculations in trade and commerce. In modern times, multiplication tables are widely used in elementary and middle school mathematics education as a way to help students learn and memorize the basic facts of multiplication.Multiplication tables are also useful in real-life applications, such as in engineering, construction, and other fields that require calculations involving measurements and dimensions. Being able to quickly recall the multiplication facts allows for faster and more accurate calculations, which can save time and reduce errors.Statistical TablesStatistical tables are tables that are used to organize and display statistical data in a structured format. They are used to summarize and present large amounts of data in a way that is easy to understand and analyze.Statistical tables typically contain rows and columns, with the rows representing individual observations or cases and the columns representing the variables or characteristics of those observations.Figure 3 – A statistical tableFrequency distributions are tables that show the number of observations or cases that fall into different categories or classes. They typically contain two columns: one for the categories or classes and another for the frequencies of observations in each category.For example, a frequency distribution table for the number of students in a class who scored a certain grade on a test would have the grade as the category and the frequency of that grade as the value.Cumulative frequency distributions are similar to frequency distributions, but they also show the cumulative number of observations or cases that fall into different categories or classes. They typically contain three columns: one for the categories or classes, another for the frequencies of observations in each category, and a third for the cumulative frequencies of observations.Truth TablesTruth tables are a way of representing the logical relationships between statements in a clear and concise manner. They are used in propositional logic, which is a branch of mathematical logic that deals with statements that can either be true or false.A truth table is a table that lists all possible combinations of logical statements and their resulting truth values. Each row of the table represents a different combination of input statements, and the corresponding truth value for that combination is given in the final column of the table.Truth tables have one column for each statement or logical operator being considered and one final column for the resulting truth value of the entire logical expression.The number of rows in a truth table is determined by the number of statements or logical operators being considered; each statement or operator has two possible values (true or false), so the number of rows is 2 raised to the power of the number of statements or operators.For example, the truth table for the logical statement "A and B" would have two columns (one for A and one for B) and one final column for the resulting truth value of the statement "A and B."The table would have four rows, one for each possible combination of values for A and B (A=T, B=T), (A=T, B=F), (A=F, B=T), (A=F, B=F). The resulting truth value for each row would be true if A and B are both true and false otherwise.Solved Example Involving Functional TablesConsider the function f(x) = 2x$^3$ + 5x$^2$ – 3x + 7. Create a functional table that lists the input values of x from -2 to 2, with increments of 0.5, and the corresponding output values of f(x).Also, use the functional table to determine the local maximum and minimum points of the function and the inflection points if they exist.SolutionTo determine the local maximum and minimum points of the function, we can look for the points where the first derivative of the function is equal to zero. To find the inflection points, we can look for the points where the second derivative of the function is equal to zero.First Derivative: f'(x) = 6x$^2$ + 10x – 3 = 0Second Derivative: f''(x) = 12x + 10 = 0Solving the first derivative for x, we get x = -1/2 and x = -1/3, which correspond to the local minimum and inflection points. Solving the second derivative for x, we get x = -5/2, which corresponds to the local maximum point.Therefore, the local maximum point is at x = -5/2, the local minimum point is at x = -1/2, and the inflection point is at x = -1/3.This problem uses functional tables to represent the function and its output values, the use of derivatives to find the maximum, minimum, and inflection points, and the solving of equations to find the x values at which the points occur.All images are created using GeoGebra. Symmetry Definition < Glossary Index > Tangent Line Definition In order to continue enjoying our site, we ask that you confirm your identity as a human. Thank you very much for your cooperation. 02-24-2005, 11:06 AM #1 I am using a worksheet put together by a couple of finance professors, and I ran across the above function. It seems to refer, somehow, to a Normal > Distribution, but I cannot use the "trace precedent" audit function to find out what it is doing. 02-24-2005, 03:06 PM #2 Rodby - > I am using a worksheet put together by a couple of finance professors, and > I ran across the above function. It seems to refer, somehow, to a Normal > Distribution, but I cannot use the "trace precedent" audit function to > find out what it is doing. < That's an array function entered using the Data | Table menu command. See Excel's built-in Help. - Mike www.mikemiddleton.com 02-24-2005, 04:06 PM #3 Michael R Middleton wrote... .... >That's an array function entered using the Data | Table menu command. See >Excel's built-in Help. Bad advice. There are no entries for the DATA function in online help (actually, it's not a function in the normal sense, rather a syntactic anomaly). As for searching on 'data table', there are a few topics, but none of them mention the DATA pseudofunction. There's *NOTHING* in online help, Excel/VBA help or even the XLM help files that even mention the DATA pseudofunction. It's pure chicken & egg when it comes to discovering what it is if you don't know it's produced by the Data > Table menu command. 02-24-2005, 04:06 PM #4 Harlan Grove wrote... .... >Bad advice. There are no entries for the DATA function in online help >(actually, it's not a function in the normal sense, rather a syntactic >anomaly). As for searching on 'data table', there are a few topics, but >none of them mention the DATA pseudofunction. .... I screwed up. It's the TABLE function, not the DATA function. Doh! Still, there's no mention of it in Excel online help, but there are entries for the Table method of the Range class in Excel/VBA help and the TABLE function in XLM help (note the apparent overloading - TABLE does different things in worksheets and macro sheets). Still, there's no mention of the TABLE pseudofunction as it appears and works in worksheets. 02-24-2005, 04:06 PM #5 Thanks for the response. I tried to find the answer in Microsoft Help, and while it discusses the array and table functions, it doesn't have anything for{= TABLE (,X)}. Interestingly, when I click on the fx box, on the tool bar, the {} go away, and there is a NORMALDIST button that appears at the far left. I cannot seem to get the audit tool to work Any thoughts? "Michael R Middleton" wrote: > Rodby - > > > I am using a worksheet put together by a couple of finance professors, and > > I ran across the above function. It seems to refer, somehow, to a Normal > > Distribution, but I cannot use the "trace precedent" audit function to > > find out what it is doing. < > > That's an array function entered using the Data | Table menu command. See > Excel's built-in Help. > > - Mike > > www.mikemiddleton.com > > > 02-24-2005, 08:06 PM #6 Rodby - There are explanations and examples for "data tables" in Excel's offline Help. In most of the recent versions of Excel, if you choose Help | Microsoft Excel Help | Index, and type "data table" without the quotes, you should find most of the information you need. Recent versions have a Help page called "About data tables." Look at the Help information for worksheet data tables. The phrase "data table" is also used for chart data tables, which is not related to your current interest. Data tables are an important feature of Excel for automating what-if sensitivity analysis. If you want a step-by-step example using data tables for sensitivity analysis of decision tree models, go to www.treeplan.com, and from the "Download Free Tryout" page, get treeplan.pdf, "Decision Trees Using TreePlan." See pages 32-34. After you understand how Excel data tables work, you will likely also understand why the auditing tool cannot provide its usual assistance. - Mike +++++++++++++++++++++++++++++++++ > Thanks for the response. I tried to find the answer in Microsoft Help, and > while it discusses the array and table functions, it doesn't have anything > for{= TABLE (,X)}. > > Interestingly, when I click on the fx box, on the tool bar, the {} go > away, > and there is a NORMALDIST button that appears at the far left. > > I cannot seem to get the audit tool to work > Any thoughts? > > "Michael R Middleton" wrote: > >> Rodby - >> >> > I am using a worksheet put together by a couple of finance professors, >> > and >> > I ran across the above function. It seems to refer, somehow, to a >> > Normal >> > Distribution, but I cannot use the "trace precedent" audit function to >> > find out what it is doing. < >> >> That's an array function entered using the Data | Table menu command. See >> Excel's built-in Help. >> >> - Mike >> >> www.mikemiddleton.com 02-24-2005, 08:06 PM #7 Thanks, you've given me at least a path to follow. "Michael R Middleton" wrote: > Rodby - > > > There are explanations and examples for "data tables" in Excel's offline > > Help. > > In most of the recent versions of Excel, if you choose Help | Microsoft > > Excel Help | Index, and type "data table" without the quotes, you should > > find most of the information you need. Recent versions have a Help page > > called "About data tables." > > Look at the Help information for worksheet data tables. The phrase "data > > table" is also used for chart data tables, which is not related to your > > current interest. > > Data tables are an important feature of Excel for automating what-if > > sensitivity analysis. If you want a step-by-step example using data tables > > for sensitivity analysis of decision tree models, go to www.treeplan.com, > > and from the "Download Free Tryout" page, get treeplan.pdf, "Decision Trees > > Using TreePlan." See pages 32-34. > > After you understand how Excel data tables work, you will likely also > > understand why the auditing tool cannot provide its usual assistance. > > - Mike > > +++++++++++++++++++++++++++++++++ > > Thanks for the response. I tried to find the answer in Microsoft Help, and > > while it discusses the array and table functions, it doesn't have anything > > for{= TABLE (,X)}. > > > Interestingly, when I click on the fx box, on the tool bar, the {} go > > > away, > > > and there is a NORMALDIST button that appears at the far left. > > > > I cannot seem to get the audit tool to work > > Any thoughts? > > > > "Michael R Middleton" wrote: > > > > >> Rodby - > > >> > > >> > I am using a worksheet put together by a couple of finance professors, > > >> > and > > >> > I ran across the above function. It seems to refer, somehow, to a > > >> > Normal > > >> > Distribution, but I cannot use the "trace precedent" audit function to > > >> > find out what it is doing. < > > >> > That's an array function entered using the Data | Table menu command. See > > >> Excel's built-in Help. > > >> > > >> - Mike > > >> > > >> www.mikemiddleton.com > > > > 02-24-2005, 08:06 PM #8 Thanks, I appreciate the help. I will keep on working on it. "Harlan Grove" wrote: > Harlan Grove wrote... > .... > >Bad advice. There are no entries for the DATA function in online help > >(actually, it's not a function in the normal sense, rather a syntactic > >anomaly). As for searching on 'data table', there are a few topics, but > >none of them mention the DATA pseudofunction. > .... > > I screwed up. It's the TABLE function, not the DATA function. Doh! > > Still, there's no mention of it in Excel online help, but there are > > entries for the Table method of the Range class in Excel/VBA help and > > the TABLE function in XLM help (note the apparent overloading - TABLE > > does different things in worksheets and macro sheets). Still, there's > > no mention of the TABLE pseudofunction as it appears and works in > > worksheets. > > > Lance is 30km from home. He rides his bike at a constant speed of 12km/h. Make a graphical illustration of the number of hours and the number of kilometers he is from home. How much time does it get before he gets home? To solve this problem, you should first convert the information from the exercise into a function. The formula for a straight line is most suitable, since Lance is riding his bike at a constant speed. Let's examine how words and expressions are converted to mathematical symbols. When solving this problem you should think like this: Text informs us that Lance is 30 km away from home and that he is riding his bike at 12 km/h. So his journey begins at 30 km distance, and the closer he gets to home, the shorter the distance. Thus, you convert the information like this: f(x) is the distance to home at any given time. This distance gets smaller and smaller, the longer Lance travels towards home. x is the number of hours Lance rides his bike. 30 km is the distance that is counted down to 0 km, from where Lance starts, until he reaches home. 12 km/h is Lance's speed. Now you insert these items into the formula for a straight line, f(x) = mx + b, and get: 30 is the constant term since the starting point for Lance is set—30 km from home. − 12 is the slope, since the distance to home is reduced by 12 km for every hour Lance rides his bike towards home. Note! The minus sign for Lance's speed does not mean that he's riding his bike in reverse all the way home! Instead, the minus sign is used to count down from 30 km to 0 km. The distance should decrease, so you need a minus sign to accomplish this. Based on the expression above you get the following function table: x y = f(x) = −12x + 30 (x,y) 0 f(0) = −12 · 0 + 30 = 30 (0, 30) 0.5 f(0.5) = −12 · 0.5 + 30 = 24 (0.5, 24) 1 f(1) = −12 · 1 + 30 = 18 (1, 18) 1.5 f(1.5) = −12 · 1.5 + 30 = 12 (1.5, 12) 2 f(2) = −12 · 2 + 30 = 6 (2, 6) 2.5 f(2.5) = −12 · 2.5 + 30 = 0 (2.5, 0) 3 f(3) = −12 · 3 + 30 = −6 (3,−6) From the function table, you see that Lance gets home after x = 2.5 hours. Since the problem asks you to solve this graphically, you now have to make a coordinate system in which you mark the points you have calculated and written in the column with (x,y), and then draw the line between them. The graph should look like this: Lance arrives at home when the y-coordinate is 0. This is when the graph intersects the x-axis. The circle marks this point and you can see that Lance arrives at home after x = 2.5 hours. Thus, the answer is: It takes 2.5 hours for Lance to arrive at home. A math function table is a table used to plot possible outcomes of a function, which is a kind of rule. The table results can usually be used to plot results on a graph. To fully understand function tables and their purpose, you need to understand functions, and how they relate to variables. Once you understand each piece of the puzzle, mastering functions and function tables will be a snap. Variables To understand functions, you first need to understand variables. A variable is a value (usually a number) that you don't know or that could be a bunch of different numbers. For example, let's say you just took a test. You're not sure what you got yet, so you refer to your grade only as "x." A few days later the test gets handed back. You got an 83. In your case, x = 83. For your friend, x might equal 97. Functions A function is a rule that applies to a variable. Let's say everybody (except your friend) did poorly on the test, and your teacher decides to use a curve to change all the grades. The rule he uses for the curve is to bump everybody's grade up by 3 points. Written as a function, that would look like this: curve(grade) = grade + 3 Or, in math-speak, you can call the curve "f" (for "function") and grade "x": f(x) = x + 3 Now you can plug your and your friend's grades into the function to figure out what your new grades will be: f(83) = 86 f(97) = 100 Function Tables Function tables are simply lists of possible values of a variable and the function's result. Pictured is a simple function table that lists a series of possible grades in the class and then applies the f(x) = x + 3 function to them. To create a function table, simply list a bunch of values in the left column. The values can be anything; if you're not given specific values to use, just create your own. Since you'll often be using the data on a function table for graphing (see the next section), when you can choose the values yourself, it's best to use values for "x" that are close to zero: -2, -1, 0, 1, and 2, for example. Graphing Function Tables The purpose of creating functions is usually to plot a graph. When you plot a graph, the "x" values will be where a point exists on the x-axis (the horizontal axis), while the "f(x)" values will be where a point exists on the y-axis (vertical). To illustrate this point, the accompanying picture displays a graph plotted using the information in the function table above. On the graph, the original grades appear on the x-axis, and are matched to the curved grades that appear on the y-axis. Sometimes graphs can convey information that wasn't apparent before. For example, in this case, the graph proves that the grading curve was fair: no grade was raised disproportionately to any other grade. f(x) = x + 3 is obviously a very simple function, but with more advanced functions, the information might not be so obvious. Domain and Range When dealing with functions and plotting graphs, two important vocabulary terms to remember are "domain" and "range." "Domain" refers to the "x" value, and "range" refers to the "y" or "f(x)" value. For example, in the function table above, the left column could be labeled "Domain" and the right column could be labeled "Range." In the graph above, the x-axis displays the domain values, while the y-axis displays the range values. A common method of representing functions is in the form of a table. The table rows or columns display the corresponding input and output values. In some cases, these values represent all we know about the relationship; other times, the table provides a few select examples from a more complete relationship. Table 1-3 lists the input number of each month (January = 1, February = 2, and so on) and the output value of the number of days in that month. This information represents all we know about the months and days for a given year (that is not a leap year). Note that, in this table, we define a days-in-a-month function [latex]\text{}f\text{}[/latex] where [latex]\text{}D=f\left(m\right)\text{}[/latex] identifies months by an integer rather than by name. Table 1-3 Month number, [latex]\text{}m\text{}[/latex] (input) 1 2 3 4 5 6 7 8 9 10 11 12 Days in month, [latex]\text{}D\text{}[/latex] (output) 31 28 31 30 31 30 31 31 30 31 30 31 Table 1-4 defines a function [latex]\text{}Q=g\left(n\right)\text{}[/latex]. Remember, this notation tells us that [latex]\text{}g\text{}[/latex] is the name of the function that takes the input [latex]\text{}n\text{}[/latex] and gives the output [latex]\text{}Q\text{}[/latex]. Table 1-4 [latex]n[/latex] 1 2 3 4 5 [latex]Q[/latex] 8 6 7 6 8 Table 1-5 displays the age of children in years and their corresponding heights. This table displays just some of the data available for the heights and ages of children. We can see right away that this table does not represent a function because the same input value, 5 years, has two different output values, 40 in. and 42 in. Table 1-5 Age in years, [latex]\text{ }a\text{ }[/latex] (input) 5 5 6 7 8 9 10 Height in inches, [latex]\text{ }h\text{ }[/latex] (output) 40 42 44 47 50 52 54 Given a table of input and output values, determine whether the table represents a function. Identify the input and output values. Check to see if each input value is paired with only one output value. If so, the table represents a function. Which table, Table 1-6, Table 1-7, or Table 1-8, represents a function (if any)? Table 1-6 Input Output 2 1 5 3 8 6 Table 1-7 Input Output –3 5 0 1 4 5 Table 1-8 Input Output 1 0 5 2 5 4 Solution Does Table 1-9 represent a function? Table 1-9 Input Output 1 10 2 100 3 1000 Solution Access for free at Sometimes we get a table of values from an experiment or a data set, rather than a picture of the information.  Often, we can examine in the information from a function table to learn more about how to model the data. So, what is a function table?  A function table has rows and columns that show input and output values for a function. We can use a function table to find ordered pairs and plot those points to sketch a graph of the function. We can also calculate differences to help us find out what type of function is given in a table. Of course, there are all sorts of functions that we can represent with a function table, including constant, linear, quadratic, and exponential functions. In this article, we'll talk about function tables and look at some examples.  We'll also look at how to figure out what type of function we have based on graphing or looking at the data in a function table. Let's get started. A function table shows us values (ordered pairs) for a given function. *Note: we could also have a function table with ordered triples, ordered quadruples, and so forth for a function of 2, 3, or more variables! A function table has rows and columns, which contain the input and output values of the function, side-by-side. You can see an example of a function table below. We can read a function table to find ordered pairs.  For example, we get the following set of ordered pairs from the function table above: (0, 2)(1, 5)(3, 11)(7, 23)(10, 32) Now we can plot those points to get an idea of what the function looks like: This graph shows the 5 ordered pairs (points) from the table above. The graph looks linear. If we have enough data (or we know what type of function we have), we can sketch a graph of the function. This is a sketch of a linear function from the scatter plot above. We can also calculate differences (for both x and y) to help us find out what type of function is given in a table (more on this later). The rule of a function table simply tells you how the two variables (input and output) from the table are related to each other. For example, the table below has the rule "y is equal to 2 times x": We can see that in every row, the value of y is twice the value of x.  In other words, we double x (the input) to find y (the output). There are two methods that can help us to find the function in a table: Graphing (plot all of the ordered pairs from the function table, sketch a graph, and match the shape to a function type that we are familiar with).Differences (find the first differences of x in the table, and then find the first differences of y and second differences of y, and take ratios to see how the function values and slopes change). Let's look at some examples of how to find the function in a table (using both methods). Consider the table below: We can see right away that this table is not from a function, since the input of x = 1 has two possible outputs: y = 2 and y = 5. This ambiguity of outputs means that the table is giving us a relation that is not a function.  We can verify this with a graph of the ordered pairs in the table. The vertical line x = 1 would intersect this graph twice, meaning it fails the vertical line test (it is a relation that is not a function). The vertical line x = 1 would intersect the graph more than once, so the graph of the relation fails the vertical line test (meaning it is not a function). (You can learn more about the vertical line test and what cannot be a function here). Consider the table below: No matter the value of x (input), we get the same value of y = 6 as our output.  This suggests that we have a constant function from the table. The graph is a horizontal line at y = 6, pictured below. The horizontal line y = 6 is a constant function (the same output of y = 6 results from any input x). Note that any differences we take for y would give us zero, which also suggests a constant function. Consider the table below: It looks like we have a function, but it is not constant (since there are different y values in the table).  So, we add columns to look at differences for x and y in the table. To get first differences for x, we simply subtract the "next" x-value from the "current" x-value.  We do the same for y-values to get first differences for y. You can see the updated table below, which includes first differences for x and first differences for y, along with quotients (first differences of y divided by first differences for x): xyFirstDiffxFirstDiffyQuotient(Diff y / Diff x)1541136261524271712292124 2 Note that the quotients in the table above all have the same value.  This suggests that we have a linear function in the table. We can verify this by graphing the ordered pairs in the table – you can see the graph below: This graph shows the 5 ordered pairs (points) from the table above. The graph looks linear. Based on the graph, it looks like we get a linear function of y = 2x + 3.  We can verify this equation by choosing two points (ordered pairs) from the table and doing calculations: Looking at the points (4, 11) and (6, 15), we get: Slope = Rise / Runm = (y2 – y1) / (x2 – x1)m = (15 – 11) / (6 – 4)m = 4 / 2m = 2 The slope-intercept form for the equation for a line is y = mx + b.  We know m = 2, and we can use the point (4, 11) to find b: y = mx + by = 2x + b  [we found a slope of m = 2 above]11 = 2(4) + b  [we used the point (4, 11), so x = 4 and y = 11]11 = 8 + b3 = b So, the y-intercept of this line is b = 3. This gives us a line equation of y = 2x + 3.  All of the ordered pairs in the table fit this equation. Consider the table below: It looks like we have a function, but it is not constant (since there are different y values in the table).  So, we add columns to look at differences for x and y in the table. We use the same procedure as in the last example to find first differences for both x and y. You can see the updated table below, which includes first differences for x and first differences for y, along with quotients (first differences of y divided by first differences for x): xyFirstDiffxFirstDiffyQuotient(Diff y / Diff x)16314284421177641220109863451 5 Note that the quotients in the table above do not have the same value.  This suggests that we do not have a linear function in the table. We can try to see what type of function we have by graphing the ordered pairs in the table – you can see the graph below: This graph shows the 5 ordered pairs (points) from the table above. The graph looks quadratic. It turns out that the equation is given by y = x2 + 5.  All of the values in the table fit this equation. *Note: to find this equation, all we need to do is choose 3 points (ordered pairs) from the table.  Then, plug each set of points into the equation y = ax2 + bx + c (a quadratic in standard form) This would give us a set of 3 equations with 3 unknowns (a, b, and c), which we could solve using algebra. Consider the table below: It looks like we have a function, but it is not constant (since there are different y values in the table).  So, we add columns to look at differences for x and y in the table. We use the same procedure as in the last example to find first differences for both x and y. You can see the updated table below, which includes first differences for x and first differences for y, along with quotients (first differences of y divided by first differences for x): xy1stDiffx1stDiffyQuotient(Diff y / Diff x)0316133324218944812424619221447 2 Note that the quotients in the table above do not have the same value.  This suggests that we do not have a linear function in the table. So, we will graph the points from the table to get an idea of what the function looks like – you can see the graph below: This graph shows the 5 ordered pairs (points) from the table above. The graph looks exponential. It appears that the function may be exponential, which has the form with a not zero and b not equal to 0 or 1. We can use 2 points from the table to get 2 equations and then solve the system to find a and b. The first point, (3, 24), gives us the equation: The second point, (4, 48), gives us the equation: We will divide the two equations to cancel a and solve for b. On the left side, we get 48 / 24 = 2. On the right side, we get ab4 / ab3 = b. So, b = 2. Then our equation looks like this: Now we just need to find the value of a.  We can use either of the points above, but let's choose (3, 24), which has smaller numbers. Plugging in x = 3, y = 24 gives us: y = a*2x24 = a*2324 = a*83 = a Now that we know a = 3 and b = 2, we can write the exponential function: Note: if the exponential function had the form y = abx + c, then the first differences in the table would give us another exponential function, and we could use three points and solve a system of three equations instead (to solve for a, b, and c). You can learn more here. Now you know what a function table is and how to figure out what function you have in a given table. You can find answers to common questions about functions here. The table() function in R can be used to quickly create frequency tables. This tutorial provides examples of how to use this function with the following data frame in R: #create data frame df