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The logarithmic function is an important medium of math calculations. Logarithms were discovered in the 16th century by John Napier a Scottish mathematician, scientist, and astronomical and scientific calculations involving huge numbers. Logarithmic functions are closely related to exponential functions and are considered as an inverse of the exponential function. The exponential function ax = N is transformed to a logarithm of any number N if interpreted as an exponential function be raised, to obtain the number N. Here we shall aim at knowing more about logarithmic functions, types of logarithms, the graph of the logarithmic function and the properties of logarithmic function is of the form f(x) = logax, where a > 0. It is the inverse of the exponential function ay = x. Log functions include natural logarithm (ln) or common logarithm (log). Here are some examples of logarithmic functions: $f(x) = \ln(x - 2)g(x) = \log 2(x + 5) - 2h(x) = 2\log x$, etc. Some of the non-integral exponent values of x in the exponent values of x in the exponent values can be calculated easily with the use of logarithmic functions. Finding the value of x in 2x = 10 is difficult. Here we can use log functions to transform 2x = 10 into logarithmic form as log210 = x and then find the value of x. The logarithmic function into a logarithmic function is as follows. The exponential function of the form ax = N can be transformed into a logarithmic function logaN = x. The logarithms are generally calculated for positive whole numbers, fractions, decimals, but cannot be calculated for negative values. Domain and Range of Log Functions Let us consider the basic (parent) common logarithmic function $f(x) = \log x$ (or $y = \log x$). We know that $\log x$ is defined only when x > 0 (try finding $\log 0$, $\log (-1)$, $\log (-2)$, etc using your calculator. You will come up with an error). So the domain is the set of all positive real numbers. Now, we will observe some of the y-values (outputs) of the function for different x-values (inputs). When x = 1, y = log 1 = 0When x = 2, y = log 2 = 0.3010When x = 0.2, y = -0.6990When x = 0.2, y = 0.6990When x = 0.2, y = 0Thus: The domain of log function $y = \log x$ is x > 0 (or) (0,). The range of any log function is the argument of the function $y = \log x$ is x > 0 (or) (0,). The range of any log function $y = \log x$ is y = 0 (or) (0,). The range of any log function $y = \log x$ is y = 0 (or) (0,). The range of any log function $y = \log x$ is y = 0 (or) (0,). The range of any log function $y = \log x$ is y = 0 (or) (0,). The range of any log function $y = \log x$ is y = 0 (or) (0,). The range of any log function $y = \log x$ is y = 0 (or) (0,). The range of any log function y = 0 (or) (0,). The range of any log function y = 0 (or) (0,). The range of any log function y = 0 (or) (0,). The range of any log function y = 0 (or) (0,). The range of any log function y = 0 (or) (0,). The range of any log function y = 0 (or) (0,). The range of any log function y = 0 (or) (0,). The range of any log function y = 0 (or) (0,). The range of any log function y = 0 (or) (0,). The range of any log function y = 0 (or) (0,). The range of any log function y = 0 (or) (0,). The range of any log function y = 0 (or) (0,). The range of any log function y = 0 (or) (0,). The range of any log function y = 0 (or) (0,). The range of any log function y = 0 (or) (0,). The range of any log function y = 0 (or) (0,). The range of any log function y = 0 (or) (0,). The range of any log function y = 0 (or) (0,). have seen earlier, the range of any log function is R. So the range of f(x) is R.Logarithmic function y = loga x is the set of positive real numbers and the range is the set of all real numbers. We know that the exponential and log functions are inverses of each other and hence their graphs are symmetric with respect to the line y = x. Also, note that y = 0 when x = 0 as y = loga1 = 0 for any 'a'. Thus, all such functions have an x-intercept of (1, 0). A logarithmic function doesn't have a y-intercept as loga0 is not defined. Summarizing all these, the graphs of exponential functions and logarithmic graph look like below. Properties of Logarithmic Grapha > 0 and a 1The logarithmic graph increases when a > 1, and decreases when a > curve or decreasing curve as the answer. If the base > 1, then the curve is increasing; and if 0 < base < 1, then the curve is decreasing. Here are the steps for graphing logarithmic functions: Find the curve is decreasing. Here are the steps for graphing logarithmic functions and range. Find the curve is decreasing. asymptote. Substitute some value of x that makes the argument equal to 1 and use the property loga a = 1. This would give us a point on the graph. Join the two points (from the last two steps) and extend the curve on both sides with respect to the vertical asymptote. Example: Graph the logarithmic function $f(x) = 2 \log 3 (x + 1)$. So domain = (-1,). Range = R. Vertical asymptote is x = -1. At x = 0, $y = 2 \log 3 (0 + 1) = 2 \log 3 (0 +$ 3 = 2 (1) = 2If we want more clarity, we can form a table of values with some random values of x and substitute each of them in the given function to compute the y-values. This way, we get more points on the curve. Thus, the log function graph looks as follows. Properties of Logarithmic Functions Logarithmic functions complex log functions across numbers are transformed into a different set of operations within logarithms. The product of two numbers, when taken within the logarithmic functions is equal to the sum of the logarithmic values of the two functions. Similarly, the operations of division are transformed into the difference of the logarithms of the two numbers. Let us list the important properties of log functions in the below points.log ab = log a + log bloga/b = log a - log bloga/b = log a - log bloga/b = (logc a)/(logc b) (change of base rule)logax = x logaloga 1 = 0loga a = 1Derivative and Integral of Logarithmic Functions The derivation of the logarithmic function gives the slope of the tangent to the curve representing the logarithmic functions are as follows. The integral formulas of logarithmic functions are as follows: The integral of ln x is form as $\log 464 = 3$. Answer: $\log 464 = 3$. Answer: $\log 464 = 3$. Simplify $\log 2 (1/128) = -7$. Solution: We use the properties of $\log 27 = -7$ $\log 27 = -7$. Solution: We use the properties of $\log 27 = -7$. logarithmic function $f(x) = 3 \log 2 (2x - 3) - 7$. Solution: For domain, $2x - 3 > 0 \ x > 3/2$. Hence domain = (3/2,); Range = (-,); VA is x = 3/2; No HA. View More > go to slidego to slide slideBreakdown tough concepts through simple visuals. Math will no longer be a tough subject, especially when you understand the concepts through visualizations. Book a Free Trial ClassFAQs on Logarithmic functions The logarithmic functions are through visualizations. The product of functions within logarithms is equal (log ab = $\log a + \log b$ to the sum of two logarithm functions. The division of two logarithm functions (loga/b = log a - log b) is changed to the difference of logarithm functions. The graph of log function y = log x can be obtained by finding its domain, range, asymptotes, and some points on the curve. To find some points on the curve we can use the following properties: What are Asymptotes of a logarithmic function $f(x) = a \log (x - b) + c$: The vertical asymptote is x = b. There is no horizontal asymptote. How Are Exponential and Logarithmic Functions Related? The exponential function of the form ax = N can be transformed into a logarithmic form as log210 = x, to find the value of x. The logarithm counts the numbers of occurrences of the base in repeated multiples. What is the Difference Between Natural Logarithmic and Common Logarithmic Functions? The logarithms are logarithms. We have natural logarithms are logarithms are logarithms are logarithms are logarithms are logarithms. logarithms can be calculated with reference to any base, but are often calculated for the base of either 'e' or '10'. The natural logarithms are written as log10x (or) log x. To obtain the value of x from natural logarithms, it is equal to the power to which e has to be raised to obtain x.e = 2.718logeN = 2.303 log10Nlog10N = 0.4343 logeNThe value of e = 2.718281828459, but is often written in short as e = 2.718. Also, the above formulas help in the interconversion of a logarithmic function results in the inverse of the function. The differentiation of ln x is equal to 1/x. (d/dx .ln x = 1//x). Also, the antiderivative of 1/x gives back the ln function. What Is the Range of Logarithmic function is from negative infinity to positive infinity. What Is the Domain of Logarithmic Functions? The logarithmic Functions? The logarithmic Functions? The following formulas are helpful to work and solve the log functions.log ab = $\log a + \log a +$ huge scientific calculations can be easily simplified and calculated using log functions. The logarithmic functions help in transforming the product and division of numbers into sum and difference of numbers. A step by step tutorial, with detailed solutions, on how to find the domain of real valued logarithmic functions is presented. Problems matched to the exercises with solutions at the bottom of the page are also presented. also a Step by Step Calculator to Find Domain of a Function (f \) defined by an expression with variable \(x \), the implied domain of \(f \) is the set of all real numbers variable \(x \) can take such that the expression defining the function is real. The domain of Logarithmic Functions with Solutions Example 1 \(f(x) \) can take real values if the argument of \(\log 3(x - 1) \) which is \(x - 1 \) is positive. Hence the condition on the argument \(x - 1 > 0 \) Solve the above inequality for \(x \) to obtain the domain of function \(f \) defined by \[f(x) = \log_2(x^2 + 5) \] Solution to Example 2. 2 The argument of \(\log_2(x^2 + 5)\) which is \(x^2 + 5\) is always greater than zero and therefore positive. Hence the domain of function \(f\) defined by: \[f(x) = \ln(3 + x^4)\] Example 3 Find the domain of function \(f\) defined by: \[f(x) = \ln(3 + x^4)\] = $\ln(9 - x^2)$ | Solution to Example 3 For $\ln(9 - x^2)$ | The domain of the inequality $\ln(9 - x^2)$ | Which is $\ln(9 - x^2)$ | domain of function \(f \) defined by: \[f(x) = \log_4(16 - x^2) \] Example 4 Find the domain of function is the set of all values of \(x \) such that \(|x - 3| \) is positive for all real values except for \(x = 3 \) which makes it zero. Hence the domain of the given function is the set of all real values except 3, which can be written in interval form as follows (\(\x\\ta\)) or \(\x > 3\) Matched Problem 4 Find the domain of function \(\frac{f}{x} = \ln|-x - 6|\) Example 5 Find the domain of function \(\frac{f}{x} \) defined by: $\{f(x) = \ln(2x^2 - 3x - 5) \}$ Solution to Example 5 The domain of this function is the set of all values of $\{x - 3x - 5 > 0 \}$. We need to solve the inequality $\{2x^2 - 3x - 5 > 0 \}$. We need to solve the above inequality to obtain the solution set as follows: $\{x \in x - 5 = 0 \}$. -1 \) or \(x > \frac{5}{2} \) The domain is given in inequality form as \(x \lt -1 \) or \(x > \frac{5}{2} \), \(+\infty \)) Matched Problems (-\(\infty \), -1 \\ (\infty \), 3) (-\(\infty \), \(\infty \) input values) for which the logarithmic function is defined. Recall that the exponential function is defined as [latex]y={b}^{x}[/latex] for any real number xand constant [latex]be 1[/latex], where The domain of yis [latex]y={b}^{x}[/latex] for any real number xand constant [latex]be 1[/latex]. The range of yis [latex]y={b}^{x}[/latex] for any real number xand constant [latex]be 1[/latex]. that the logarithmic function [latex]y={\mathrm{log}}_{b}\eft(x\right)[/latex] is the inverse of the exponential function [latex]y={\mathrm{log}}_{b}^{x}[/latex]. So, as inverse functions: The domain of [latex]y={\mathrm{log}}_{\mathrm{log}}_{\mathrm{log}}}_{\mathrm{log}}_{\mathrm{log}}_{\mathrm{log}}}_{\mathrm{log}}_{\mathrm{log}}_{\mathrm{log}}_{\mathrm{log}}}_{\mathrm{log}}_{\mathrm{log}}}_{\mathrm{log}}_{\mathrm{log}}}_{\mathrm{log}}_{\mathrm{log}}}_{\mathrm{log}}_{\mathrm{log}}_{\mathrm{log}}}_{\mathrm{log}}_{\mathrm{log}}}_{\mathrm{log}}_{\mathrm{log}}_{\mathrm{log}}}_{\mathrm{log}}_{\mathrm{log}}_{\mathrm{log}}}_{\mathrm{log}}_{\mathrm{log}}}_{\mathrm{log}}_{\mathrm{log}}_{\mathrm{log}}}_{\mathrm{log}_{\mathrm{log}}_{\mathrm{log}}}_{\mathrm{log}_{\mathrm{log}}_{\mathrm{log}}_{\mathrm{log}_{\mathrm{log}}_{\mathrm{log}}_{\mathrm{log}_{\mathrm{log}}_{\mathrm{log}_{\mathrm{log}}_{\mathrm{log}_{\mathrm{log}}_{\mathrm{log}_{\mathrm{log}}_{\mathrm{log}_{\mathrm{l {\mathrm{log}}_{b}\left(x\right)[/latex] is the domain of [latex]y={b}^{x}[/latex] behave similarly to those of other functions. Just as with other parent functions, we can apply the four types of transformationsshifts, stretches, compressions, and reflections to the parent function without loss of shape. In Graphs of Exponential Functions we saw that certain transformations to the parent function [latex]y={b}^{x}[/latex]. Similarly, applying transformations to the parent function [latex]y={\mathrm{log}}} {b}\left(x\right)[/latex] can change the domain. When finding the domain of a logarithmic function, therefore, it is important to remember that the domain consists only of positive real numbers. That is, the argument of the logarithmic function must be greater than zero. For example, consider [latex]f\left(x\right)={\mathrm{log}} {4}\left(2x - 3\right)[/latex]. This function is defined for any values of xsuch that the argument, in this case [latex]2x - 3[/latex], is greater than zero. To find the domain, we set up an inequality and solve forx:[latex]\begin{cases}2x - 3>0\hfill \\ x>3\hfill \\ x>1.5\hfill \\ [latex]f\left(x\right)={\mathrm{log}} {4}\left(2x - 3\right)[/latex] is [latex]\left(1.5,\infty \right)[/latex]. How To: Given a logarithmic function, identify the domain in interval notation. What is the domain of [latex]f\left(x\right)= {\mathrm{log}} {2}\left(x+3\right)[/latex]? The logarithmic function is defined only when the input is positive, so this function is defined when [latex]x+3>0[/latex]. Solving this inequality, [latex] \text{Subtract 3}.\hfill \x>-3\hfill \x>-3\hf [latex]f\left(x\right)={\mathrm{log}} {2}\left(x+3\right)[/latex]? Solution What is the domain of [latex]f\left(x\right)={\mathrm{log}} {5}\left(x+3\right)[/latex]? The logarithmic function is defined only when the input is positive, so this function is defined when [latex]5 - 2x>0[/latex]. Solving this inequality,[latex]\begin{cases}5 - 2x>0\hfill \\ -2x>-5\hfill \\ xThe domain of [latex]f\left(x\right)=\mathrm{log}\left(5 - 2x\right)[/latex] is [latex]\left(-\infty,\frac{5}{2}\right)[/latex]. What is the domain of [latex]f\left(x\right)=\mathrm{log}\left(x - 5\right)+2[/latex]?Solution Please ensure that your password is at least 8 characters and contains each of the following: a number a letter a special character: @\$#!%*?&\mathrm{asymptotes} See All AI explanations are generated using OpenAI technology. AI generated content may present inaccurate or offensive content that does not represent Symbolab's view. Function is a function domain? The domain of a function is the set of all input values for which the function is defined. It is the set of all values that can be inserted into the function and produce a valid output. How do I find domain of function, consider any restrictions on the input values that would make the function undefined, including dividing by zero, taking the square root of a negative number, or taking the logarithm of a negative number. Remove these values from the set of all possible input values to find the domain of the function would be all real numbers except for x = 0 (x0), as division by zero is undefined. Why users love our Functions Domain Calculator Languages EN, ES, PT & more Practice Improve your math skills Step by step In depth solution steps Rating 4.6 based on 20924 reviews function-domain-calculator en Related Symbolab blog posts AI may present inaccurate or offensive content that does not represent Symbolab's views. View Full Notebook

What is the domain of the function below $f(x) = \log(x-4) + 4$. Find the domain of the function $f(x) = \log 4 (4-3x)$. What is the domain of the function below $f(x) = \log(x-4) + 4$ a. $(-\infty 4)$ b. 4∞ c. (-4∞) d. (4-3x) d. (4-3x) b. (4-3x) d. (4-3x) b. (4-3x) b. (4-3x) d. (4-3x) b. (4-3x) d. (4-3x) b. (4-3x) d. (4-3x) b. (4-3x) d. (4-3x) d.