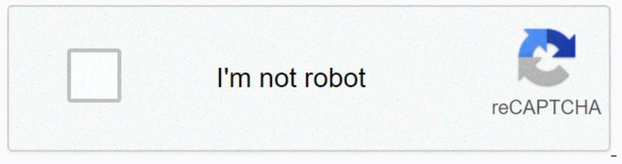

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Change of Base Formula A formula that lets you rewrite a logarithm in terms of logs written with a different basis. It is especially useful when using a calculator to evaluate a log to any base other than 10 or e. Assume that x, a and b are all positive. Also assume that a ≠ 1, b ≠ 1. Change of base formula: Example 1: Example 2: (note that) Example 3: Also see Logarithm rules, general logarithm, natural logarithm Basic RulesExpandingCondensingTrick Q's There is one other log rule, but it is more of a formula than a rule. You may have noticed that your calculator only has keys to the values for the general (that is, the base-10) log and the natural (that is, the base-e) log. There are no keys for any other bases. Some students try to get it by evaluating something like log3(6) with the following keystrokes: [LOG] [3] [6] [ ) Of course they then get the wrong answer, because the above actually calculates (usually) the value of log10(3) × 6. That's not what was meant. In order to evaluate a non-standard-base log, you must use the Change-of-Base formula: What this rule says, in practical terms, is that you can evaluate a non-standard-base log by converting it to the fraction of the form (standard-base log of the argument) divided by (the same standard-base log of the non-standard-base). I keep it straight by looking at the position of things. In the original log, the argument is above the base (since the base is subscripted), so I leave things like that when I split them: Here's a simple example of this formula's application: The argument is 6 and the base is 3. I'd plug them into the change-of-base formula, using the natural log as my new-base log: Then the answer, rounded up to three decimal places, is: I would have gotten the same final answer if I had used the general log instead of the natural log, although the numerator and denominator of the intermediate fraction would have been different than I displayed above : As you can see, it doesn't matter what standard-base log you're using, as long as you use the same base for both the numerator and the denominator. While I've shown the numerator and denominator values in the above calculations, it's actually best to do the calculations entirely within your calculator. You don't have to bother writing out that intermediate step. In fact, to reduce finishing errors, it's best to try to do all the steps for the section and evaluation in your calculator, all at once. In the above calculation, rather than writing down and dividing the first eight or so decimal places in the values of ln(6) and ln(3), you will only write and divide ln(6) ÷ into your calculator. You can get some simple (but fairly useless) exercises on this topic. Don't beg them; they are easy points, as long as you keep the change-of-base formula in your head. For example: I can't think of any particular reason why a base-5 log might be useful, so I think the only point of these problems is to give your practice using change-of-base. Okay; I'll plug-in-n-chug: Why on earth do I want to do it (in real life), since I can already evaluate the natural log in my calculator? I wouldn't; this exercise is for practice only (and easy marks). I'll plug-n-chug into the change-of-base formula: Since getting an actual decimal value isn't the point in exercises of this kind (the conversion using change-of-base is the point), just leave the answer as a logarithmic fraction. While the above exercises were quite pointless, using the change-of-base formula can be very useful for finding plot points when charting non-standard logs, especially when you're supposed to be using a chart calculator. If I worked manually, I would use the definition of logs to note: since 2-2 = 1/4, then log2 (1/4) = -2 since 2-1 = 1/2, then log2 (1/2) = –1 since 20 = 1, then log2(1) = 0 since 21 = 2, then log2(2) = 1 since 22 = 4, then log2(4) = 2 since 23 = 8, then log2(8) = 3 since 24 = 16, then log2(16) = 4 And then I would pull my graph manually. (Why did I choose these specific x values? Because anything smaller would have been too small to chart by hand, and anything bigger would have led to a ridiculously wide chart. I chose the values that fit my needs.) But in this case, I'm supposed to do the chart with my chart computer. How can I do this? (Or what if I just want to use my chart calculator's TABLE feature to find some pretty neat plot points?) I don't have a log-base-two button. However, I can enter the given function in my calculator using the change-of-base formula to convert the original function to something stated in terms of a base that my calculator can understand. To rotate a coin, I choose the natural log: (I could have used the general log as well. In that case, the function would have been y1 = log(x)/log(2).) In my chart calculator, after adjusting the view window to show useful parts of the plane, the graph would look something like this: By the way, you can make sure that the chart contains the expected neat points (that is, the points I would have calculated manually, as shown above) to verify that the image displays the correct chart: URL: Page 1Page 2Page 3Page 4 If you see this message, it means we struggle to load external resources on our website. If you are behind a web filter, please make sure that the domains are *.kastatic.org and *.kasandbox.org Is. I try to change the formula of cell B based on the value of cell A. If the value is in A 2, I want the formula to be e^(-b*x) and otherwise it should be x^2. I tried this with an IF statement: =IF (G2=2; (G2=2; But it doesn't work. Examples also only use IF statements to display text. So I wonder if what I'd like to do is even be possible. Percentage change is a simple mathematical concept that represents the degree of change over time. It is used in finance for many purposes, often to represent the price change of a security. Percentage change can be applied to any amount you measure over time. Let's test you track the quoted price of a security. If the price has increased, use the formula [(New Price - Old Price)/Old Price] and then multiply that number by 100. If the price has decreased, use the formula [(Old Price - New Price)/Old Price] and multiply that number by 100. This formula is used to track the prices of individual securities and large market inflections, as well as to compare the values of different currencies. Balance sheets with comparative financial statements will generally include the prices of specific assets at different points on time, along with the percentage of changes over the associated periods of time. Percentage change represents some change over time; it is used in finance for many purposes, especially to indicate the price change of a security. Percentage change can be applied to any amount that can be measured over time. Positive values indicate a percentage increase while negative values indicate percentage decline. To calculate a percentage increase, first work out the difference (increase) between the two numbers you compare: Increase = New Number - Original Number Next, split the increase by the original number and multiply the answer by 100: % increase = Increase ÷ Original Number × 100. If the answer is a negative number, that means the percentage change is a decline. The percentage change formula can track the prices of individual securities and large market indexes. It can also be sued to compare the values of different currencies. First, work out the difference (decrease) between the two numbers you compare. Decrease = Original Number - New Number Next, split the decline by the original number and multiply the answer by 100. % Decreased = ÷ Original Number × 100 If the answer is a negative number, this is a percentage increase. If you want to calculate the percentage increase or decrease of multiple numbers, it is best to use the formula for calculating percentage increase. Positive values indicate a percentage increase while negative values indicate the percentage decline. As an example of calculating percentage change in a real-life scenario, consider Bob, who worked a total of 35 hours in January. February, he worked 45.5 hours, by what percentage did Bob's working hours increase in February? To resolve this calculation, first calculate the difference in hours between the new and old numbers. 45.5 - 35 hours = 10.5 hours more hours by Bob in February. To work out the increase as a percentage, divide the increase by the original (January) number: 10.5 ÷ 35 = 0.3 Finally, to get the percentage we multiply the answer by 100. This simply means moving the decimal place two columns to the right. 0.3 × 100 = 30 So Bob worked 30 percent more hours in February than he did in January. You use this procedure to create an independent formula. You can copy an existing formula if necessary. Note Dependent formulas are automatically created when you create a recipe in which you plan to assign a dependent formula (see Formula Command). Dependent formulas are characterized by the data of the recipe to which they belong, that is, using the identifiers and descriptions of the recipe and stage. End of note. In customizing specification management in the IMG activity Specifying Specification Types, you specified at least one specification type of the specification category FORMULA and imported this specification type to customize for Recipe Management in the IMG activity Define and assign values to environment parameters in the environment parameter FRML_DEF_FRMLCAT. If you want to create the formula with a change number, you've defined a change master record in which the valid from date you want to use and the object types PVS Variant and Fabric are active. You define the change master record, which is identified by a change number, in engineering change management. If necessary, you defined the following default values in customizing for recipe management in the IMG activity Define and assign values to environment parameters : In the environment parameter FRML_DEF_AUTHGRP you entered a default value for the authorization group. In the environment parameter FRML_DEF_BASEQUAN, you have entered a default value for the base quantity. In customizing for recipe management in the IMG activity Define and assign values to Environment parameters, you specified the following for copying formulas: In the environment parameter FRML_COPY_TEMPLATE, you entered the inheritance template that determines the identifiers and properties to be copied. If you defined your own formula views, in the environment parameter, FRML_CUSTOMER_COPY_MODULE entered the function module used to copy these views. Specifies the change number with which to create the formula, if necessary. Download the formula you want to copy. Copy this formula from the hit list to the navigation area below Formula using drag and drop. In the context menu of the formula, select Copy in the navigation area. The Create Recipe Formula (with template) dialog box appears. Type the required data and select with the quick Create. The formula has been copied and is displayed in the application area. Enter more data on the tab pages and in the property tree if needed save the formula. The first change state of the formula was created. Page 2 2