

Work Assignment, Friday, 20th March 2020

Please complete the following tasks conscientiously and reliably. For some of the exercises you'll have video tutorials.

However, in some cases you'll receive handwritten solutions. You can find everything you need to know on the following website: www.aleph-null.li

Today's work assignment consists of the following tasks.

Task 1:

Watch the videos about the derivation of the laws of logarithms. Please take notes.

Task 2:

Solve the following exercises.

Example 13

Use the properties of logarithms to write each logarithmic expression as a sum, difference, and/or constant multiple of simple logarithms (i.e. logarithms without sums, products, quotients or exponents).

- a) $\log_2(8x)$ b) $\ln\left(\frac{3}{y}\right)$ c) $\log(\sqrt{7})$
d) $\log_b\left(\frac{x^3}{y^2}\right)$ e) $\ln(5e^2)$ f) $\log\left(\frac{m+n}{n}\right)$

Example 14

Write each expression as the logarithm of a single quantity.

- a) $\log 6 + \log x$ b) $\log_2 5 + 2 \log_2 3$
c) $\ln y - \ln 4$ d) $\log_b 12 - \frac{1}{2} \log_b 9$
e) $\log_3 M + \log_3 N - 2 \log_3 P$ f) $\log_2 80 - \log_2 5$

If you can't do it, watch the first two exercises in the video tutorial, then stop the video and try again.

Once you have solved all the exercises watch the video tutorials 1 and 2 and don't forget to take notes.

Task 3:

Why is the following law so useful? $\log_a(b^c) = c \cdot \log_a(b)$

Watch the “Introductory Video” about the importance of the aforementioned rule and the change of base theorem.

Solve the following equations and use the stated “log-key” or in other words use the stated log-function on your calculator.

a) $3^x = 17$ with $\ln(\quad)$

b) $5^x = 22$ with $\log(\quad)$

c) $\left(\frac{2}{5}\right)^x = \frac{1}{8}$ with $\log_3(\quad)$

After you have done these exercises, watch the video tutorial 3 and take notes.

What do we take away from the last video?

From now on I am going to use the $\ln(\quad)$ -key to solve exercises of this type.

Best of luck – have fun.

Sven Huber