Questions on lesson 2.3's homework? It will be turned in today.

$$\sqrt[n]{x^m} = x^{m/n} \qquad \sqrt[3]{x^1} = x^{1/3}$$

m3_mod2_logfun_seh_110514 (4).pdf - Adobe Acrobat Pro DC

File Edit View Window Help

Home Tools **Document** 24 / 61 Sign In

© 2014 www.flick

Write the following with an exponent. Simplify when possible.

1. $\sqrt[5]{x}$ 2. $\sqrt[7]{s^2}$ 3. $\sqrt[3]{w^8}$

$x^{1/5}$ $s^{2/7}$

4. $\sqrt[3]{8r^6}$ 5. $\sqrt[5]{125m^5}$ 6. $\sqrt[3]{(8x)^2}$ 7. $\sqrt[3]{9b^8}$ 8. $\sqrt[2]{75x^6}$

$8^{1/3}\cdot r^{6/3} = 2r^2$

$(8x)^{2/3} = 8^{2/3}x^{2/3} = 4x^{2/3}$

$75^{1/2}x^{6/2}$ $8.7x^3$

Rewrite with a fractional exponent. Then find the answer.

9. $\log_3\sqrt[5]{3} =$ 10. $\log_2\sqrt[3]{4} =$ 11. $\log_7\sqrt[5]{343} =$ 12. $\log_5\sqrt[5]{3125} =$

$\log_3 3^{1/5}$ $\frac{1}{5}\cdot 1 = \frac{1}{5}$

$\log_2 2^{2/3}$ $\frac{2}{3}\cdot 1 = \frac{2}{3}$

$\log_7 343^{1/5} = \frac{1}{5}\cdot\log_7 343 = \frac{1}{5}\cdot 3 = \frac{3}{5}$

$\log_5 3125^{1/5} = \frac{1}{5}\log_5 3125 = \frac{1}{5}\cdot 5 = 1$

Set

Topic: Expanding logarithmic expressions

Use the properties of logarithms to expand the expression as a sum or difference, and/or constant multiple of logarithms. (Assume all variables are positive.)

$\log_2\sqrt[3]{4}$

$\log_2 4^{1/3}$

$\frac{1}{3}\cdot 2 = \frac{2}{3}$

m3_mod2_logfun_seh_110514 (4).pdf - Adobe Acrobat Pro DC

File Edit View Window Help

Home Tools Document 24 / 61 Click to enable Mobile Link in Recent Files Sign In

Use the properties of logarithms to expand the expression as a sum or difference, and/or constant multiple of logarithms. (Assume all variables are positive.)

13. $log_5 7x$ 14. $log_5 10a$ 15. $log_5 \frac{5}{b}$ 16. $log_5 \frac{d}{4}$

$\log_5 7 + \log_5 x$

$\log_5 5 - \log_5 b$

Secondary Mathematics III

25

Name Logarithmic Functions 2.3

17. $log_6 x^3$ =

$3 \cdot \log_6 x$

18. $log_5 9x^2$ 19. $log_2 (7x)^4$ 20. $log_3 \sqrt{w}$

103%

18 $\log_5 9x^2 =$

$\log_5 9 + \log_5 x^2$

$\log_5 9 + 2\log_5 x$

19 $\log_2 (7x)^4$

$4\log_2 7x$

$4(\log_2 7 + \log_2 x)$

$4\log_2 7 + 4\log_2 x$

20 $\log_3 w^{1/2}$

$\frac{1}{2}\log_3 w$

17. $log_6 x^3$

18. $log_5 9x^2$

19. $log_2 (7x)^4$

20. $log_3 \sqrt{w}$

21. $log_5 \frac{xyz}{w}$

22. $log_5 \frac{9\sqrt{x}}{y^3}$

23. $log_2 \left(\frac{x^2-4}{x^3}\right)$

24. $log_2 \left(\frac{x^2}{y^5 w^3}\right)$

Go

Topic: Writing expressions in exponential form and logarithmic form

Convert to logarithmic form.

25. $2^9 = 512$

26. $10^{-2} = 0.01$

27. $\left(\frac{2}{3}\right)^{-1} = \frac{3}{2}$

Write in exponential form.

28. $log_4 2 = \frac{1}{2}$

29. $log_{\text{[illegible]}} 3 = -1$

30. $log_{\text{[illegible]}} \frac{8}{\text{[illegible]}} = 3$

2.4 Log-Arithm-etic

A Practice Understanding Task

Abe and Mary are feeling good about their log rules and bragging about mathematical prowess to all their friends when this exchange occurs:

Stephen: I guess you think you're pretty smart because you figured out some log rules, but I want to know what they're good for.

Abe: Well, we've seen a lot of times when equivalent expressions are handy. Sometimes when you write an expression with a variable in it in a different way it means something different.

1. What are some examples from your previous experience where equivalent expressions were useful?

baking, quadratics, graphing

Mary: I was thinking about the Log Logic task where we were trying to estimate and order certain log values. I was wondering if we could use our log rules to take values we know and use them to find values that we don't know.

For instance: Let's say you want to calculate $\log_2 6$. If you know what $\log_2 2$ and $\log_2 3$ are then you can use the product rule and say:

$$\log_2(2 \cdot 3) = \log_2 2 + \log_2 3$$

Stephen: That's great. Everyone knows that $\log_2 2 = 1$, but what is $\log_2 3$?

Abe: Oh, I saw this somewhere. Uh, $\log_2 3 = 1.585$. So Mary's idea really works. You say:

$$\log_2(2 \cdot 3) = \log_2 2 + \log_2 3$$

$$= 1 + 1.585$$

$$= 2.585$$

$$\log_2 6 = 2.585$$

2. Based on what you know about logarithms, explain why 2.585 is a reasonable value for $\log_2 6$.

Math & rules are correct. :)

Stephen: Oh, oh! I've got one. I can figure out $\log_2 5$ like this:

$$\log_2(2 + 3) = \log_2 2 + \log_2 3$$

$$\log_2 5 \quad = 1 + 1.585$$

$$2.32 \quad \cancel{=} \; 2.585$$

$$\log_2 5 = 2.585$$

3. Can Stephen and Mary both be correct? Explain who's right, who's wrong (if anyone) and why.

No, Mary's correct.

Now you can try applying the log rules yourself. Use the values that are given and the ones that yo know by definition like $\log_2 2 = 1$ to figure out each of the following values. Explain what you did in the space below each question.

$\log_2 3 = 1.585$ $\quad$ $\log_2 5 = 2.322$ $\quad$ $\log_2 7 = 2.807$

The three rules, written for any base $b > 1$ are:

Log of a Product Rule: $\log_b(xy) = \log_b x + \log_b y$

Log of a Quotient Rule: $\log_b\left(\frac{x}{y}\right) = \log_b x - \log_b y$

Log of a Power Rule: $\log_b(x^k) = k \log_b x$

4. $\log_2 9 =$ $\log_2(3)^2 = 2 \cdot \log_2 3 = 2 \cdot 1.585 = \boxed{3.17}$

5. $\log_2 10 =$ $\log_2(5 \cdot 2) = \log_2 5 + \log_2 2 = 2.322 + 1 = \boxed{3.322}$

6. $\log_2 12 =$ ______________________

7. $\log_2 \left(\frac{7}{3}\right) =$ ______________________

8. $\log_2\left(\frac{30}{7}\right) =$ $\log_2 30 - \log_2 7 = \log_2(3\cdot2\cdot5) - \log_2 7$

$\log_2 3 + \log_2 2 + \log_2 5 - \log_2 7 = 1.585 + 1 + 2.322 -$
$2.807 =$ $\boxed{2.1}$

9. $\log_2 486 =$ $\log_2(2\cdot3^5) = \log_2 2 + 5\log_2 3 =$
$1 + 5(1.585) =$
$\boxed{8.925}$

$486 = 2\cdot3\cdot3\cdot3\cdot3\cdot3 = 2\cdot3^5$

10. Given the work that you have just done, what other values would you need to figure out the value of the base 2 log for any number?

Mar 28-11:31 AM

Sometimes thinking about equivalent expressions with logarithms can get tricky. Consider each of the following expressions and decide if they are always true for the numbers in the domain of the logarithmic function, sometimes true, or never true. Explain your answers. If you answer "sometimes true" then describe the conditions that must be in place to make the statement true.

11. $\log_4 5 - \log_4 x = \log_4 \left(\frac{5}{x}\right)$ ______________________________

12. $\log 3 - \log x - \log x = \log \left(\frac{3}{x^2}\right)$ ______________________________

13. $\log x - \log 5 = \frac{\log x}{\log 5}$ ______________________________

14. $5 \log x = \log x^5$ ______________________________

15. $2\log x + \log 5 = \log(x^2 + 5)$ ________________________________

16. $\frac{1}{2}\log x = \log\sqrt{x}$ ________________________________

17. $\log(x-5) = \frac{\log x}{\log 5}$ ________________________________

Homework

Finish 2.4 "Ready, Set, Go"

HW: 1-22 on pg30-1