

Log Laws II (8.3) p400 day 4

music quiz

Take up quiz 11

Quiz 11C

1. Solve  $5^{x+2} = 25^{x-1}$

2. If you invested \$10,000 in a bond paying 5% per year compounded annually, how much money would you have after 10 years?

3. Evaluate  $\log_2 64$

4. Express in log form  $4^x = 1024$

5. Express in exponential form  $\log_5 125 = 3$

6. How much more powerful is an earthquake that measured 7.1 on the Richter scale compared to a 6.0?

7. Liquid is evaporating continuously from a dish at a rate of 0.05% of the liquid that is left. How much liquid is left after 100 days if you start with 100 ml?

8. The number of bacteria on a Petri dish is presently 20,000. If the doubling time is 40 minutes, how many were on the dish 14 minutes ago?

9. Write as a single function and then evaluate  $\sin 22^\circ \cos 67^\circ + \cos 22^\circ \sin 67^\circ$

10. Make an equation in polynomial form for this graph.

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14. Abdi incorrectly states, "A noise of 20 dB is twice as loud as a noise of 10 dB." Explain the error in Abdi's reasoning.

10 dB  $10^1$   
20 dB  $10^2$   
50 dB  $10^5$

7. Decide whether each equation is true or false. Justify your answer.

a)  $\frac{\log x}{\log y} = \log_x x - \log_y y$

b) If  $\log 3 = P$  and  $\log 5 = Q$ , express  $\log 15$  in terms of  $P$  and  $Q$ .

c) For each of the following, write the value of the expression.

a)  $\log \frac{3}{5}$

b)  $\frac{\log x}{2} - 2 \log y$

c)  $\log_5 x - \frac{1}{5} (\log_5 x + 2 \log_5 y)$

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ex1: Evaluate  $\log_2 32^2$  and  $2 \log_2 32$

$\log_2 32^2 = \log_2 (2^5)^2 = \log_2 2^{10} = 10$

$2 \log_2 32 = 2 \cdot 5 = 10$

The third Log Law:  $\log A^n = n \log A$

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ex2: Evaluate  $\log_2 8^{25}$ ,  $\log_3 \sqrt[3]{9}$ , and  $\log_{27} 3^5$

$\log_2 8^{25} = 25 \cdot \log_2 8 = 25 \cdot 3 = 75$

$\log_3 \sqrt[3]{9} = \log_3 9^{\frac{1}{3}} = \frac{1}{3} \log_3 9 = \frac{1}{3} (2) = \frac{2}{3}$

$\log_{27} 3^5 = 5 \log_{27} 3 = 5 \left( \frac{1}{3} \right) = \frac{5}{3}$

zbc

b)  $3 \log_5 10 - \frac{1}{2} \log_5 64$

$= \log_5 10^3 - \log_5 64^{\frac{1}{2}}$

$= \log_5 \frac{1000}{8}$

$= \log_5 125$

$= 3$

$\log_3 (27\sqrt{3})$

$= \log_3 (3^3 \cdot 3^{\frac{1}{2}})$

$= \log_3 3^{3.5}$

$= 3.5$

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ex3: If  $\log_2 5 = a$ , express  $\log_2 40$  in terms of  $a$ .

$\log_2 40 = \log_2 (5 \cdot 8) = \log_2 5 + \log_2 8 = a + 3$

ab

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ex4: Evaluate  $\log_4 6 + \log_4 \frac{64}{3} - \log_4 8$ 

$$= \log_4 \left( \frac{6 \cdot \frac{64}{3}}{8} \right)$$

$$= \log_4 16$$

$$\boxed{= 2}$$

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ex5: Write as a single logarithm

$$\log A - 3 \log B + 5 \log \sqrt[3]{C}$$

$$= \log A - \log B^3 + \log(C^{\frac{5}{3}})$$

$$= \log A - \log B^3 + \log C$$

$$\boxed{= \log \left( \frac{AC}{B^3} \right)}$$

$$\log a^2 - 5 \log a$$

$$= \log a^2 - \log a^5$$

$$= \log \left( \frac{a^2}{a^5} \right)$$

$$\boxed{= \log \left( \frac{1}{a^3} \right)}$$

$$\log a^{-3} \rightarrow -3 \log a$$

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ex6: Simplify  $\ln x^2 + \ln x - \frac{5 \ln x}{2}$ 

$$\ln x = \log_e x$$

$$= \ln x^2 + \ln x - \ln x^{\frac{5}{2}}$$

$$= \ln \left( \frac{x^2 \cdot x}{x^{\frac{5}{2}}} \right)$$

$$= \ln \left( \frac{x^3}{x^{\frac{5}{2}}} \right)$$

$$= \ln x^{0.5}$$

$$\boxed{= \frac{1}{2} \ln x}$$

10a, 11a

$$\begin{array}{l} \ln \\ \ln \end{array}$$

$$11a) \log_2(x^2 - 25) - \log_2(3x - 15)$$

$$= \log_2 \left( \frac{x^2 - 25}{3x - 15} \right)$$

$$= \log_2 \left( \frac{(x+5)(x-5)}{3(x-5)} \right)$$

$$= \log_2 \left( \frac{x+5}{3} \right)$$

$$3x - 15 > 0$$

$$3x > 15$$

$$\boxed{x > 5}$$

$$x^2 - 25 > 0$$

$$x^2 > 25$$

$$\boxed{x > 5 \text{ or } x < -5}$$

## Log Laws II (8.3)

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hw: p400#10b, 11b, 12c, 16

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## Assignment 5

make some food

write up 1/2 page - 1 page

how math from 621B was used in making the food  
be specific, use examples

show me math

bring enough for 6 people

due Monday Dec 16

food allergies? Halal?