Happy Thursday, January 12th!

Homework on desk!!

Do Now:

Which of the functions below represents exponential growth? Which represents exponential decay?

$3^x$ $f(x)=x^3$ $f(x)=x^2$

$$f(x)=3\left(\frac{1}{2}\right)^x$$

Exp Decay

$\frac{1}{2}<1$

$$f(x)=5\left(\frac{7}{3}\right)^x$$

Exp Growth

$\frac{7}{3}>1$

Jan 7-6:38 PM

Homework (Log Foldable) Questions?

$\log_{\frac{7}{4}} x = y$

$\left(\frac{7}{4}\right)^y = x$

$\log_v u = 4$

$v^4 = u$

$\log_y x = -8$

$y^{-8} = x$

Jan 12-9:57 AM

$\log_{343} 7$ $\boxed{\frac{1}{3}}$ $7^3 = 343$

$\sqrt[3]{343} = 7$

If # gets smaller then exp = fraction.

$4^{\boxed{3}} = 64$

$\log_{64} 4 = \frac{1}{3}$

Jan 12-11:27 AM

$\log_9 3 = \frac{1}{2}$

$3^2 = 9$

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$\log_4 \frac{1}{16}$

$4^{-2} = \frac{1}{16}$

* Negative exp. make fractions

$\frac{1}{4^2}$

Jan 12-11:31 AM

Jan 12-10:31 AM

Today's Agenda:

- Log Properties (Group Work)

-2 Examples from homework

Materials Needed:

- Pen/pencil, Calculator, Logs Investigation worksheet

Jan 10-7:30 AM

**Part I: Evaluate these expressions using your understanding of logs:**

1) $\log_2(8)+\log_2(4)=$ 5 which is the same as... $\log_2(32)$

2) $\log_3(9)+\log_3(81)=$ 6 which is the same as... $\log_3(729)$

3) $\log_3\left(\frac{1}{9}\right)+\log_3(81)=$ 2 which is the same as... $\log_3(9)$

4) $\log_5(5)+\log_5(1)=$ 1 which is the same as... $\log_5(5)$

$\log_2(\ )=5$ $\quad 2^5=$

5) What pattern seems to hold? Write a rule:

$6^2=36$

$\log_b X+\log_b Y=\log_b(XY)$

$\log_6 12+\log_6 3=\log_6 36=2$

Jan 12-10:00 AM

**Part II: Evaluate these expressions using your understanding of logs:**

9) $\log_5 625 - \log_5 5 =$ 3 (4 − 1)

10) $\log_6 36 - \log_6 6 =$ 1 (2 − 1)

11) $\log_3 9 - \log_3 1 =$ 2 (2 − 0)

12) $\log_2 16 - \log_2 32 =$ −1 (4 − 5)

Which is the same as...

$\log_5 (125)$ $5^3$

$\log_6 (6)$ 6

$\log_3 (9)$

$\log_2 (\frac{1}{2})$

13) What pattern seems to hold? Write a rule:

$$\log_b X - \log_b Y = \log_b \left(\frac{X}{Y}\right)$$

$\log_6 72 - \log_6 2 = \log_6 36 = 2$

Jan 12-10:03 AM

17) $\log_2 (4^3) =$ _____

18) $\log_3 \sqrt{9} =$ _____

19) $\log_5 (5^2) =$ _____

20) $\log_3 (3^{95}) =$ _____

Which is the same as...

_____ $\cdot \log_2 4$

_____ $\cdot \log_3 9$

_____ $\cdot \log_5 5$

_____ $\cdot \log_3 3$

21) What pattern seems to hold? Write a rule...

$$\log_b (A^c) = c \cdot \log_b A$$

$\log_3 3^{95} = 95 \log_3 3$

Jan 12-10:03 AM

## Three Rules

$$\log_b X + \log_b Y = \log_b (XY)$$

$$\log_b X - \log_b Y = \log_b \left( \frac{X}{Y} \right)$$

$$\log_b (A^c) = c \bullet \log_b A$$

Jan 12-10:04 AM

(4) $\log (3 \cdot 2^3)$

$\log 3 + \log 2^3$

(5) $\log 3 + 3 \log 2$

Jan 12-11:04 AM

Homework practice:

15 $4\log 3 - 4\log 8$

$\log 3^4 - \log 8^4$

$\log \frac{3^4}{8^4}$

Jan 12-10:06 AM

Homework: Choose 5 MORE problems on the front and 5 MORE problems on the back of the worksheet.

Exit Slip: Condense the expression into one logarithm.

$$\log_7 3 + \log_7 10 + \log_7 8$$

Jan 10-7:57 AM