Pick Up the Warm Up

HW Help

1 Divide $\dfrac{x + \frac{1}{x}}{x}$

condense to a single fraction

$\dfrac{\frac{x}{1} + \frac{1}{x}}{x} \rightarrow$

2 Convert from log to exponential form

$t = \log_5 60$

3 solve

$3.26^{x+1} = 99$

4 A. Convert the following log equaiton to exponential form.

B. Then follow the same process from problem #3 above (in other words, take the log of both sides) to isolate n. If sucessful you can outsmart your calculator!

$\log_a b$

You are now smarter than your calculator !!!

This is called the

change of base formula

$$\log_a(b) = \frac{\log(b)}{\log(a)}$$

which, in fact, can be converted to <u>any</u> base

This is called the

change of base formula

$$\log_a b = \frac{\log b}{\log a} = \frac{\log_n b}{\log_n a}$$

which, in fact, can be converted to <u>any</u> base

5 Change each expression to ones with common logs only.

$\log_8(3)$ $\log_5(x)$ $\log_n(70)$

6 Lastly, change the following log expression to one with base 5

$$\log_3 4 = \frac{\log 4}{\log 3}$$

Add to your notes

This is called the

change of base formula

$$\log_a b = \frac{\log b}{\log a} = \frac{\log_n b}{\log_n a}$$

which, in fact, can be converted to <u>any</u> base

$$1.04^x = 2$$

not helpful

convert to log form

$$x = \log_{1.04}(2)$$

helpful

$$\log 1.04^x = \log 2$$

HW Questions

Answer $\underline{103a}$

$x = -3$

$y = 5$

$z = 10$

$\boxed{6-72}$ Find a quadratic in the form $y = ax^2 + bx + c$ that passes through the three points.

$(1,5)$ $5 = a(1)^2 + b(1) + c \rightarrow \boxed{I}\ 5 = a + b + c$

$(3,19)$ $19 = a(3)^2 + b(3) + c \rightarrow \boxed{II}\ 19 = 9a + 3b + c$

$(-2,29)$ $29 = a(-2)^2 + b(-2) + c \rightarrow \boxed{III}\ 29 = 4a - 2b + c$

$\boxed{II}$ $19 = 9a + 3b + c$
$\boxed{I}$ $5 = a + b + c$
Subtract $14 = 8a + 2b$

$\boxed{III}$ $29 = 4a - 2b + c$
$\boxed{I}$ $5 = a + b + c$
Subtract $24 = 3a - 3b$

$$\text{(A)} \quad 14 = 8a + 2b \xrightarrow{3} 42 = 24a + \cancel{6b}$$

$$\text{(B)} \quad 24 = 3a - 3b \xrightarrow{2} 48 = 6a - \cancel{6b}$$

$$90 = 3a$$

so... $\underline{a = 3}$

$42 = 24(3) + 6b$

$42 = 72 + 6b$

$-30 = 6b$

so $\underline{b = -5}$

$5 = a + b + c$

$5 = 3 + (-5) + c$

$5 = -2 + c$

$\underline{c = 7}$

$$\boxed{y = 3x^2 - 5x + 7}$$

$\boxed{97}$

$\log(x) = 0$	$10^0 = x$	1
$\log(x) = 1$	$10^1 = x$	10
$\log(x) = 2$	$10^2 = x$	100

Aim

Use properties of logs to simplify log expressions

Why ?

because log equations can get more complex

$$5 \cdot \log_3(x) - \log_3(2x) = 14$$

Tape or Write into your notes

Logarithm Properties

The following definitions and properties hold true for all positive $m \neq 1$.

Definition of logs:	$\log_m(a) = n$ means $m^n = a$
Product Property:	$\log_m(a \cdot b) = \log_m(a) + \log_m(b)$
Quotient Property:	$\log_m(\frac{a}{b}) = \log_m(a) - \log_m(b)$
Power Property:	$\log_m(a^n) = n \cdot \log_m(a)$

Ch. 5

Fri

Take notes as we do

log together

a. $\log_{1/2}(4) + \log_{1/2}(2) - \log_{1/2}(5)$

$\log_{\frac{1}{2}}(4 \cdot 2) - \log_{\frac{1}{2}}(5)$

$\log_{\frac{1}{2}}(8) - \log_{\frac{1}{2}}(5) \longrightarrow \boxed{\log_{\frac{1}{2}}\left(\frac{8}{5}\right)}$

$\log_m(a \cdot b) = \log_m(a) + \log_m(b)$

$\log_m\left(\frac{a}{b}\right) = \log_m(a) - \log_m(b)$

b. $\log_2(M) + \log_3(N)$

can't

(base is not the same)

$\log_m(a \cdot b) = \log_m(a) + \log_m(b)$

c. $\log(k) + x\log(m)$

$\log(k) + \log(m^x)$

$\log(k \cdot m^x)$

$\log_m(a \cdot b) = \log_m(a) + n\log_m(b)$

d. $\frac{1}{2}\log_5 x + 2\log_5(x+1)$

$\log_5(x^{\frac{1}{2}}) + \log_5(x+1)^2$

$\log_5\left[x^{\frac{1}{2}} \cdot (x+1)^2\right]$

$\log_m(a \cdot b) = \log_m(a) + \log_m(b)$

e. $\log(4) - \log(3) + \log(\pi) + 3\log(r)$

$$\log\left(\frac{4(\pi)(r)^3}{(3)}\right)$$

$$\log\left(\frac{4}{3} r^3 \pi\right)$$

$$\log\left(\frac{4}{3} \pi r^3\right)$$

$$\log_m (a \cdot b) = \log_m (a) + \log_m (b)$$

$$\log_m \left(\tfrac{a}{b}\right) = \log_m (a) - \log_m (b)$$

f. $\log(6) + 23$ $\log(10)$

$$\log(6) + \log(10^{23})$$

$$\log\left[6 \cdot 10^{23}\right]$$

B.B.

2 person - Pass backs

1st person makes does one step. Passes paper.

2nd person does a step, passes back.

$\log r - \log t + 2\log w$

Now backwards!

expand $\log 3m^3p^2$

LCQ

Assignment

6......41b, 113, 114a, 115, 122ab, 163

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