Warm Up

1) Expand the following:

a) $\log 4x^3y^4$

$\log 4 + 3\log x + 4\log y$

b) $\log 2 \frac{x^2y}{z^3}$

$\log 2 + 2\log x + \log y - 3\log z$

2) Condense the following:

a) $\log_3 4 + 3\log_3 x$

$\log_3 4 \cdot x^3$

b) $4\log_4 2 - \log_4 5$

$\log_4 \frac{2^4}{5}$

3) Use the change of base:

a) $\log_4 7$

$\frac{\log 7}{\log 4}$

b) $\log_5 13$

*calculator trick

Homework Questions

(27) $\log_2 \sqrt{x}$

$\log_2 x^{1/2}$

$\frac{1}{2}\log_2 x$

(29) $\ln \sqrt[4]{x^3}$

$\ln x^{3/4}$

$\frac{3}{4}\ln x$

(41)

*Activity- Math Lib

* "Where would you find a prehistoric cow?" ws

$\log_3 6 + 2 \cdot \log_3 x + \frac{1}{2} \log_3 9$

$9^{1/2}$ $\sqrt{9}$

$\log_3 6 \cdot x^2 \cdot 3$

$\log_3 18x^2$

7.6 Solving Exponential and Logarithmic Equations

*What does it mean to be a solution?

*Why do extraneous solutions exist?

*What are the appropriate operations to solving exponential & logarithmic equations?

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7.6 Solving Exponential and Logarithmic Equations

Property of Equality for Exponential Equations

*If b is a positive number other than 1, then $b^x=b^y$ if and only if x=y.

Example:

If $3^x=3^5$, then x=5. If x=5, then $3^x=3^5$.

Examples:

A) $9^{2x}=27^{x-1}$

$3^{2(2x)}=3^{3(x-1)}$

$4x=3x-3$

$-3x \quad -3x$

$1x=-3$

B) $3^{-3x+1}=3^{x-9}$

$-3x+1=x-9$

$-x \quad -1 \quad -x \quad -1$

$\frac{-4x}{-4}=\frac{-10}{-4}$

$x=\frac{5}{2}$

C) $8^{2x}=8^{x+7}$

$2x=x+7$

$x=7$

D) $8^{x-1}=(1/2)^{2x-1}$

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

$-3x+3=2x-1$

$-2x \quad -3 \quad -2x \quad -1$

$-5x=-4$

$x=\frac{4}{5}$

How do I solve equations with e?

1) $e^x=1$

$\ln$

$X=\ln(1)$

$X=0$

2) $e^x+1=7$

$-1\ -1$

$\ln e^x=\ln 6$

$X=\ln(6)$

$X=1.79$

3) $(3/4)e^{3x}-8=-6$

$+8\ +8$

$\frac{4}{3}\cdot\frac{3}{4}e^{3x}=2\cdot\frac{4}{3}$

$\ln e^{3x}=\ln\frac{8}{3}$

$\frac{3x}{3}=\ln\left(\frac{8}{3}\right)\Big/3$

$x=\frac{\ln\left(\frac{8}{3}\right)}{3}$

How do I solve equations with ln?

1) $-2 + \ln 2x = 1$

$+2 \quad +2$

$e^{\ln 2x} = e^{3}$

$\frac{2x}{2} = \frac{e^{3}}{2}$

$x = \frac{e^{3}}{2}$

2) $\ln 2x + \ln 4x = 2$

$\ln 2x \cdot 4x = 2$

$e^{\ln(8x^2)} = e^{2}$

$\frac{8x^2}{8} = \frac{e^{2}}{8}$

$\sqrt{x^2} = \sqrt{\frac{e^2}{8}}$

$x = \sqrt{\frac{e^2}{8}}$

$x = .96$

*Natural Logarithms Equations Maze

Points

1 point for each addition used in an equation

2 points for each subtraction used in an equation

3 points for each multiplication used in an equation

4 points for each division used in an equation

Can you make it?

1 2 3 4 5 6 7

8 9 0

Can you make 218

using-

7.6 Solving Exponential and Logarithmic Equations

Property of Equality for Logarithmic Equations

*If b, x, and y are positive numbers with $b \neq 1$, then $\log_b x = \log_b y$ if and only if $x=y$.

Example:

If $\log_2 x = \log_2 7$, then $x=7$.

If $x=7$, then $\log_2 x = \log_2 7$.

1) $\log_7(2-x)=\log_7 5x$

$2-x=5x$

$+x \quad +x$

$\frac{2}{6}=\frac{6x}{6}$

$\frac{1}{3}=x$

2) $\frac{2\log_7(1-2x)}{2}=\frac{12}{2}$

$\log_7(1-2x)=6$

$7^6=1-2x$

$117649=1-2x$

$\frac{117648}{-2}=\frac{-2x}{-2}$

$x=-58824$

3) $\log_3 x=5$

$3^5 = x$

$x = 243$

$3^{4x}=27$

$\log_3 27 = 4x$

$\frac{3}{4}=\frac{4x}{4}$

$\frac{3}{4}=x$

$\frac{\log 27}{\log 3}$

4) $3^{4x}=27$

$3^{4x} = 3^3$

$\frac{4x}{4}=\frac{3}{4}$

$x=\frac{3}{4}$

* "If you had eight porcupines in on hand and seven porcupines in the other, what would you have?" WS

Homework:

★Page 519#3-42 multiples of 3, 55, 56b &c, 57, 58

★ WS's (finish)

Reminders

*Review packet due and Test on

Red- 18th

Blue- 22nd