Today's Plan:

Learning Target (standard): I will use properties of logarithms to rewrite expressions.

Students will: Complete practice problems over previous concepts at the boards, put up homework problems on the board and make necessary corrections to their own work, take notes over new material and complete practice problems over new concepts.

Teacher will: Provide practice problems over previous concepts, check homework problems for accuracy and provide students feedback, describe and provide examples of new concepts and assign students assessment problems over new concepts.

Assessment: Board work, homework check and homework assignment

Differentiation: Students will work at the board, go over and correct homework at their seats, actively engage in lecture over new concepts, practice new concepts with the aid of other students and the teacher and complete homework assignment.

Logarithm Practice #17-30

17) $\log_6\left(\frac{x^5}{y^6 z}\right)$

18) $\log\left(\frac{a^2}{bc}\right)^2$

19) $\log\left(xy^3z^3\right)$

20) $\log_5\left(ab^3c\right)^6$

21) $\log_3\left(xyz^3\right)$

22) $\log_3\left(\sqrt[3]{ac^{18}}\right)$

23) $12\log_2 u + 6\log_2 v$

24) $\log_9 x + \log_9 y + 4\log_9 z$

25) $15\log_8 u + 5\log_8 v$

26) $\frac{1}{3}\log_9 x + 6\log_9 z$

* 27) $\log_7 38 \approx 1.869$

28) $\log_3 2.793 \approx 0.935$

29) $\log_4 5 \approx 1.161$

30) $\log_7 50 \approx 2.010$

* Be sure to show what you put in the calculator *

Find the domain and intercepts:

$$f(x)=\log_3\left(\frac{2x+1}{x-4}\right)$$

$\frac{2x+1}{x-4}>0$

D: $\{x \mid x<-\frac{1}{2}, x>4\}$

	$(-\infty,-\frac{1}{2})$	$-\frac{1}{2}$	$(-\frac{1}{2},4)$	4	$(4,\infty)$
$2x+1$	$-$	0	$+$	$\|$	$+$
$x-4$	$-$	$\|$	$-$	0	$+$

I_x: $(-5,0)$

$0=\log_3\left(\frac{2x+1}{x-4}\right)$

$3^0=\frac{2x+1}{x-4}$

$1=\frac{2x+1}{x-4}$

$x-4=2x+1$

$-5=x$

I_y: $(0,-)$

$y=\log_3\left(\frac{1}{-4}\right)$

$3^y \neq -\frac{1}{4}$

Find the domain and intercepts:

$$f(x)=\log_{\frac{1}{2}}\left(x^2-18x+32\right)$$

$x^2-18x+32>0$

$(x-16)(x-2)>0$

D: $\{x \mid x<2, x>16\}$

	$(-\infty,2)$	2	$(2,16)$	16	$(16,\infty)$
$x-16$	$-$	$-$	$-$	0	$+$
$x-2$	$-$	0	$+$	$+$	$+$

I_x: $(9+5\sqrt{2},0),(9-5\sqrt{2},0)$

$0=\log_{\frac{1}{2}}(x^2-18x+32)$

$\left(\frac{1}{2}\right)^0=x^2-18x+32$

$1=x^2-18x+32$

$0=x^2-18x+31$

$x^2-18x+81=-31+81$

$(x-9)^2=\pm\sqrt{50}$

$x-9=5\sqrt{2},-5\sqrt{2}$

$x=9+5\sqrt{2},9-5\sqrt{2}$

I_y: $(0,-5)$

$y=\log_{\frac{1}{2}}(32)$

$\left(\frac{1}{2}\right)^y=32$

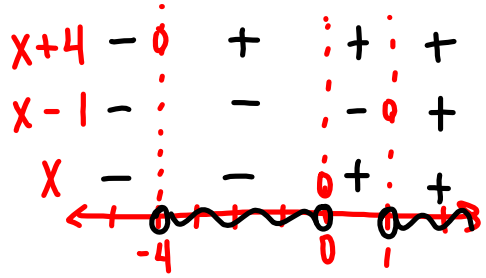
$y=-5$

Find domain and intercepts.

$$f(x)=\log_3\left(\frac{x^2+3x-4}{x}\right)$$

D: $\{x \mid -4<x<0,\ x>1\}$

$\frac{(x+4)(x-1)}{x}>0$



I_y: —

$y=\log_3\left(\frac{-4}{0}\right)$ ↑ not defined

I_x: $(-1+\sqrt{5},0),(-1-\sqrt{5},0)$

$0=\log_3\left(\frac{x^2+3x-4}{x}\right)$

$3^0=\frac{x^2+3x-4}{x}$

$x=x^2+3x-4$

$0=x^2+2x-4$

$x^2+2x+1=4+1$

$\sqrt{(x+1)^2}=\pm\sqrt{5}$

$x+1=\sqrt{5},-\sqrt{5}$

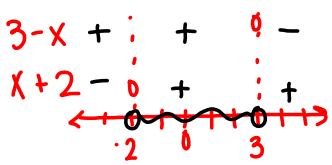
$x=-1+\sqrt{5},-1-\sqrt{5}$

Find domain and intercepts.

$$f(x)=2\ln\left(\frac{3-x}{x+2}\right)-1$$

D: $\{x \mid -2<x<3\}$

$\frac{3-x}{x+2}>0$



I_y: $(0,-.189)$

$y=2\ln\left(\frac{3}{2}\right)-1$

$y=2(.405)-1$

$y=-.189$

I_x: $\left(\frac{5\sqrt{e}-2e-3}{e-1},0\right)$

$0=2\ln\left(\frac{3-x}{x+2}\right)-1$

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

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

$e^{\frac{1}{2}}=\frac{3-x}{x+2}$

$\sqrt{e}(x+2)=3-x$

$\sqrt{e}x+2\sqrt{e}=3-x$

$\sqrt{e}x+x=3-2\sqrt{e}$

$x(\sqrt{e}+1)=3-2\sqrt{e}$

$x=\frac{3-2\sqrt{e}}{\sqrt{e}+1}\cdot\frac{\sqrt{e}-1}{\sqrt{e}-1}$

$x=\frac{3\sqrt{e}-3-2e+2\sqrt{e}}{e-1}$

$x=\frac{5\sqrt{e}-2e-3}{e-1}$

Write the expression as a sum/difference of logarithms:

$$\ln\left[\frac{x(x+2)}{(x+3)^2}\right]$$

$= \ln x(x+2) - \ln(x+3)^2$

$= \ln x + \ln(x+2) - 2\ln(x+3)$

Write the expression as a sum/difference of logarithms:

$$\ln\left(x^2\sqrt{1-x}\right)$$

$x^{\frac{m}{n}} = \sqrt[n]{x^m}$

$= \ln x^2 + \ln\sqrt{1-x}$

$= 2\ln x + \ln(1-x)^{\frac{1}{2}}$

$= 2\ln x + \frac{1}{2}\ln(1-x)$

Write the expression as a sum/difference of logarithms:

$$\ln\left[\frac{5x\sqrt{1-3x}}{(x-4)^3}\right]$$

$= \ln 5x\sqrt{1-3x} - \ln(x-4)^3$

$= \ln(5x) + \ln\sqrt{1-3x} - 3\ln(x-4)$

$= \ln 5 + \ln x + \ln(1-3x)^{\frac{1}{2}} - 3\ln(x-4)$

$= \ln 5 + \ln x + \frac{1}{2}\ln(1-3x) - 3\ln(x-4)$

Write the expression as a single logarithm:

$$3\log_5 u + 4\log_5 v$$

$= \log_5 u^3 + \log_5 v^4$

$= \log_5(u^3 v^4)$

Write the expression as a single logarithm:

$$3\log_5(x+2)+2\log_5(x-3)-4\log_5(x-1)$$

$$= \log_5(x+2)^3 + \log_5(x-3)^2 - \log_5(x-1)^4$$

$$= \log_5\left[(x+2)^3(x-3)^2\right] - \log_5(x-1)^4$$

$$= \log_5\left[\frac{(x+2)^3(x-3)^2}{(x-1)^4}\right]$$

Write the expression as a single logarithm:

$$\frac{3}{4}\log x - \frac{1}{2}\log x + 2\log x$$

$$= \frac{3}{4}\log x - \frac{2}{4}\log x + \frac{8}{4}\log x$$

$$= \frac{9}{4}\log x$$

$$= \log x^{\frac{9}{4}}$$

$$= \log \sqrt[4]{x^9}$$

Assignment:

p.330 #14-44 even

* write the problem & show ALL steps *

* QUIZ on Friday! *