Pre-Calcuclus 12 **7.4-7.6 Extra Practice** **Name:** _____

A1. Write $\log_x y = z+2$ in exponential form. $x^{z+2} = y$

A2. Write $a = b^{c+1}$ in logarithmic form. $\log_b a = c+1$

B1. Evaluate: $\log_5 \frac{1}{125}$ $= -3$

$5^{\square} = \frac{1}{125}$

B2. $\log \sqrt[3]{1000000}$ $= 2$

$10^{\square} = \sqrt[3]{1000000}$

$= \sqrt[3]{10^6}$

$= 10^{6/3} = 10^2$

B3. Evaluate: $3\log_3\left(\frac{1}{27}\right) + \frac{1}{2}\log_2 64$

$= 3(-3) + \frac{1}{2}(6) = -9 + 3 = \boxed{-6}$

B4. Solve for x: a) $\log x = -3$ b) $\log_2 16 + \log_3 \frac{1}{9} = \log_5 x$

$10^{-3} = x$

$\boxed{x = \frac{1}{1000}}$

$4 + (-2) = \log_5 x$

$2 = \log_5 x$

$x = 5^2$

$\boxed{x = 25}$

C1. Use benchmarks to estimate the value of : a) $\log_3 25$

~ 2.9

b) $\log_4 14$

~ 1.9

~~E1. Evaluate the above values exactly (round to the nearest hundredth – 2 decimal places).~~

D1. Write as a single logarithm:

a) $2\log m + \log n - 5\log p$

$= \log m^2 + \log n - \log p^5$

$= \boxed{\log \frac{m^2 n}{p^5}}$

b) $3\log a + \frac{1}{2}\log b - \frac{5}{4}\log c$

$= \log a^3 + \log b^{1/2} - \log c^{5/4}$

$= \boxed{\log \frac{a^3 b^{1/2}}{c^{5/4}} \text{ or } \log \frac{a^3\sqrt{b}}{\sqrt[4]{c^5}}}$

c) $\frac{1}{2}\log x - 2\log y - \log z$

$= \log x^{1/2} - \log y^2 - \log z$

$= \boxed{\log \frac{x^{1/2}}{y^2 z} \text{ or } \log \frac{\sqrt{x}}{y^2 z}}$

d) $2 + 4\log_3 x - \frac{1}{2}\log_3 y$

$= \log_3 9 + \log_3 x^4 - \log_3 y^{1/2}$

$= \boxed{\log_3 \frac{9x^4}{y^{1/2}} \text{ or } \log_3 \frac{9x^4}{\sqrt{y}}}$

D2. Evaluate:

a) $\log_2 24 - \log_2\left(\frac{3}{4}\right)$

$= \log_2 \frac{24}{3/4} = \log_2 24 \cdot \frac{4}{3} = \log_2 32 = \boxed{5}$

b) $3\log_4 2 + \log_4 6 + \log_4\left(\frac{4}{3}\right)$

$= \log_4 2^3 + \log_4 6 + \log_4 4/3$

$= \log_4 8 \cdot 6 \cdot \frac{4}{3}$

$= \log_4 64 \Rightarrow \boxed{3}$

c) $\frac{1}{2}\log_3 18 + \log_3\sqrt{5} - \frac{1}{2}\log_3 10$

$= \log_3\sqrt{18} + \log_3\sqrt{5} - \log_3\sqrt{10}$

$= \log_3 \frac{\sqrt{18}\cdot\sqrt{5}}{\sqrt{10}} \Rightarrow \log_3\sqrt{9} = \log_3 3 = \boxed{1}$

D3. Write $\log\left(\frac{x^2}{y^3\sqrt{z}}\right)$ in terms of logx, logy, and logz.

$= \log x^2 - \log y^3 - \log\sqrt{z} = \boxed{2\log x - 3\log y - \frac{1}{2}\log z}$

D4. If $\log_2 x = 6$ and $\log_2 y = 2$, evaluate $\log_2\left(\frac{4x}{y^2}\right)$.

substitute!

$= \log_2 4 + \log_2 x - \log_2 y^2 = \log_2 4 + \log_2 x - 2\log_2 y$

$= 2 + 6 - 2(2) = 2 + 6 - 4 = \boxed{4}$

F2. State the domain, range, and equation of the asymptote of:

a) $y = \log_3(x-2)+1$

D: $x > 2$ A: $x = 2$

R: $y \in \mathbb{R}$

b) $y = \log_2(x+3)$

D: $x > -3$ A: $x = -3$

R: $y \in \mathbb{R}$

c) $y = \log_2(x-3)+2$

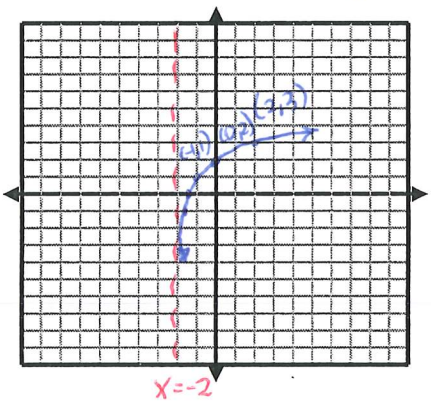
D: $x > 3$ A: $x = 3$

R: $y \in \mathbb{R}$

F1. Sketch the following. Label at least 3 points and the equation of the asymptote.

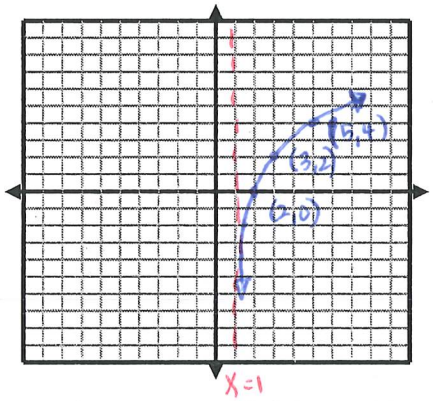
a) $y = \log_2(x+2)+1$ Left 2 up 1

x	y
$-1\frac{3}{4}$	$\frac{1}{4}$
$-1\frac{1}{2}$	$\frac{1}{2}$
-1	1
0	2
2	4
-2	-1
-1	0
0	1
1	2
2	3



b) $y = 2\log_3(x-1)$ Right 1 VE 2

x	y
$1\frac{1}{4}$	$\frac{1}{4}$
$1\frac{1}{2}$	$\frac{1}{2}$
2	1
3	2
5	4
-2	-4
-1	-2
0	0
1	2
2	4



G1. Determine the domain, range, equation of the asymptote, and intercepts of the graph in F.

a) D: $x > -2$ A: $x = -2$

R: $y \in \mathbb{R}$

x-int: $-1\frac{1}{2}$

y-int: 2

b) D: $x > 1$ A: $x = 1$

R: $y \in \mathbb{R}$

x-int: 2

y-int: D.N.E. / none