IB Pre HL chapter 4 Exit Slip #2 Name: key

No Calculators #1-#4

$\log_2 \frac{1}{4} = -2$ $\log_2 64 = 6$ $\log_8 8 = 3$

1. Write the expression as a single logarithm.

$$\log_{\frac{1}{4}} x - \log_{64} y + \frac{1}{2}\log_8 z = \frac{\log_2 x}{\log_2 \frac{1}{4}} - \frac{\log_2 y}{\log_2 64} + \frac{\log_2 z^{\frac{1}{2}}}{\log_2 8} = \frac{\log_2 x}{-2} - \frac{\log_2 y}{6} + \frac{\log_2 z^{\frac{1}{2}}}{3}$$

$$= \log_2\left(\frac{z^{\frac{1}{2}} \cdot x^{-2}}{y^{\frac{1}{6}}}\right) = \log_2 \frac{z^{\frac{1}{2}}}{y^{\frac{1}{6}} \cdot x^2}$$

2. Simplify.

a. $A = \log_{\frac{1}{3}} 9 = \frac{\log_3 9}{\log_3 \frac{1}{3}} = -2$

b. $B = e^{3\ln 2} = 2^3 = 8$

d. $C = l\log_2 5 - \log_2 20 = \log_2 \frac{5}{20} = \log_2 \frac{1}{4} = -2$

e. Hence solve $Ax^2 + Bx + C = 0$

$-2x^2 + 8x - 2 = 0$ $-2(x^2 - 4x + 1) = 0$ $x = \frac{4 \pm \sqrt{(4)^2 - 4}}{2}$

$= 2 \pm \sqrt{3}$

3. Solve for x.

a. $\log_3(4x^2 - 5x - 6) = 1 + 2\log_3 x$

$\log_3(4x^2 - 5x - 6) = \log_3 3 + \log_3 x^2$

$4x^2 - 5x - 6 = 3x^2$ $x^2 - 5x - 6 = 0$

$(x-6)(x+1) = 0$

$x = 6$ ~~$x = -1$~~

b. $\frac{6}{7^x} - 2(7^x) = 1$

$(6 \cdot (7^{-x}) - 2(7^x) = 1) \cdot 7^x$

$-2(7^x)^2 - 7^x + 6 = 0$

$2(7^x)^2 + 7^x - 6 = 0$

$(2 \cdot 7^x - 3)(7^x + 2) = 0$

$2 \cdot 7^x - 3$ $\cdot 7^x + 2$

$7^x = \frac{3}{2}$ ~~$7^x = -2$~~

$x = \log_7 \left(\frac{3}{2}\right)$

c. $\log_9 x^4 + \log_3 \sqrt{x} = 1$

$\frac{\log_3 x^4}{\log_3 9} + \frac{\log_3 \sqrt{x}}{\log_3 3} = 1$

$\log_3 (x^4)^{\frac{1}{2}} + \log_3 \sqrt{x} =$

$\log_3 x^2 \cdot \sqrt{x} = 1$

$\left(x^{\frac{5}{2}}\right)^{\frac{2}{5}} = (3)^{\frac{2}{5}}$

$x = 3^{\frac{2}{5}}$

4. Given $f(x) = \ln(x+5) - 3$

a) Find the domain and range of $f(x)$.

Domain $(-5, \infty)$ Range $(-\infty, \infty)$

b) Find $f^{-1}(x)$.

$x = \ln(y+5) - 3 \Rightarrow x + 3 = \ln(y+5)$

$\Rightarrow e^{x+3} = y + 5$

c) State the domain and range of $f^{-1}(x)$.

$y = e^{x+3} - 5$

Domain $(-\infty, \infty)$

Range $(-5, \infty)$

d) Determine $f(x)$ is one to one function or not.

yes.

Calculator is okay.

5. A car is expected to decrease in value at an average rate of 12% annually. If the car is worth \$ 15000 now, when would you expect it to be worth \$6000?

$6000 = 15000(.88)^t$ $t = \frac{\left(\ln\left(\frac{2}{5}\right)\right)}{\ln(0.88)} \approx 7.17$ yrs

Notes: To prepare for the exam, study the Exit slips of ch3 #1, ch4 #1, ch4 #2, IB questions of ch 3 and ch4, and the review sets. Do not expect you will do fine without study. The exam is on Tuesday and covers both chapter 3 and chapter 4.