ICNS100 Intensive Mathematics
Quiz 2 (10%)

out of 20 points

Name: _____ Student ID _____

1. Write the exponential form in logarithmic form and logarithmic form in exponential form. (3 points)

   (a) $x^y = A$. Logarithmic form is $\boxed{\log_x A = y}$

   (b) $\log_2(16) = x$. Exponential form is $\boxed{2^x = 16}$

   The value of x from 1(b) is $\boxed{4}$

2. Find the value of $\log_{1/5}(5^3)$. (2 points)

   Solution: Use the change of base formula:

$$\log_{1/5}(5^3) = \frac{\log_5(5^3)}{\log_5(1/5)} = \frac{3}{-1} = -3$$

3. If $\log 3 = a$ and $\log 2 = b$, express $\log(\sqrt{60})$ in terms of a and b. (2 points)

   Solution:

$$\begin{aligned}\log(\sqrt{60}) &= \log 60^{1/2} = \frac{1}{2}\log 60 \\ &= \frac{1}{2}\log(10 \cdot 2 \cdot 3) = \frac{1}{2}(\log 10 + \log 2 + \log 3) \\ &= \frac{1}{2}(1 + a + b)\end{aligned}$$

4. Write $2\log_3 5 - \log_3 2$ as a single logarithm. (2 points)

   Solution:

$$2\log_3 5 - \log_3 2 = \log_3(5^2) - \log_3(2) = \log_3(25/2)$$

5. Find the value of $\log_{125}(25)$. (2 points)

   Solution: Use the change of base formula:

$$\log_{125}(25) = \frac{\log_5(25)}{\log_5(125)} = \frac{2}{3}$$

6. Find the value(s) of x from the equation

$$\log_2(x) = 5 - \log_2(x+4).$$

(3 points)

Solution:

$$\log_2(x) + \log_2(x+4) = 5 = \log_2(2^5)$$
$$\log_2(x^2+4x) = \log_2(32)$$
$$x^2 + 4x = 32$$
$$x^2 + 4x - 32 = 0$$
$$(x+8)(x-4) = 0$$

Thus $x = -8$ or 4. But the term $\log_2(x)$ implies that $x > 0$. Thus $x = 4$ is the solution.

7. Suppose you deposit 20,000 baht into a savings account that earns the interest at the rate of 4.8% compounded monthly. What is the compound amount at the end of the fifth year? (3 points)

Solution: From $S = P(1+r)^n$, we see that $P = 20000$. Compound monthly means $r = \frac{4.8}{12}\% = 0.4\% = 0.004$. For 5 years, we have $n = 12 \cdot 5 = 60$. Thus.

$$S = 20000(1+0.004)^{60} = 20000(1.004)^{60}.$$

8. Sketch the graph of

$$y = \log_2(x - 0.5).$$

Also complete the following table of sample points. What is the x intercept? (3 points)

x	1	2.5	4.5	8.5
y	-1	1	2	3

The x intercept is $\boxed{1.5}$