

**Chapter 3 Part B
Practice Test**

1. Evaluate the expression $8^{\frac{4}{3}}$. Then write 1 or 2 sentences that describe how you could use mental math to evaluate the expression without using a calculator.

$8^{\frac{4}{3}} = (\sqrt[3]{8})^4 = 2^4 = \boxed{16}$ First find the cube root of 8 which = 2
Then take 2 to the 4th power.

2. What is the relationship between logarithms and exponential functions?

They are inverses of one another.

3. Write $8^2 = 64$ in logarithmic form.

$\log_8 64 = 2$

Write the following equation in exponential form.

4. $\log_4 2 = \frac{1}{2}$ $4^{\frac{1}{2}} = 2$

5. Write a logarithmic or exponential equation that has no solution and briefly explain why this occurs.

$\log_4 -2 = x$

$4^x = -2$

If you change it to an exponential equation, you will see that there is no solution because 4^x will only produce positive outputs.

Solve the following equations.

6. $2.5^x = 65.7$

$\log 2.5^x = \log 65.7$
 $x \cdot \log 2.5 = \log 65.7$
 $x = \frac{\log 65.7}{\log 2.5} = \boxed{4.57}$

7. $\log_5 2x = \log_5 (3x-4)$

$2x = 3x - 4$
 $\boxed{x = 4}$

9. $7^{x-2} = 5^{3-x}$

$\log 7^{x-2} = \log 5^{3-x}$
 $(x-2)\log 7 = (3-x)(\log 5)$
 $x \cdot \log 7 - 2 \cdot \log 7 = 3\log 5 - x \cdot \log 5$
 $x \log 7 + x \log 5 = 2\log 7 + 3\log 5$
 $x(\log 7 + \log 5) = \log 49 + \log 125$

$\boxed{2.15}$
 $\frac{\log 49 + \log 125}{\log 7 + \log 5}$
 $x =$

Division Rule

$\rightarrow \log_6 16 - \log_6 2 = \log_6 x$
 $\log_6 8 = \log_6 x$ $\boxed{x=8}$