

*AAT

Chapter 5: Logarithm Practice Problems (IC)

Name: _____

Date: _____ Period: _____

Express in logarithmic form.

1. $4^2 = 16$

$\log_4 16 = 2$

2. $8^{-3} = \frac{1}{512}$

$\log_8 \left(\frac{1}{512}\right) = -3$

3. $27^{\frac{1}{3}} = 3$

$\log_{27} 3 = \frac{1}{3}$

4. $\left(\frac{1}{3}\right)^4 = \frac{1}{81}$

$\log_{\frac{1}{3}} \left(\frac{1}{81}\right) = 4$

Solve for the unknown.

5. $\log_6 1296 = p$

$6^p = 1296$
 $6^p = 6^4$
 $p = 4$

6. $\log_4 \sqrt{e} = \frac{1}{2}$

$4^{\frac{1}{2}} = e^{\frac{1}{2}}$
 $4 = e$

7. $\log_9 \left(\frac{1}{81}\right) = i$

$9^i = \frac{1}{81}$
 $9^i = 9^{-2}$
 $i = -2$

8. $\log_9 x = -2$

$9^{-2} = x$
 $\frac{1}{9^2} = x$
 $\frac{1}{81} = x$

Determine the value of each of the following.

9. $\log_2 64 = x$

$2^x = 64$
 $2^x = 2^6$
 $x = 6$

10. $\log_{16} 2 = x$

$16^x = 2$
 $2^{4x} = 2^1$
 $4x = 1$
 $x = \frac{1}{4}$

11. $\log_{\frac{1}{4}} 64 = x$

$\left(\frac{1}{4}\right)^x = 64$
 $4^{-1x} = 4^3$
 $-x = 3$
 $x = -3$

12. $\log_{16} \sqrt{2} = x$

$16^x = 2^{\frac{1}{2}}$
 $2^{4x} = 2^{\frac{1}{2}}$
 $4x = \frac{1}{2}$
 $x = \frac{1}{8}$

Express each of the following as a single logarithm.

13. $\log 8 - \log 2$

$\log \frac{8}{2}$
 $\log 4$

14. $\log 2 + \log 5$

$\log(2 \cdot 5)$
 $\log 10$

15. $\log 4 + 2\log 4$

$\log(4 \cdot 4^2)$
 $\log 64$

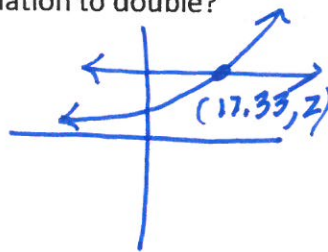
16. $\log 12 - \frac{2}{3} \log 343$

$\log \frac{12}{343^{\frac{2}{3}}}$
 $= \log \frac{12}{49}$

Solve.

17. The local government projects that the town will grow at a constant rate of four percent per year. At this rate, how many years will it take the town's population to double?

$2 = 100e^{.04t}$
 $200 = 100e^{.04t}$
 $2x$



$\approx 17.33 \text{ yrs}$