Name key Date_____ Hour_____

9.4 – Common Logarithms

Alg 2 Trig G – day 2

PRACTICE!

Use a calculator to evaluate the expression to 4 decimal places.

1. $\log 39$

$\boxed{1.5911}$

2. $\log 0.003$

$\boxed{-2.5229}$

3. $\log 5.8$

$\boxed{0.7634}$

4. $\log(-100)$

$\varnothing$

5. $\log\left(\frac{1}{2}\right)$

$\boxed{-0.3010}$

6. $\log 120$

$\boxed{2.0792}$

7. **Solve the logarithmic equation**:

An equation for loudness (L) in decibels is given by $\boxed{L = 10 \bullet \log R}$, where R is the sound's relative intensity. An air-raid siren can reach 150 decibels and jet engine noise can reach 120 decibels. How many times greater is the relative intensity of the air-raid siren than that of the jet engine noise?

Air-Raid

$150 = 10 \cdot \log R$

$15 = \log R$

$\boxed{10^{15} = R}$

Jet Engine

$120 = 10 \cdot \log R$

$12 = \log R$

$\boxed{10^{12} = R}$

$\frac{10^{15}}{10^{12}} = 10^3 =$ 1,000 times greater

Solve the equation using logs (and your calculator!)

8. $5^x = 120$

$\log 5^x = \log 120$

$x \cdot \log 5 = \log 120$

$x = \frac{\log 120}{\log 5}$

$\boxed{x = 2.9746}$

9. $6^x = 45.6$

$\log 6^x = \log 45.6$

$x \cdot \log 6 = \log 45.6$

$x = \frac{\log 45.6}{\log 6}$

$\boxed{x = 2.1319}$

Remember: $\boxed{\log_a n = \dfrac{\log n}{\log a}}$

Express each in terms of common logs. Then approximate its value to four decimal places.

10. $\log_{12} 200$ $\dfrac{\log 200}{\log 12}$

$\boxed{2.1322}$

11. $\log_4 28.5$ $\dfrac{\log 28.5}{\log 4}$

$\boxed{2.4164}$

Solve each equation or inequality.

12. $4^{3x} = 12$

$3x \cdot \log 4 = \log 12$

$3x = 1.7925$

$\boxed{x = .5975}$

13. $5^{4x-2} = 120$

$(4x-2) \cdot \log 5 = \log 120$

$4x - 2 = 2.9746$

$4x = 4.9746$

$\boxed{x = 1.2437}$

14. $6.5^{2x} \geq 200$

$2x \cdot \log 6.5 \geq \log 200$

$2x \geq 2.8306$

$\boxed{x \geq 1.4153}$

15. $7^{3x-1} \geq 21$

$(3x-1) \cdot \log 7 \geq \log 21$

$3x - 1 \geq 1.5646$

$3x \geq 2.5646$

$\boxed{x \geq 0.8549}$

16. $2.4^{x+4} = 30$

$(x+4) \log 2.4 = \log 30$

$x + 4 = 3.8850$

$\boxed{x = -0.1150}$

17. $3.6^{4x-1} = 85.4$

$(4x-1) \log 3.6 = \log 85.4$

$4x - 1 = 3.4720$

$4x = 4.4720$

$\boxed{x = 1.1180}$