Pre-Calculus
Chapter 3 Test Review

Name: key
Period: _____ Date: _____

Use the properties of logarithms to expand the expression as a sum or difference, or condense as a constant multiple of logarithms.

1. $\log\sqrt{a^2b^3}$ $\log(a^2b^3)^{1/2}$ $\frac{1}{2}\log(a^2b^3)$ $\frac{1}{2}(\log a^2+\log b^3)=\frac{1}{2}(2\log a+3\log b)$ $=\log a+\frac{3}{2}\log b$

2. $\frac{1}{2}(\ln(x+2)+\ln(x-2)-\ln x)$ $\frac{1}{2}\ln\frac{(x+2)(x-2)}{x}$ $\ln\sqrt{\frac{(x+2)(x-2)}{x}}$

Evaluate.

3. $\log .001$ $=-3$ because $10^{-3}=.001$

4. $\log_a a^{2x}$ $=2x$

~~5. $\log_3 7$~~

Write in logarithmic form.

5. $3^4=81$ $\log_3 81=4$

6. $(ac)^x=b$ $\log_{ac} b=x$

Write in exponential form.

7. $\log_2 64=6$ $2^6=64$

8. $\ln 2=x$ $e^x=2$

9. Explain how this statement needs to be changed so it is true: $\log_3(15+15)=\log_3 15+\log_3 15$
it should be multiply $\log_3(15\cdot 15)$

10. If $\log_b 3=1.585$ and $\log_b 5=2.322$, then $\log_b 15=?$ $\log_b(3\cdot 5)=$ $\log_b 3+\log_b 5=1.585+2.322=3.907$

11. Given $f(x)=\ln(x)$, evaluate:
a. $f(e^3)=\ln e^3=\log_e e^3=3$
b. $f(e^{\ln 4})=\ln e^{\ln 4}=\log_e e^{\log_e 4}=\log_e 4$ or $\ln 4$

12. Given $f(x)=\log_5 x$, evaluate:
a. $f(5^2)$ $\log_5 5^2=2$
b. $f(5^{\log_5 4})$ $\log_5 5^{\log_5 4}=\log_5 4$

~~13. The following argument shows that $4=6$. Find the incorrect step.~~

$4=\log_2 16$

$4=\log_2(8+8)$

~~$4=\log_2 8+\log_2 8$~~

$4=3+3$

$4=6$

Evaluate. Round your answers to 3 decimal places.

14. $4(0.5)^{\sqrt{3}}$ 1.204

15. $\frac{6\ln 7}{3+\ln 5}$ 2.533

16. $\log_5 5^6$ 6

17. $2(3)^{\sqrt{5}}$ 23.330