IV. Use the definition of logarithmic function to evaluate each logarithm. NO CALCULATOR!

11. $\log_3 9$ 2	12. $\log_5 \frac{1}{125}$ -3	13. $\log_2 \sqrt[4]{8}$ $3/4$	14. $\log_4 16^{1.2}$ 2.4
15. $\log_2(-16)$ log (neg #) Not possible	16. $\ln e^{4.5}$ 4.5	17. $\log_{\frac{1}{4}} 256$ -4	18. $\log 0.001$ -3

V. Evaluate with the calculator. Round to 3 decimal places.

19. $\log 170$ 2.230	20. $\log 179000$ 5.253	21. $\ln 16$ 2.773	22. $\ln(e-6)$ Ln (neg #) Not possible
23. $\log x = 4.5$ 31622.777	24. $\log x = -2.1$ .008	25. $\ln x = \frac{3}{4}$ 2.117	26. $\ln x = 5.1$ 164.022

VI. Use the change of base formula to evaluate to 3 decimal places. SHOW YOUR WORK.

27. $\log_3 5$ 1.465	28. $\log_7 4$ .712	29. $\log_{\frac{1}{2}} 15$ -3.907	30. $\log_{20} 0.125$ $-.694$
31. $\log_{15} 1250$ 2.633	32. $\log_{\sqrt{7}} 160$ 5.216	33. $\log_{13} \sqrt[3]{52}$ .513	34. $\log_{\sqrt{7}} \sqrt[3]{\frac{1}{9}}$ $-.753$