Name:_____

DIRECTIONS To receive full credit, you must provide complete solutions to the following problems on an attached lined paper with clearly numbered problem solutions. Transfer all your answers to the space provided on the test paper.

Problems 1 through 7
Use properties of logarithms to expand each logarithmic expression as much as possible. Where possible evaluate the logarithmic expression without a calculator.

1. $\log(100x)$ Ans_____

2. $\log\left(\dfrac{10}{x+1}\right)$ Ans_____

3. $\ln\left(x^2 y^3\right)$ Ans_____

4. $\log_2\left(\dfrac{4}{\sqrt{x}}\right)$ Ans_____

5. $\log_5\left(25\sqrt{x}\right)$ Ans_____

6. $\log\left(\dfrac{x^3 y^2}{z^4}\right)$ Ans_____

7. $\log \sqrt{\dfrac{xy^2}{z^3}}$ Ans_____

Problems 8 through 12
Use properties of logarithms to condense each logarithmic expression into a single logarithm with coefficient 1, and evaluate when possible.

8. $\log 4 + \log 25$ Ans_____

9. $\log_3 96 - \log_3 3$ Ans_____

10. $\dfrac{1}{2}\log x + \log y$ Ans_____

11. $3\ln x + 2\ln y - \ln z$ Ans_____

12. $\dfrac{1}{2}\big(\log x + \log y - 2\log(x+y)\big)$ Ans_____