Name _____

9-8A Lesson Master

VOCABULARY

In 1 and 2, write the exponential equation as a logarithmic equation, or vice-versa.

1. a. $e^3 \approx 20.086$ _____
    b. $e^{-1.5} \approx 0.223$ _____
    c. $e^r = a$ _____

2. a. $\ln 0.135 \approx -2$ _____
    b. $\ln 3361 \approx 8.12$ _____
    c. $\ln v = u$ _____

SKILLS Objective A

In 3–5, evaluate to the nearest thousandth.

3. $\ln 873.5 \approx$ _____
4. $\ln 0.0924 \approx$ _____
5. $\ln \sqrt{2} \approx$ _____

In 6–8, give an exact answer. Do all work in your head; check with a CAS if necessary.

6. $\ln e =$ _____
7. $\ln e^5 =$ _____
8. $\ln \frac{1}{e^2} =$ _____

PROPERTIES Objective E

9. Give the domain and range of the function f where $f(x) = \ln x$.
    _____

10. Explain why $\ln(e^a) = a$. _____

USES Objective I

11. The median height for girls aged 2 to 16 is approximated by the function h with equation $h(a) = 47.28 + 40.86 \ln(a)$, where $h(a)$ is the median height in centimeters of a girl a years old.

    a. Use the function to approximate the median height of 14-year-old girls.
    _____

    b. At what age (to the nearest month) is the median height one meter?
    _____

    c. Explain why this function would not be appropriate to estimate the median height of 42-year-old women.

    _____

12. For large values of n, the number of prime numbers less than n is approximated by a function P where $P(n) = \frac{n}{\ln(n)}$.

    a. Find $P(100)$, $P(1000)$, and $P(1,000,000)$.
    _____

    b. There are 25 prime numbers less than 100; 168 less than 1000; and 78,498 less than 1,000,000. For which of these values did $P(n)$ give the best estimate? Explain.

    _____