Algebra 2 CP CLASSWORK Natural Log Name _____

Evaluate using a calculator. Round to three decimal places.

1. $\ln 24$ 3.178

Simplify each expression.

2. $3e^{\ln}$ 3

3. $5 \ln e^7$ $5 \cdot 7 = 35$

Expand each expression.

4. $\ln \frac{7x^3}{y}$ exponents at the end

$\ln 7x^3 - \ln y$

$\ln 7 + \ln x^3 - \ln y$

$\ln 7 + 3\ln x - \ln y$

Condense each expression.

5. $2 \ln 8 + \frac{1}{2} \ln a - 4 \ln b$ exponents first!

$\ln 8^2 + \ln a^{1/2} - \ln b^4$

$\ln 64\sqrt{a} - \ln b^4 = \ln \frac{64\sqrt{a}}{b^4}$

Solve each equation using the natural logarithm function.

6. $7^x = 18$

$\ln 7^x = \ln 18$

$x \ln 7 = \ln 18$

$\frac{x \ln 7}{\ln 7} = \frac{\ln 18}{\ln 7}$

$x = \frac{\ln 18}{\ln 7} \approx 1.485$

Solve each equation.

7. $25 \ln x = 225$

$\div 25 \quad \div 25$

$\ln x = 9$

$e^{\ln x} = e^{9}$

$x = e^{9} \approx 8103.084$

8. $\ln(x+4) = 10$

$e^{\ln(x+4)} = e^{10}$

$x + 4 = e^{10}$

$-4 \quad -4$

$x = e^{10} - 4$

≈ 22022.4466

Use the formula $N(t) = N_0 e^{-0.00012t}$ to solve.

9. A fossil is found that contains 35% of its original amount of carbon-14. How old is the fossil?

N_0

$N(t) = N_0 e^{-0.00012t}$

$\frac{0.35N_0}{N_0} = \frac{N_0 e^{-0.00012t}}{N_0}$

$0.35 = e^{-0.00012t}$

$\ln 0.35 = \ln e^{-0.00012t}$

$\frac{\ln 0.35}{-0.00012} = \frac{-0.00012t}{-0.00012}$

$t = \frac{\ln 0.35}{-0.00012}$

≈ 8748.5

$t \approx 8749$ yrs old