Name _____ Class _____ Date _____

Reteaching 8-6

Natural Logarithms

OBJECTIVE: Solving equations using natural logarithms

MATERIALS: Graphing calculator

- To solve equations that involve natural logarithms, use the following inverse properties:

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

Example

Solve $4e^{2x} = 5$.

$4e^{2x} = 5$

$e^{2x} = \frac{5}{4}$ ← **Divide each side by 4.**

$\ln e^{2x} = \ln 1.25$ ← **Take the natural logarithm of each side since the base of the exponent is *e*.**

$2x = \ln 1.25$ ← **Apply the inverse property $\ln e^x = x$.**

$x = \frac{\ln 1.25}{2}$ ← **Divide each side by 2.**

$x \approx 0.112$ ← **Use a calculator to approximate.**

The solution is $x \approx 0.112$.

Exercises

Solve each equation. Check your answers. Round answers to the nearest thousandth.

1. $2e^x = 4$ **2.** $e^{4x} = 25$ **3.** $e^x = 72$

4. $e^{3x} = 124$ **5.** $12e^{3x-2} = 8$ **6.** $\ln (x - 3) = 2$

7. $\ln 2x = 4$ **8.** $1 + \ln x^2 = 2$ **9.** $\ln (2x - 5) = 3$

Use the formula $A = Pe^{rt}$ to solve.

10. If \$5000 is invested in a savings account that pays 7.85% interest compounded continuously, how much money will be in the account after 12 yr?

11. If \$10,000 is invested in a savings account that pays 8.65% interest compounded continuously, in how many years will the balance be \$250,000? Round to the nearest tenth.