$\ln e^5 = 5$

$\ln e^{12} = 12$

$\ln e^{-3} = -3$

$\ln e^5 = \log_e e^5$

$e^n = e^5$

$e^{\ln(2)} = 2$

$e^{\ln(7)} = 7$

Since the natural base function and the natural logarithmic function are inverses, these two functions can be used to "undo" each other.

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

For example $e^{\ln 7} = 7$ and $\ln e^{4x+3} = 4x+3$.

① $5\boxed{e^{-x}} - 7 = 2$

$5e^{-x} = 9$

$e^{-x} = \frac{9}{5}$ → log form: $\ln \frac{9}{5} = -x$

$\ln e^{-x} = \ln \frac{9}{5}$

$-x = \ln \frac{9}{5}$

exact $x = -\ln \frac{9}{5}$

approx $x \approx -.5878$

② $3e^x + 2 = 4$

$3e^x = 2$

$e^x = \frac{2}{3}$ → log form: $\ln \frac{2}{3} = x$

$\ln e^x = \ln \frac{2}{3}$

$x = \ln \frac{2}{3}$

$x \approx -.4055$

③ $\ln 5x = 4$ → exp. form: $e^4 = 5x$

$e^{\ln 5x} = e^4$

$5x = e^4$

exact $x = \frac{e^4}{5}$

$x \approx 10.9196$

④ $\ln(x-1) = -2$ → exp. form: $e^{-2} = x-1$

$e^{\ln(x-1)} = e^{-2}$

$x - 1 = e^{-2}$

$e^{-2} + 1 = x$ exact

$1.1353 \approx x$

When interest is compounded continuously, the amount A in an account after t years is found using the formula $A = Pe^{rt}$, where P is the amount of principal and r is the annual interest rate (as a decimal).

$r = .025$

Suppose you deposit $1000 in an account paying 2.5% annual interest, compounded continuously, what is the balance after 10 years? 15 years?

$A = Pe^{rt}$

$A = 1000e^{.025(10)}$

$A = \$1284.03$

$A = 1000e^{.025(15)}$

$A = \$1454.99$

9.5 wkst → due tomorrow

midterm → due Thursday (5 pts.)