$\ln e^6 = 6 \rightarrow \ln e^6 = \log_e e^6 = 6$

$e^n = e^6$

$\ln e^{84} = 84$

$\ln e^{-7} = -7$

$\log_{10} 10^1 = 1$

$\log_7 7^2 = 2$

$\ln e^x = x$

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

$e^{\ln 8} = 8$

$e^{\ln x} = x$

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

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 $5e^{-x} - 7 = 2$

$5e^{-x} = 9$

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

log form

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

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

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

$x \approx -.5878$

② $3e^{x} + 2 = 4$

$3e^{x} = 2$

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

log form

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

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

$x \approx -.4055$

③ $\ln 5x = 4$

exp form

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

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

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

$x \approx 10.9196$

④ $\ln(x-1) = -2$

exp. form

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

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

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

$x \approx 1.1353$

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).

→ initial amount

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

$$A = Pe^{rt}$$

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

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

$$= \$1454.99$$

A= 1000e^(.025×10).

$$A = \$1284.03$$

9.5 wkst - due tomorrow

midterm - due Thursday (5pts)