

Sec. 7.2 Properties Exponential Functions

$a > 0$ Parent \nearrow
 $a < 0$ Reflection in x-axis \searrow
 $y = a b^{x-h} + k$
 Horizontal Translation h units \nearrow
 Vertical Translation k units \searrow
 $|a| > 1$ v.s.
 $|a| < 1$ v.c.

Problem 1: Compare $y = -\frac{1}{5} \cdot 4^x$ to the parent.
 reflection on the x-axis \longleftarrow
 vertical compression by a factor of $\frac{1}{5}$ \searrow

Problem 2: $y = 3^{(x+1)}$
 parent $y = 3^x$ horizontal translation 1 unit left

Problem 3: What is the value of $2e^6$?
 6 $\boxed{2nd}$ \boxed{LN} \boxed{x} 2
 The graph of $y = (1 + \frac{1}{x})^x$ has an asymptote at $y = e$ or $y \approx 2.71828$
 806.86

Natural base exponential function: $y = a e^{x-h} + k$

Continuously Compounded Interest

Recall: compound interest

$$y = e \quad A(t) = a(1+r)^t \quad t \text{ yrs.}$$

$$y = \left(1 + \frac{r}{n}\right)^{nt}$$

$$A(t) = a\left(1 + \frac{r}{n}\right)^{nt}$$

amount in account at time t \leftarrow

$$A(t) = P \cdot e^{rt}$$

\leftarrow Principal \leftarrow annual interest rate \leftarrow time in years

Problem 4:

\$1500 P

4.5% annual interest, compounded continuously ($P e^{rt}$)

$r = 0.045$

After 15 years, how much money is in the account (to the nearest dollar)?

$$A(t) = P e^{rt}$$

$$A(15) = 1500 e^{0.045(15)}$$

$$0.045 \boxed{\times} 15 \boxed{=} \boxed{2nd} \boxed{LN} \boxed{\times} 1500 \boxed{=}$$

\$2946

Principal: \$2000

air: 5.1%

time: 3 years

$$A = P e^{rt}$$

$$A = 2000 e^{0.051(3)}$$

$$A = \$2331$$