5.2
Notes

THE EXPONENTIAL FUNCTION $y=e^x$

Objectives: 1) Graph.
2) Simplify expressions containing irrational exponents.
3) Solve an exponential equation.
4) Graph exponential functions using transformations.

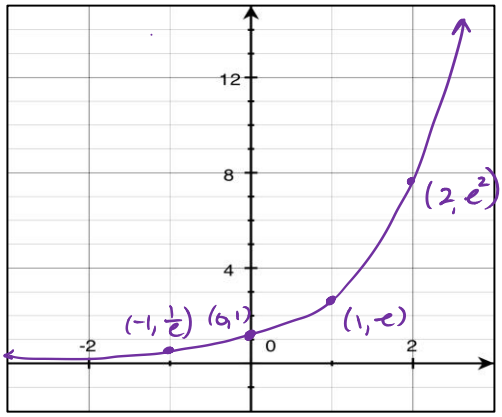
THE HISTORY OF e

Although the number e was used in other works prior to the 1800s, Leonhard Euler (1707 – 1783) was the first to designate the number as e and discover many of its properties. Its value is 2.718281828…. e is a transcendental number which, like π or $\sqrt{2}$ continues on forever without any pattern. (Note: the 1828 in e, although appearing twice consecutively near the start does not appear again for a very long while. It is completely coincidental that it appears twice.)

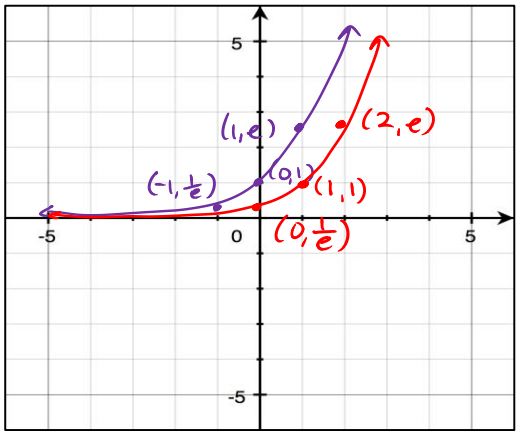
For most purposes of approximation and simple estimation, all you need to remember is that $e \approx 2.7$.

GRAPHING

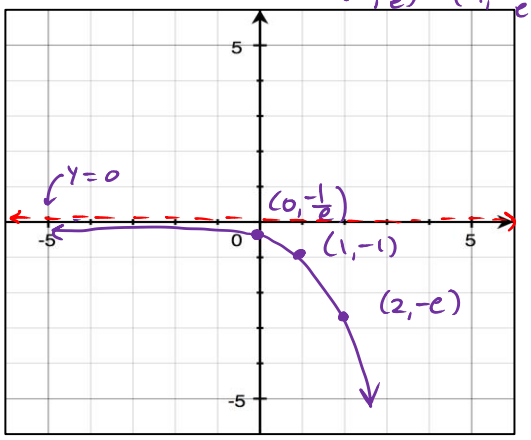
1) $y = e^x$ $\frac{1}{e} \approx .37$



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



3) $y = -e^{x-1}$ $(0,1)$ $(0,-1)$ $(1,-1)$ $(1,e)$ $(1,-e)$ $(2,-e)$ $(-1,\frac{1}{e})$ $(-1,-\frac{1}{e})$ $(0,-\frac{1}{e})$



4) $y = -e^{x-1} + 1$ F_x R_1 U_1 $(0,1) \to (0,-1)$ $(1,-1)$ $(1,0)$ $(1,e) \to (1,-e)$ $(2,-e)$ $(2,1-e)$ $(-1,\frac{1}{e}) \to (-1,-\frac{1}{e})$ $(0,-\frac{1}{e})$ $(0,1-\frac{1}{e})$