TOPIC: THE NUMBER e

The Number e

- You will have to evaluate exponential expressions & graph exponential functions with a base of e:
  - e, like π (3.14…), is ***NOT*** a variable, but a ***number***.

$$f(x) = 2^x$$
$$f(x) = e^x$$

$$e = 2.718281828459\ldots$$

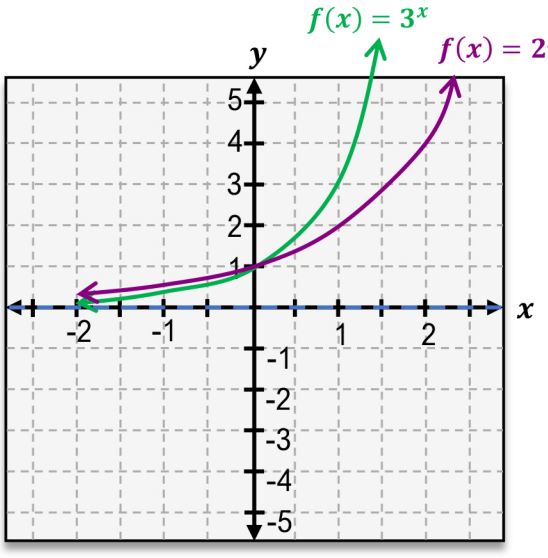
- A calculator should be used to evaluate an exponential function of base e: 2nd LN (POWER)

EXAMPLE Evaluate the exponential function $f(x) = e^x$ for each given value of x.

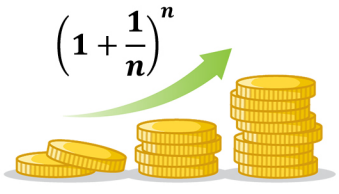
(***A***) $x = 2$

(***B***) $x = -3$

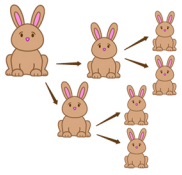
- The graph of $f(x) = e^x$ is _____ the graphs of $f(x) = 2^x$ and $f(x) = 3^x$ because $2 <$ ___ < 3.
  - Just like ***any*** exponential function, exponential functions of base e can be graphed using _____.

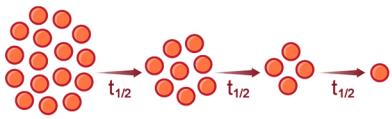


- e comes from the idea of compounding interest, but is useful in many different contexts.



Compounding Interest


Population Growth



Radioactive Decay

TOPIC: THE NUMBER e

PRACTICE: Graph the given function.

$g(x) = e^{x+3} - 1$

TO GRAPH

0) Identify & graph parent function, $f(x) = b^x$
   a. Plot: $(-1, \underset{1/b}{\_\_\_}), (0,1), (1, \underset{b}{\_\_})$, connect
   b. HA at: $y = 0$

1) Shift HA to $y = k$: $y =$ _____

2) a. Reflect? □ → test points over $[x \mid y]$
   b. Shift test points by $(\underset{h}{\_\_\_\_}, \underset{k}{\_\_\_\_})$

3) Sketch curve approaching asymptote

FROM GRAPH

Domain: *always* _____

Range: If ABOVE asymp.: $(\underset{k}{\_\_\_\_}, \infty)$

If BELOW asymp.: $(-\infty, k)$