

# LESSON 4.2: THE NATURAL EXPONENTIAL FUNCTION

THE  
NATURAL  
EXPONENTIAL  
function

The natural exponential function is of the form:

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

\* The natural number  $e \approx 2.718$

**Example:** Let  $f(x) = e^x$ . Use your calculator to evaluate the following to five decimal places.

1.  $f(3) = e^3 \approx 20.08554$

3.  $f(0) = e^0 = 1$

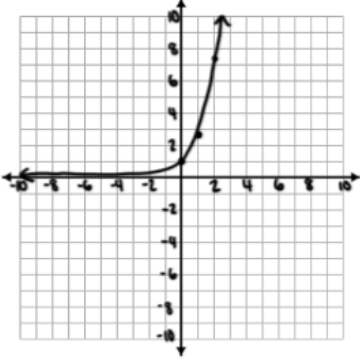
2.  $f\left(-\frac{1}{2}\right) = e^{-\frac{1}{2}} \approx 0.60653$

4.  $f(\sqrt{2}) = e^{\sqrt{2}} \approx 4.11325$

GRAPHING  
THE  
NATURAL  
EXPONENTIAL  
function

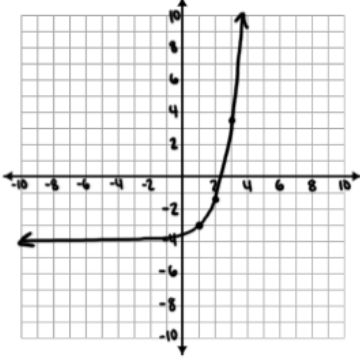
**Examples:** Use a table and your knowledge of the shifts of exponential graphs to graph the functions below.

1.  $f(x) = e^x$



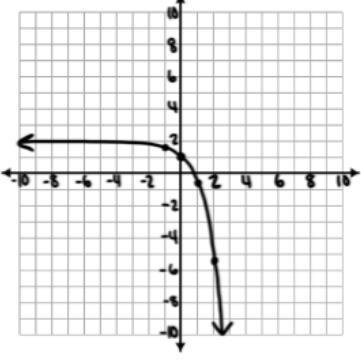
x	f(x)
-3	0.050
-2	0.135
-1	0.368
0	1
1	2.718
2	7.389
3	20.086

2.  $f(x) = e^{x-1} - 4$



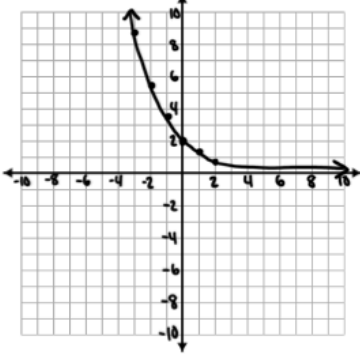
x	f(x)
-3	-3.982
-2	-3.950
-1	-3.865
0	-3.632
1	-3
2	-1.282
3	3.389

3.  $f(x) = -e^x + 2$



x	f(x)
-3	1.950
-2	1.865
-1	1.632
0	1
1	-0.718
2	-5.389
3	-18.086

4.  $f(x) = 2e^{-\frac{1}{2}x}$



x	f(x)
-3	8.963
-2	5.437
-1	3.297
0	2
1	1.213
2	0.736
3	0.446