**4.4 Graphing Exponentials (A.CED.2)**

SM1H

Exponential functions have a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ with an exponent *x*. The base is the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ for the function.

Here is an example of a basic exponential function. Use your calculator to check your answers.



|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| |  |  | | --- | --- | |  |  | |  |  | | -2 |  | | -1 |  | | 0 |  | | 1 |  | | 2 |  | |  |

Find the y-intercept: ( , ).

End behavior:

As x 🡪 ∞ y 🡪 \_\_\_\_\_\_\_\_.

As x 🡪 -∞ y 🡪 \_\_\_\_\_\_\_\_.

So we see the graph of the function will never cross the line \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

We call this kind of line (where the graph gets close, but doesn’t touch it) an \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

Try the following:

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| |  |  | | --- | --- | | *x* | *f*(*x*) | | -2 |  | | -1 |  | | 0 |  | | 1 |  | | 2 |  | |  | y-intercept: ( , )    As x🡪 ∞ y🡪 \_\_\_\_\_\_\_\_.  As x🡪 -∞ y🡪 \_\_\_\_\_\_\_\_.  Increasing or decreasing?  Asymptote: |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| |  |  | | --- | --- | | *x* | *f*(*x*) | | -2 |  | | -1 |  | | 0 |  | | 1 |  | | 2 |  | |  | y-intercept: ( , )    As x🡪 ∞ y🡪 \_\_\_\_\_\_\_\_.  As x🡪 -∞ y🡪 \_\_\_\_\_\_\_\_.  Increasing or decreasing?  Asymptote: |