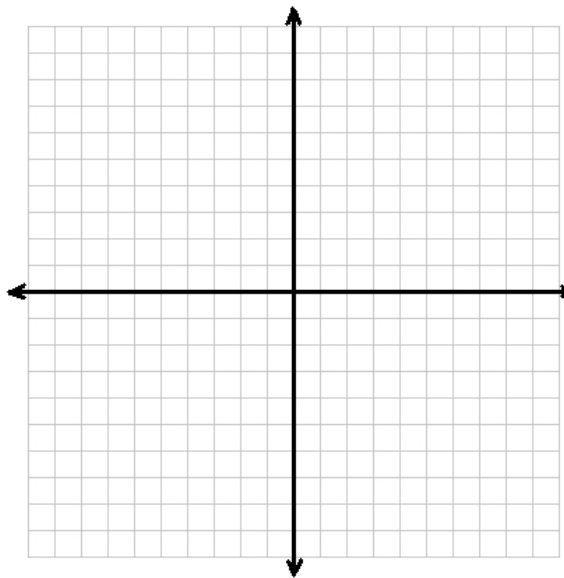


MATH 1650: SECTION 6.1: EXPONENTIAL FUNCTIONS WORKSHEET

In this section, we introduce the notion of an **exponential function**. That is, a function of the form $f(x) = b^x$ for some positive base, b . Notice here that the variable, x is the exponent!

EXAMPLE: Fill in the table of values below to graph $f(x) = 2^x$.

x	$f(x)$	$(x, f(x))$
-3		
-2		
-1		
0		
1		
2		
3		

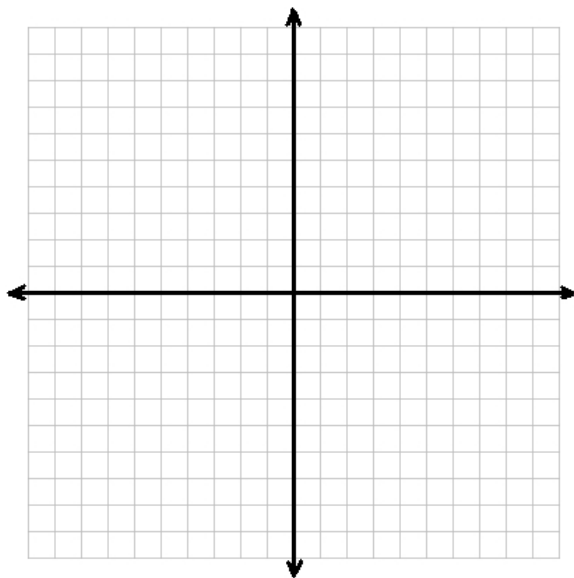


What appears to happen as $x \rightarrow -\infty$? What appears to happen as $x \rightarrow \infty$?

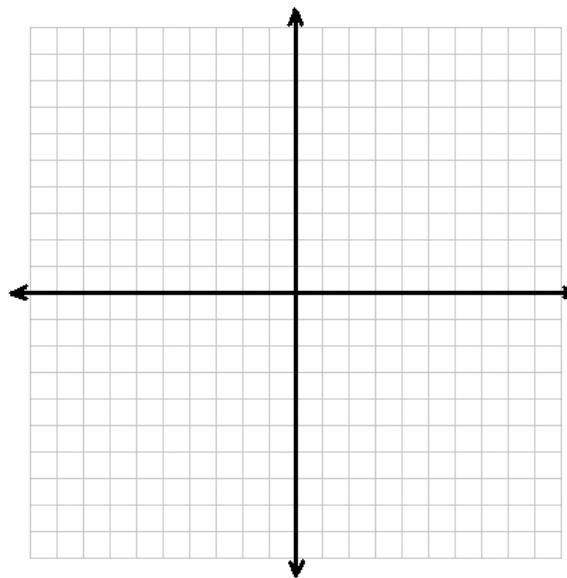
As $x \rightarrow -\infty$, $f(x) \rightarrow$ _____

As $x \rightarrow \infty$, $f(x) \rightarrow$ _____

EXAMPLE: Graph $f(x) = 2^{x-1} - 4$ by transforming the graph of $y = 2^x$. Track the points $(0, 1)$, $(1, 2)$ and the horizontal asymptote $y = 0$ through the transformations. State the domain and range of f .



$$y = 2^x$$



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

EXAMPLE: The value of a car is modeled by $V(t) = 25(0.8)^t$, for $t \geq 0$.

Here, t is number of years the car has been owned and $V(t)$ is the value in thousands of dollars.

- Find and interpret $V(0)$, $V(1)$, and $V(2)$.

- Find and interpret $\frac{V(1)}{V(0)}$, $\frac{V(2)}{V(1)}$, and $\frac{V(2)}{V(0)}$.

- Find and simplify the expression: $\frac{V(t+1)}{V(t)}$. What does this mean in terms of the value of the car?

EXAMPLE: (Continued.) The value of a car is modeled by $V(t) = 25(0.8)^t$, for $t \geq 0$.

Here, t is number of years the car has been owned and $V(t)$ is the value in thousands of dollars.

- Find and interpret: $\frac{V(1) - V(0)}{V(0)}$, $\frac{V(2) - V(1)}{V(1)}$, $\frac{V(2) - V(0)}{V(0)}$

- Find and simplify the expression: $\frac{V(t+1) - V(t)}{V(t)}$. What does this mean in terms of the value of the car?

- Graph $V(t)$ using desmos and estimate how long it takes for the car to depreciate to half its original value.
How long does it take for the car to depreciate to one quarter of its original value?

- Interpret the horizontal asymptote to the graph of $y = V(t)$.

HOMEWORK: Section 6.1: 1 - 21 odd.