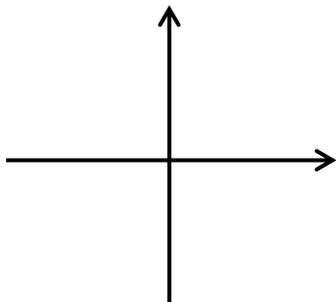


**Worksheet 9 – Exponential Functions (§5.2)**

1. Sketch the graph of the following basic functions and then state their domain, range, and asymptote.

$$f(x) = b^x, b > 1$$

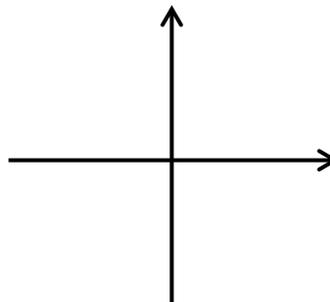


Domain:

Range:

Asymptote:

$$f(x) = b^x, 0 < b < 1$$



Domain:

Range:

Asymptote:

2. Sketch the graph of the following functions using transformations. For partial credit, start with the basic graph of each function and graph/label each stage of its transformation. Then state its domain, range, and asymptote.

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

(b)  $f(x) = 2 - 3^{x+1}$

(c)  $f(x) = 1 - \left(\frac{1}{3}\right)^{x-1}$

(d)  $f(x) = -1 + (0.25)^{-x}$

3. A bacterial culture starts with 100 cells at  $t = 0$  hours when an anti-bacterial agent is introduced. Each hour later, there are half as many bacteria from the hour before. Determine a function  $N(t)$  for the number of bacteria in culture  $t$  hours later from the time the agent is introduced.
4. A farm begins with 25 bunnies. Each month later, the number of bunnies double from the month before. Determine a function for the number of bunnies  $x$  months after the start, and then use it to determine the number of bunnies on the farm after a year.