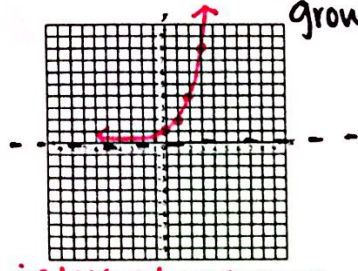


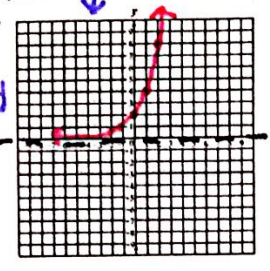
# Graphing Exponential Functions

1. Sketch:  $y = 2^x$   $y = 1 \cdot 2^x$   $b > 1$  growth



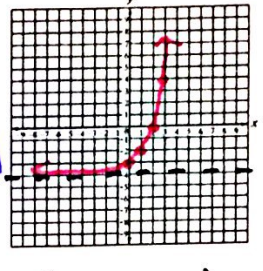
- interval notation
- Domain:  $(-\infty, \infty)$
  - Range:  $(0, \infty)$
  - Asymptotes:  $y = 0$
  - End Behavior:
    - $x \rightarrow \infty, y \rightarrow \infty$
    - $x \rightarrow -\infty, y \rightarrow 0$
  - Y-intercept:  $(0, 1)$   
 $y = 2^0 = 1$
  - X-intercept: none  
 $0 = 2^x$

2. Sketch:  $y = 2^{x+1}$   $b > 1$  growth



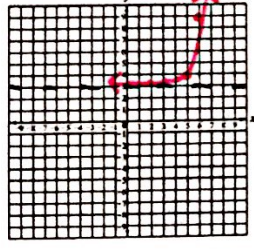
- this function moved 1 unit left compared to example #1
- Domain:  $(-\infty, \infty)$
  - Range:  $(0, \infty)$
  - Asymptotes:  $y = 0$
  - End Behavior:
    - $x \rightarrow \infty, y \rightarrow \infty$
    - $x \rightarrow -\infty, y \rightarrow 0$
  - Y-intercept:  $(0, 2)$   
 $y = 2^{0+1} = 2^1 = 2$
  - X-intercept: none

3. Sketch:  $y = 2^{x-4}$   $b > 1$  growth



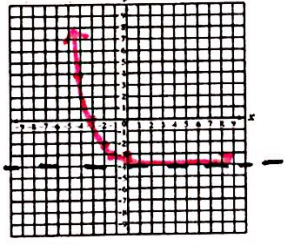
- this function moved 4 units down compared to example #1
- Domain:  $(-\infty, \infty)$
  - Range:  $(-4, \infty)$
  - Asymptotes:  $y = -4$
  - End Behavior:
    - $x \rightarrow \infty, y \rightarrow \infty$
    - $x \rightarrow -\infty, y \rightarrow -4$
  - Y-intercept:  $(0, -3)$   
 $y = 2^0 - 4 = 1 - 4 = -3$
  - X-intercept:  $(2, 0)$   
 $0 = 2^x - 4$   
 $4 = 2^x$   
 $2^2 = 2^x$   
 $x = 2$

4. Sketch:  $y = 6^{x-5} + 3$   $b > 1$  growth



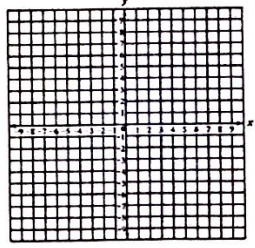
- Domain:  $(-\infty, \infty)$
- Range:  $(3, \infty)$
- Asymptotes:  $y = 3$
- End Behavior:
  - $x \rightarrow \infty, y \rightarrow \infty$
  - $x \rightarrow -\infty, y \rightarrow 3$
- Y-intercept:  $(0, 3.0001)$   
 $y = 6^{0-5} + 3 = 3.0001$
- X-intercept: none

5. Sketch:  $y = \left(\frac{1}{2}\right)^{x+1} - 4$   $0 < b < 1$  decay



- Domain:  $(-\infty, \infty)$
- Range:  $(-4, \infty)$
- Asymptotes:  $y = -4$
- End Behavior:
  - $x \rightarrow \infty, y \rightarrow -4$
  - $x \rightarrow -\infty, y \rightarrow \infty$
- Y-intercept:  $(0, -3.5)$   
 $y = \left(\frac{1}{2}\right)^{0+1} - 4 = \frac{1}{2} - 4 = -3.5$
- X-intercept:  $(-3, 0)$   
 $0 = \left(\frac{1}{2}\right)^{x+1} - 4$

6. Sketch:  $y = \left(\frac{1}{2}\right)^{x+4} - 1$



- Domain: \_\_\_\_\_
- Range: \_\_\_\_\_
- Asymptotes: \_\_\_\_\_
- End Behavior:
  - $x \rightarrow \infty, y \rightarrow$  \_\_\_\_\_
  - $x \rightarrow -\infty, y \rightarrow$  \_\_\_\_\_
- Y-intercept: \_\_\_\_\_
- X-intercept: \_\_\_\_\_