

## Graphing Exponential Functions

### Calculator

$$f(0) = 6\left(\frac{1}{2}\right)^0 = 6(1) = 6$$

1. Graph the function and label all key parts:

$$f(x) = 6\left(\frac{1}{2}\right)^x$$

Identify the asymptote: H.A. @  $y = 0$

Identify the y-intercept: 6 ctrl T or @ (0, 6)

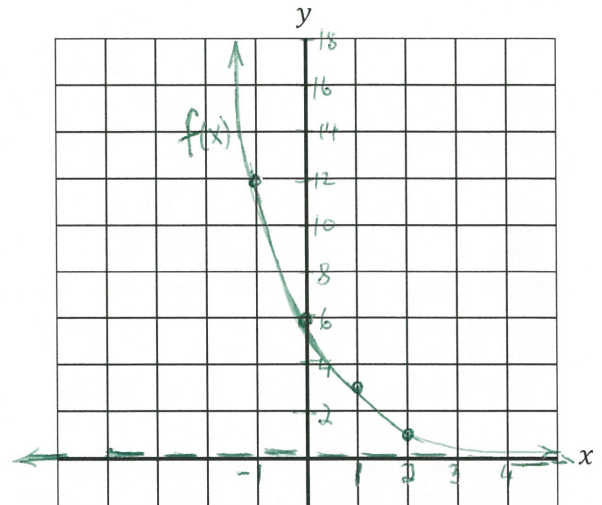
Identify the x-intercept: None

Domain:  $(-\infty, \infty)$

Range:  $(0, \infty)$

Describe the transformation(s):

Vertical stretch by factor of 6.



ctrl T to plot key pts

2. Graph the function and label all key parts:

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

Identify the asymptote: H.A. @  $y = -4$

Identify the y-intercept: -1.282 → ctrl T or @ (0, -1.282)

Identify the x-intercept: 0.386 → Analyze graph, zero or @ (0.386, 0)

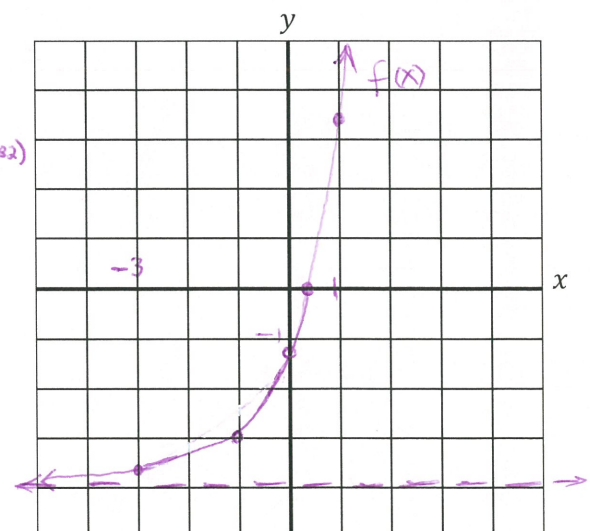
Domain:  $(-\infty, \infty)$

Range:  $(-4, \infty)$

Describe the transformations:

Shift left 1

Shift down 4



ctrl T to plot key pts.

Critical pt. (-1, -3) ↗

(left 1 and 4 down from (0, 1))

\*  $y = e^x$  is parent function  
with y-int. @ (0, 1)

## Graphing Logarithmic Functions

### Non-Calculator

3. Graph the function and label all key parts:

$$g(x) = \log_3(x - 3)$$

$$\begin{aligned} x-3 &= \infty \\ x &= 3 \end{aligned}$$

Identify the asymptote: V.A. @  $x=3$

Identify the y-intercept: None

Identify the x-intercept:  $4$  or @  $(4,0)$

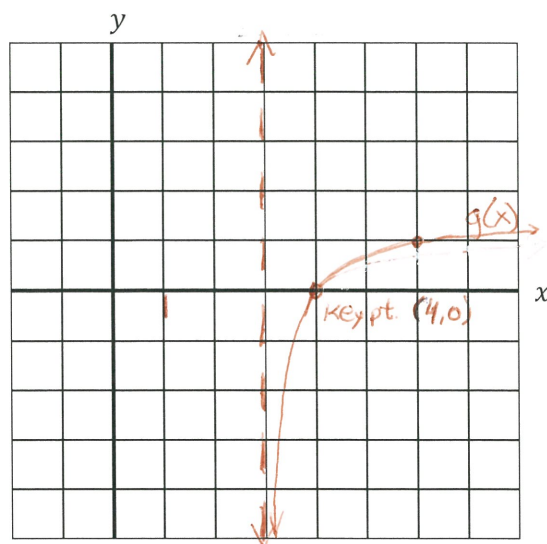
Domain:  $(3, \infty)$

Range:  $(-\infty, \infty)$

Describe the transformation(s):

Shift right 3

$$\begin{aligned} \text{x-int:} \\ 0 &= \log_3(x-3) \\ 3^0 &= x-3 \\ 1 &= x-3 \\ 4 &= x \end{aligned}$$



$$\begin{aligned} \text{Critical pt: } &(6, 1) \\ g(6) &= \log_3(6-3) \\ &= \log_3 3 \\ &= 1 \end{aligned}$$

4. Graph the function and label all key parts:

$$g(x) = \log_3(x + 3) - 2$$

$$\begin{aligned} x+3 &= 0 \\ x &= -3 \end{aligned}$$

Identify the asymptote: V.A. @  $x=-3$

Identify the y-intercept:  $-1$  or @  $(0,-1)$

Identify the x-intercept:  $6$  or @  $(6,0)$

Domain:  $(-3, \infty)$

Range:  $(-\infty, \infty)$

Describe the transformations:

shift left 3  
shift down 2

$$\begin{aligned} \text{y-int:} \\ g(0) &= \log_3(0+3) - 2 \\ &= \log_3 3 - 2 \\ &= 1 - 2 \\ &= -1 \end{aligned}$$

$$\begin{aligned} \text{x-int:} \\ 0 &= \log_3(x+3) - 2 \\ +2 & \qquad \qquad +2 \end{aligned}$$

$$2 = \log_3(x+3)$$

$$3^2 = x+3$$

$$9 = x+3$$

$$6 = x$$

