



3. (a) Sketch the graph of  $y = \log_2(x)$  using a small table of values. Please, be neat and label all important points.

- (b) Describe all transformations that must be performed to obtain from the graph you sketched in Part (a) the graph of  $f(x) = -3\log_2(x - 1) + 5$ . (You do not have to sketch the graph of  $y = f(x)$ .)

$$y = \log_2(x) \longrightarrow ( \quad )$$

$$\longrightarrow ( \quad )$$

$$\longrightarrow ( \quad )$$

$$\longrightarrow y = -3\log_2(x - 1) + 5 \quad ( \quad )$$

- (c) Find the domain and the vertical asymptote of the graph of  $y = f(x)$  starting from the domain of  $y = \log_2(x)$  and tracing carefully the changes induced by the transformations you described in Part (b).

4. Use properties of logarithms to expand or condense as appropriate the following expressions. Please, go as far as possible.

(a)  $\ln\left(\frac{x^3y}{\sqrt{z}}\right) =$

(b)  $7\log(a) - \frac{1}{3}\log(b) + 5\log(c) =$

5. Solve the following equations:

(a)  $10e^{8x+3} + 2 = 8.$

(b)  $\log(x) + \log(7 - x) = 1$