

KFUPM College Of Sciences Prep-Year Math. Program
 Quiz #1 **Math002 Sec.# 12,22**

Q1 Given $f(x) = \log_{\frac{1}{3}}(-x-2) + 1$.

- Find x and y intercept if any.
- Find domain and range of f.
- Write equation of asymptote .
- Sketch the graph of f.

Solution

a) X-intercept

$$\text{Let } y = 0 \rightarrow 0 = \log_{\frac{1}{3}}(-x-2) + 1 \rightarrow -1 = \log_{\frac{1}{3}}(-x-2)$$

$$\left(\frac{1}{3}\right)^{-1} = -x-2 \rightarrow 3 = -x-2 \rightarrow x = -5 \quad (-5, 0)$$

Y-intercept

$$\text{Let } x = 0 \rightarrow y = \log_{\frac{1}{3}}(0-2) + 1 = \log_{\frac{1}{3}}-2 + 1 \text{ undefined (no y-intercept)}$$

b) Domain: $-x-2 > 0 \rightarrow -x > 2 \rightarrow x < -2 \rightarrow D = (-\infty, -2)$

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

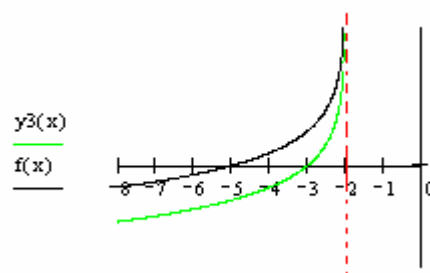
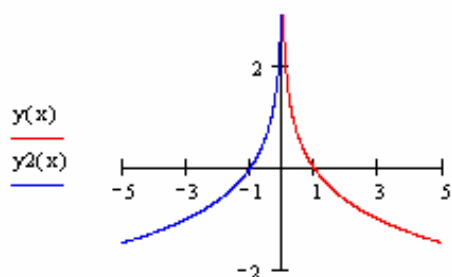
c) Vertical Asymptote $-x-2 = 0 \rightarrow x = -2$

d)

First we graph $y = \log_{\frac{1}{3}} x$, then $y_2 = \log_{\frac{1}{3}} -x$ by reflection through y-axis,

then $y_3 = \log_{\frac{1}{3}}(-x-2) = \log_{\frac{1}{3}}[-(x+2)]$ by shifting 2 units to the left,

then $f(x)$ by using part a.



Q2. Given $g(x) = -2^{x+1} + 4$.

- Find x and y intercept if any.
- Find domain and range of g .
- Write equation of asymptote .
- Sketch the graph of g .

Solution

a) X-intercept

$$\text{Let } y = 0 \rightarrow 0 = -2^{x+1} + 4 \rightarrow -4 = -2^{x+1} \rightarrow 2^2 = 2^{x+1} \rightarrow 2 = x+1 \rightarrow x = 1$$

Y-intercept

$$\text{Let } x = 0 \rightarrow y = -2^{0+1} + 4 = -2 + 4 = 2 \rightarrow (0, 2)$$

d)

First we graph $y = 2^x$, then $y_2 = -2^x$ by reflection through x -axis, then $y_3 = -2^x + 4$ by shifting 4 units upward, then $f(x)$ by using part a.

