

**King Fahd University of Petroleum and Minerals**  
**Prep-Year Math Program**  
**Math 002 - Term 142**  
**Recitation (4.3)**

**Question1** For the function  $f(x) = \log_{1/3}(x-1) - 2$

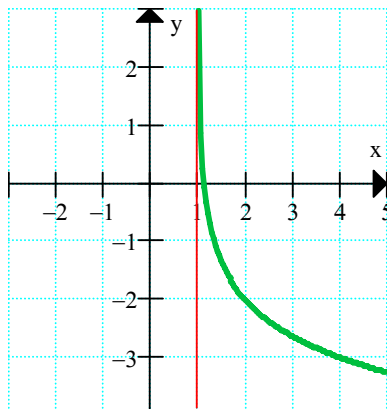
- 1) find , if any, the  $x$  – intercept and the  $y$  – intercept
- 2) find the domain
- 3) find the asymptote(s)
- 4) sketch the graph of  $f(x)$
- 5) find the inverse function  $f^{-1}(x)$

**Answer: (1):**  $x$  – intercept is  $x = \frac{10}{9}$        $y$  – intercept **does not exist**

**(2):**  $D_f = (1, \infty)$

**(3):** The vertical asymptote of the graph is:  $x = 1$

**(4):**



**(5):**  $f^{-1}(x) = \left(\frac{1}{3}\right)^{x+2} + 1$

**Question2** Expand the logarithm:  $\log_2 \left( \sqrt[3]{\frac{8x \cdot \sqrt{z}}{y^2 + 4}} \right)$

**Answer:**  $1 + \frac{1}{3} \log_2 |x| + \frac{1}{6} \log_2 z - \frac{1}{3} \log_2 (y^2 + 4)$

**Question3:** The graph of  $y = -\log_{\frac{1}{2}} |x-3|$  is below the x-axis on the interval(s):

- a)  $(1, 3) \cup (3, 5)$       b)  $(-\infty, 2) \cup (4, \infty)$       c)  $(2, 3) \cup (3, 4)$   
 d)  $(-\infty, 1) \cup (3, \infty)$       e)  $(3, \infty)$

**Question4**

The function  $y = \log_{(a+1)}(x-2)$  is **defined** when

- a)  $x > 2$  and  $a > -1$       b)  $x \geq 2$  and  $a \geq -1$       c)  $x > 0$  and  $a \neq 1$   
 d)  $x > 2$  and  $a > -1, a \neq 0$       e)  $x > 0$  and  $a > 0, a \neq 1$

### Question5

The expression  $\log x^3 y^4 - 3 \log 4 y^2 z + \log 8 x^2 y z$  can be written as:

- (a)  $\log 512 x^5 y^{11} z^4$                       (d)  $\log 2 x^5 y^3$   
(b)  $\log \frac{8}{3} x^5 y^3$                       (e)  $\log(x^3 y^4 - 12 y^2 z + 8 y z)$   
(c)  $\log \frac{x^5}{8 y z^2}$