

**King Fahd University of Petroleum and Minerals**  
**Faculty of Science, Prep-Year Math Program**  
**Math 002 - Term 052**  
**Quiz#1 (4.2 - 4.5)**

---

Name: \_\_\_\_\_ ID: \_\_\_\_\_ S/N: \_\_\_\_\_ Sec.: \_\_\_\_\_

---

**Question1:**

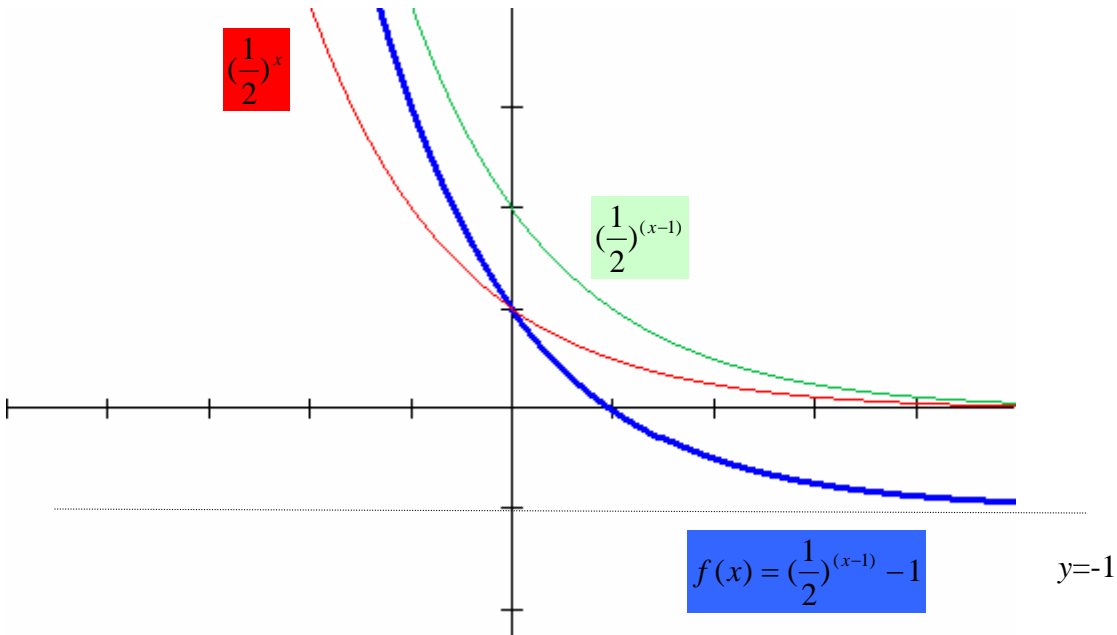
For the function

$$f(x) = \frac{2^{-x+2} - 2}{2}$$

- 1) Use translations of the graphs to sketch the graph of  $f(x)$  ( Show the  $x$  - intercept, the  $y$  - intercept, and the asymptote(s) on the graph **(4pts)**
- 2) Find  $f^{-1}(x)$  **(2pts)**
- 3) Find the range of  $f(x)$  **(1pts)**

**Solution:**

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



2)  $\left(\frac{1}{2}\right)^{y-1} - 1 = x \Rightarrow \left(\frac{1}{2}\right)^{y-1} = x + 1 \Rightarrow y - 1 = \log_{1/2}(x + 1) \Rightarrow f^{-1}(x) = 1 + \log_{1/2}(x + 1)$

3)  $R = (-1, \infty)$

**Question2:**

**(3pts)**

Solve the equation  $\log_3(-x) + \log_3(6-x) = 3$

**Solution:**

$$\log_3(-x) + \log_3(6-x) = 3$$

$$\log_3(-x)(6-x) = 3$$

$$-6x + x^2 = 3^3$$

$$x^2 - 6x - 27 = 0$$

$$(x-9)(x+3) = 0$$

$$x = 9 \text{ (Rejected) or } x = -3 \text{ (accepted)}$$

$$\therefore S.S = \{-3\}$$