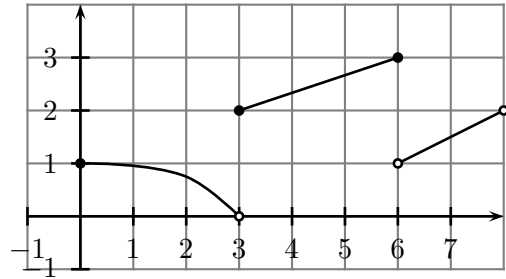


3. Table 1 below displays some values of an invertible function  $f(x)$ , while Figure 2 depicts the graph of the function  $g(x)$ .

Table 1

$x$	0	1	2	3	4	5	6
$f(x)$	2	6	5	4	1	3	7

Figure 2: Graph of  $g(x)$ 

- (a) (4 points) What is the domain of  $g$ ? of  $g^{-1}$ ?

The domain of  $g$  is  $[0, 8)$ .  
The domain of  $g^{-1}$  is  $(0, 3]$ .

- (b) (1 point each) Evaluate the following:

i.  $g(5)$

From the graph,  $g(x)$  is linear on  $[3, 6]$ , with slope  $\frac{1}{3}$ . Thus,

$$g(5) = g(3) + 2 \cdot \frac{1}{3} = 2 + \frac{2}{3} = \frac{8}{3}$$

ii.  $g(g(6))$

From the graph,  $g(6) = 3$ , so

$$g(g(6)) = g(3) = 2$$

iii.  $\lim_{x \rightarrow 3^-} g(x)$

$$\lim_{x \rightarrow 3^-} g(x) = 0$$

iv.  $g^{-1}(f^{-1}(5))$

From the table  $f^{-1}(5) = 2$ , so

$$g^{-1}(f^{-1}(5)) = g^{-1}(2) = 3$$

v.  $f(f(5))$

From the table,  $f(5) = 3$ , so

$$f(f(5)) = f(3) = 4$$

- (c) (4 points) Order the following from smallest to largest:  $g'(1)$ ,  $g'(2)$ ,  $g'(5)$ ,  $g'(6.4)$ .

$$g'(2) < g'(1) < g'(5) < g'(6.4)$$