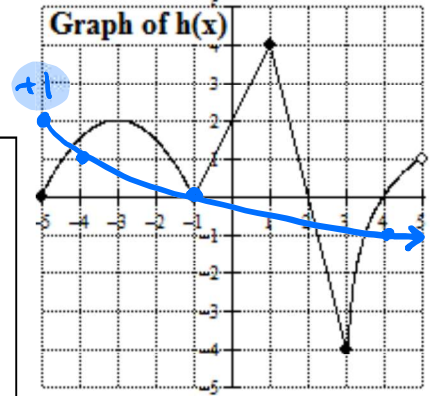


**Free Response Practice #10**  
**Calculator NOT Permitted**

The graph of a function  $h(x)$  is pictured to the right. Another function,  $g(x)$  is defined by the equation  $g(x) = -\sqrt{x+5} + 2$ .



a. **Identify** the interval(s) along the  $x$  axis where  $h(x) > 0$ . **Explain** your reasoning.

+1 If  $h(x) > 0$ , then the graph of  $h(x)$  is above the  $x$ -axis  
 +1  $\therefore h(x) > 0$  on  $(-5, -1) \cup (-1, 2) \cup (4, 5)$

b. If  $f(x) = |2x+1| - 4$ , then for what value(s) does  $f(x) = g(h(3))$ ? Show your work.

$$\begin{aligned} |2x+1| - 4 &= g(-4) \\ &= -\sqrt{(-4)+5} + 2 \\ &= -\sqrt{1} + 2 \\ &= -1 + 2 \\ |2x+1| - 4 &= 1 \end{aligned}$$

$$\begin{aligned} |2x+1| - 4 &= 1 \\ |2x+1| &= 5 \\ 2x+1 &= \pm 5 \\ 2x &= -1 \pm 5 \\ x &= \frac{-1 \pm 5}{2} \\ x &= \frac{-6}{2}, x = \frac{4}{2} \\ x &= -3, x = 2 \end{aligned}$$

c. On the same grid as  $h(x)$ , **graph  $g(x)$** . Then **determine** for how many values of  $x$  can it be said that  $h(x) = g(x)$ . Give a reason for your answer.

$h(x) = g(x)$  when the graphs of  $h(x)$  and  $g(x)$  intersect. +1  
 $h(x) = g(x)$  for 4 values of  $x$ .

d. Find an equation for  $g^{-1}(x)$ , if it exists. If  $g^{-1}(x)$  does not exist, give a reason why.

$$\begin{aligned} g(x) &= -\sqrt{x+5} + 2 && \text{range of } g(x): (-\infty, 2] \\ +1 \quad x &= -\sqrt{y+5} + 2 && \text{Domain of } g^{-1}(x): (-\infty, 2] \end{aligned}$$

$$\begin{aligned} x-2 &= -\sqrt{y+5} \\ -x+2 &= \sqrt{y+5} \\ (-x+2)^2 &= y+5 \\ (-x+2)^2 - 5 &= y \end{aligned}$$

$$g^{-1}(x) = (-x+2)^2 - 5, \quad x \leq 2. \quad +1$$