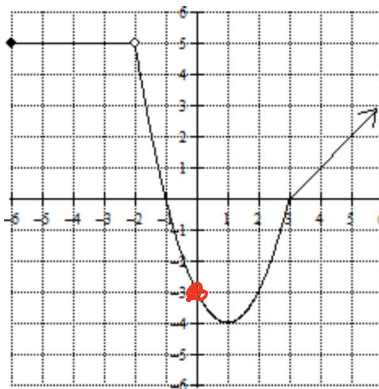
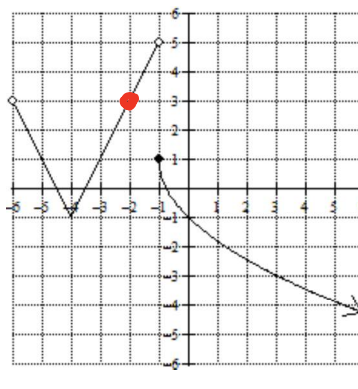


**Free Response Practice #2**  
**Calculator NOT Permitted**

Graph of  $F(x)$



Graph of  $G(x)$



Pictured above are two functions,  $F(x)$  and  $G(x)$ . Use the graphs to answer the following questions.

a. Identify the domain and range of  $G(x)$ .

Domain:  $(-6, \infty)$  Range:  $(-\infty, 5)$

b. If  $p(x) = \sqrt{x^2 + 2x + 1}$ , then what is the value of  $[3 \cdot p(3) + F(0) \cdot G(-2)]$ . Show your work or explain how you determined the values of  $p(3)$ ,  $F(0)$  and  $G(-2)$ .

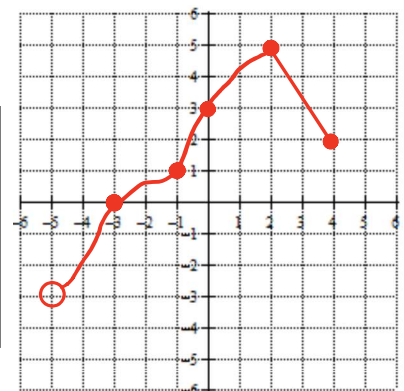
$$\begin{array}{l|l|l}
 p(3) = \sqrt{(3)^2 + 2(3) + 1} & F(0) = -3 & 3 \cdot p(3) + F(0) \cdot G(-2) \\
 = \sqrt{9 + 6 + 1} & G(-2) = 3 & = 3 \cdot 4 + (-3)(3) \\
 = \sqrt{16} & & = 12 - 9 \\
 p(3) = 4 & & = 3
 \end{array}$$

c. If  $F(x) \geq 0$ , then what must be true about the graph of  $F(x)$ ? Then, state the interval(s) on which the graph of  $F(x) \geq 0$ .

If  $F(x) \geq 0$ , then the graph of  $F(x)$  is on or above the x-axis.  
 $F(x) \geq 0$  on  $[-6, -2) \cup (-2, -1] \cup [3, \infty)$

d. Sketch a possible graph of a function,  $H(x)$ , which satisfies each of the conditions below.

- $H(-5)$  is undefined. ✓
- $H(0) = 3$  ✓
- $H(-3) = 0$  ✓
- $H(2) = 5$  ✓
- $H(4) = 2$  ✓
- $H(-1) = 1$  ✓
- The range of  $H(x)$  is  $(-3, 5]$  ✓
- The domain of  $H(x)$  is  $(-5, 4]$ . ✓
- $H(x)$  is increasing on  $(-5, 2)$  and decreasing on  $(2, 4)$  ✓



## Free Response Practice #2 Grading Rubric

### Free Response Part A – 1 point total

\_\_\_ 1 The domain of  $G(x)$  is  $(-6, \infty)$  and the range of  $G(x)$  is  $(-\infty, 5)$ .

### Free Response Part B – 3 points total

\_\_\_ 1 Correctly finds  $p(3) = 4$

\_\_\_ 1 Correctly identifies and uses  $F(0) = -3$  and  $G(-2) = 1$  3

\_\_\_ 1  $[3 \cdot p(3) + F(0) \cdot G(-2)] = 3(4) + (-3)(1) = 12 - 3 = 9$  3

### Free Response Part C – 2 points total

\_\_\_ 1 If  $F(x) \geq 0$ , then the graph of the function is above or on the  $x$  – axis.

\_\_\_ 1  $F(x) \geq 0$  on the interval  $[-6, -2) \cup (-2, -1] \cup [3, \infty)$

### Free Response Part D – 3 points total

\_\_\_ 1 The final graph is that of a function, passing the vertical line test

\_\_\_ 1 All 5 of the function values listed are graphed correctly as points.

\_\_\_ 1 The final graph is a connected having a range of  $(-3, 5]$  and a domain of  $(-5, 4]$ .

