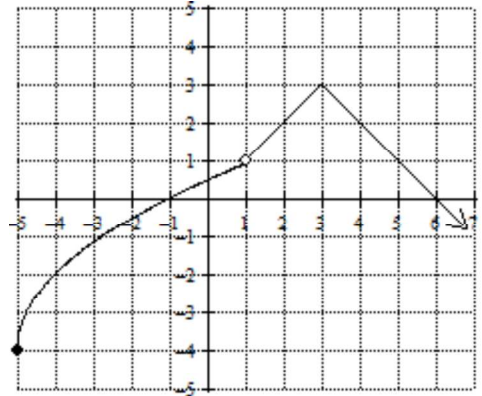


Free Response Practice #3
Calculator NOT Permitted

Pictured to the right is the graph of a piece-wise defined function, $g(x)$, that consists of a piece of a square root function and a piece of an absolute value function.



a. Express $g(x)$ as an equation in piece-wise defined form.

	Equation	,	Constraint
{	$2\sqrt{x+5} - 4$		$-5 \leq x < 1$
	$- x-3 + 3$		$x > 1$

b. If $f(x) = 3(x - 2) + 2ax$, for what value(s) of a does $f(3) = [-2 \cdot g(-4) - 3 \cdot g(3)]$? Show your work.

$-2 \cdot g(-4) - 3 \cdot g(3)$ $= -2 \cdot (-2) - 3(3)$ $= 4 - 9$ $= -5$	$f(3) = 3(3-2) + 2a(3)$ $= 3(1) + 6a$ $f(3) = 3 + 6a$	$f(3) = -2 \cdot g(-4) - 3 \cdot g(3)$ $3 + 6a = -5$ $6a = -8$ $a = -4/3$
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c. If $g(x) < 0$, then explain graphically what that means about the graph of $g(x)$. Then, state the interval(s) of values along the x – axis for which $g(x) < 0$.

If $g(x) < 0$, then y is negative
 \therefore graph of $g(x)$ is below the x -axis.
 $\therefore g(x) < 0$ on $[-5, -1) \cup (4, \infty)$

d. If $g(x) \geq 0$, then explain graphically what that means about the graph of $g(x)$. Then, state the interval(s) of values along the x – axis for which $g(x) \geq 0$.

If $g(x) \geq 0$, then $y = 0$ or y is positive.
 \therefore graph of $g(x)$ is on or above the x -axis.
 $\therefore g(x) \geq 0$ on $[-1, 1) \cup (1, 6]$

Free Response Practice #3 Grading Rubric

Free Response Part A – 2 points total

_____ 1 Correct equation and constraint for the square root piece: $2\sqrt{x+5} - 4$, $-5 \leq x < 1$

_____ 1 Correct equation and constraint for the absolute value piece: $-|x-3|+3$, $x > 1$

Free Response Part B – 3 points total

_____ 1 Correct value of $[-2 \cdot g(-4) - 3 \cdot g(3)] = -2(-2) - 3(3) = 4 - 9 = -5$

_____ 1 Sets $f(3) = [-2 \cdot g(-4) - 3 \cdot g(3)]$: $3(3 - 2) + 2a(3) = -5$

_____ 1 Correctly solves for a : $3 + 6a = -5 \rightarrow 6a = -8 \rightarrow a = -\frac{4}{3}$

Free Response Part C – 2 points total

_____ 1 If $g(x) < 0$, then the y – values of $g(x)$ are negative which means that the graph of $g(x)$ will be below the x – axis.

_____ 1 $g(x) < 0$ on the interval $[-5, -1) \cup (6, \infty)$.

Free Response Part D – 2 points total

_____ 1 If $g(x) \geq 0$, then the y – values of $g(x)$ are zero or positive which means that the graph of $g(x)$ will be on or above the x – axis.

_____ 1 $g(x) \geq 0$ on the interval $[-1, 1) \cup (1, 6]$.