**2.*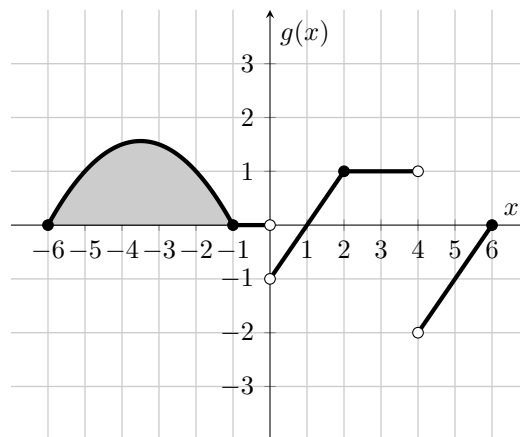* [15 points] The function $g(x)$ is graphed below. The area of the shaded region is 5.5. The function $g(x)$ is piecewise linear for $x > -1$.

On the axes provided below, sketch a continuous antiderivative $G(x)$ of $g(x)$ with domain $[-6, 6]$, satisfying $G(1) = 1$. Make sure to clearly label the input and output values at $x = -6, -1, 2, 4$, and 6. Be sure to make it clear where $G(x)$ is **concave up**, **concave down**, or **linear**, and where it is **increasing**, **decreasing**, or not **differentiable**.
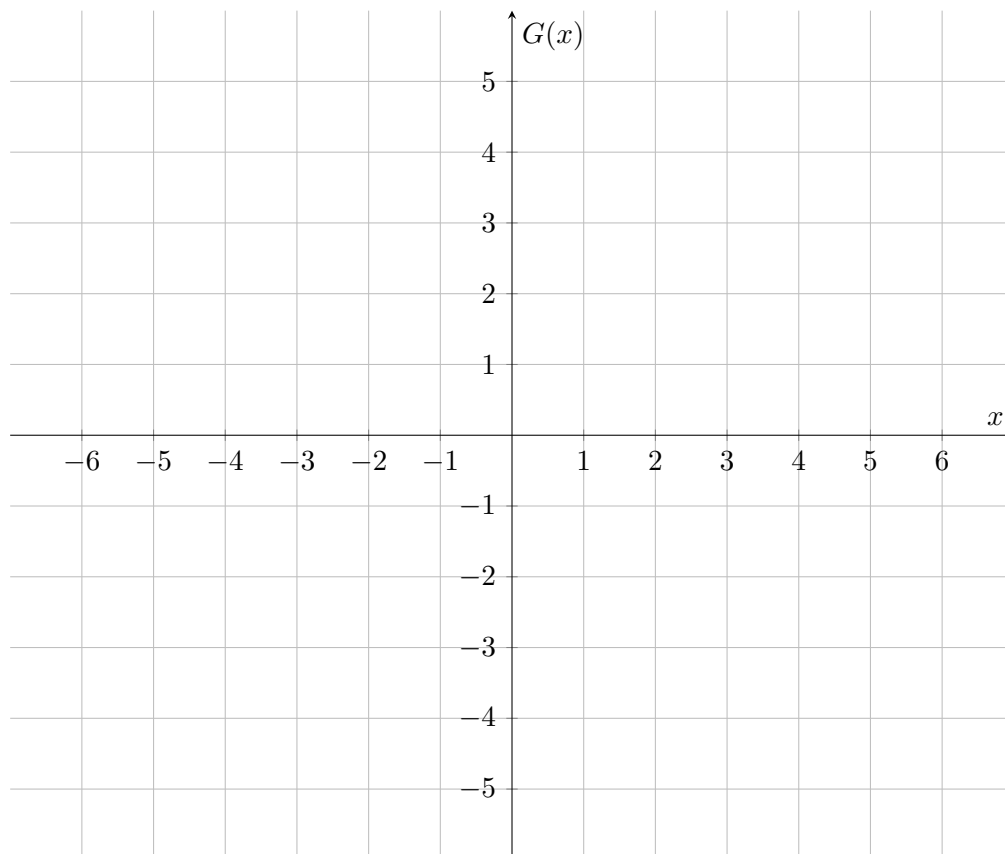
Solution: The input/output values at the specified points are labeled in the figure. The graph of $G(x)$ should be concave up on $(-6, -3.5)$, $(0, 2)$, and $(4, 6)$, concave down on $(-3.5, -1)$, and linear on $(-1, 0)$ and $(2, 4)$. The function $G(x)$ is increasing on $(-6, -1)$ and $(1, 4)$ and decreasing on $(0, 1)$ and $(4, 6)$. The function $G(x)$ is not differentiable at $(0, 1.5)$ and $(4, 3.5)$.