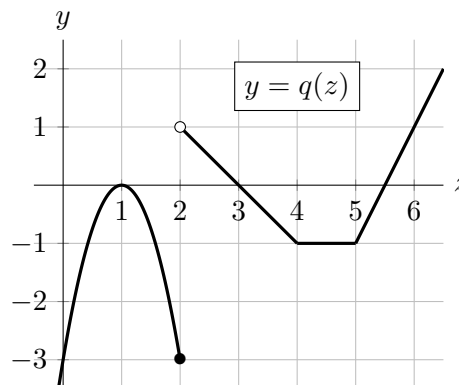


2. [13 points]

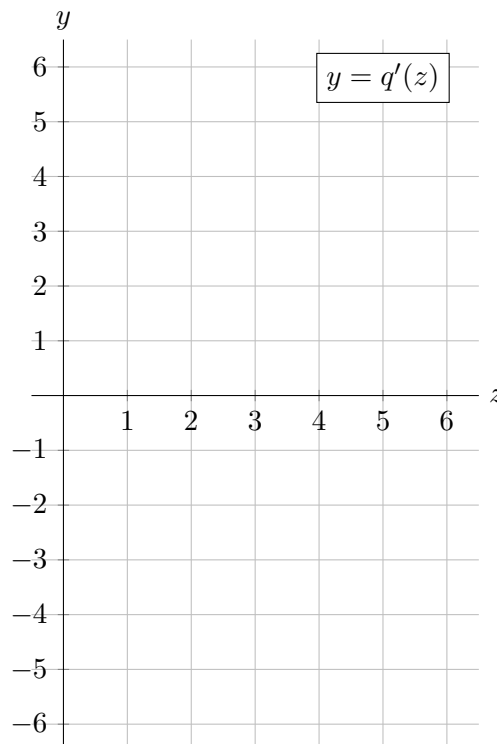
A portion of the graph of the function $q(z)$ is shown to the right. Note the following about $q(z)$:

- on the interval $0 \leq z \leq 2$, $q(z) = -3(z-1)^2$;
- $q(z)$ is linear on each of the intervals $(2, 4)$, $(4, 5)$, and $(5, 6)$.



- a. [6 points] On the axes to the right, sketch a detailed graph of $q'(z)$, the *derivative* of $q(z)$, for $0 < z < 6$. Make sure the following are clear from your graph:

- where $q'(z)$ is undefined;
- any vertical asymptotes of $q'(z)$;
- where $q'(z)$ is zero, positive, and negative;
- where $q'(z)$ is increasing, decreasing, and constant.



- b. [7 points] Let $Q(z)$ be a continuous *antiderivative* of $q(z)$ with $Q(3) = \frac{1}{2}$. On the axes to the right, sketch a detailed graph of $Q(z)$ for $0 \leq z \leq 6$. Make sure that the following are clear from your graph:

- where $Q(z)$ is and is not differentiable;
- the values of $Q(z)$ at $z = 0, 1, 2, 3, 4, 5, 6$;
- where $Q(z)$ is increasing, decreasing, and constant;
- where $Q(z)$ is linear (with correct slope);
- the concavity of $Q(z)$.

