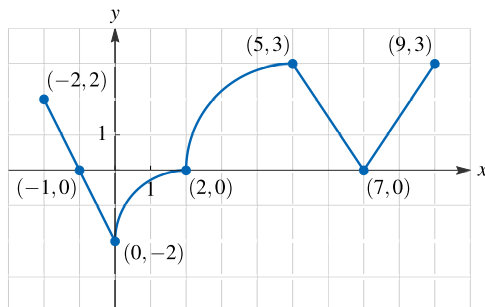


AP Calculus Mock Exam

AB 1

The continuous function f has domain $-2 \leq x \leq 9$. The graph of f , consisting of three line segments and two quarter circles, is shown in the figure.



Graph of f

Let g be the function defined by $g(x) = \int_0^x f(t) dt$ for $-2 \leq x \leq 9$.

- Find the x -coordinate of each critical point of g on the interval $-2 \leq x \leq 9$.
- Classify each critical point from part (a) as the location of a relative minimum, a relative maximum, or neither for g . Justify your answers.
- For $-2 \leq x \leq 9$, on what open intervals is g increasing and concave down? Give a reason for your answer.
- Find the value of $g(-1)$. Show the computations that lead to your answer.
- Find the value of $g(2)$. Show the computations that lead to your answer.
- Find the absolute maximum value of g over the interval $-2 \leq x \leq 5$.
- Find the value of $g''(6)$, or explain why it does not exist.
- Must there exist a value of d , for $0 < d < 2$, such that $g'(d)$ is equal to the average rate of change of g over the interval $0 \leq x \leq 2$? Justify your answer.
- Find $\lim_{x \rightarrow 0} \frac{3x + g(x)}{\sin x}$. Show the computations that lead to your answer.
- The function h is defined by $h(x) = x \cdot g(x^2)$. Find $h'(\sqrt{2})$. Show the computations that lead to your answer.