AP Calculus AB
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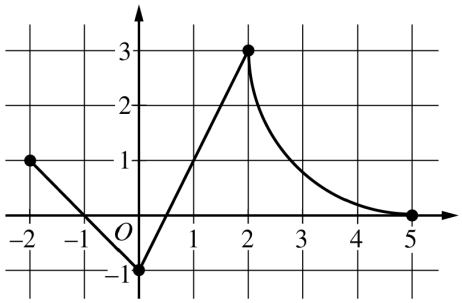
Homework 0507f
Thursday, May 7, 2020

Problem 1. The continuous function f is defined on the closed interval $-6 \leq x \leq 5$. The figure below shows a portion of the graph of f, consisting of two line segments and a quarter of a circle centered at the point $(5, 3)$. It is known that the point $(3, 3 - \sqrt{5})$ is on the graph of f.

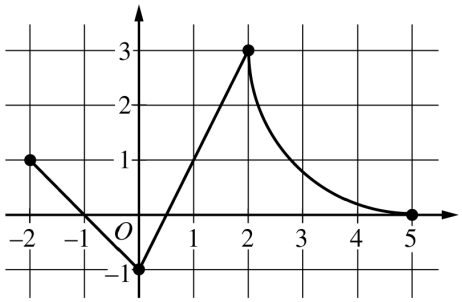


Graph of f

(a) If $\displaystyle\int_{-6}^{5} f(x)\,dx = 7$, find the value of $\displaystyle\int_{-6}^{-2} f(x)\,dx$. Show the work that leads to your answer.

(b) Evaluate $\displaystyle\int_{3}^{5} (2f'(x) + 4)\,dx$.

Problem 1 (continued)**.** The continuous function f is defined on the closed interval $-6 \le x \le 5$. The figure below shows a portion of the graph of f, consisting of two line segments and a quarter of a circle centered at the point $(5, 3)$. It is known that the point $(3, 3 - \sqrt{5})$ is on the graph of f.



Graph of f

(c) The function g is given by $g(x) = \displaystyle\int_{-2}^{x} f(t)\,dt$. Find the absolute maximum value of g on the interval $-2 \le x \le 5$. Justify your answer.

(d) Find $\displaystyle\lim_{x \to 1} \frac{10^x - 3f'(x)}{f(x) - \arctan x}$.