

**2017 AP<sup>®</sup> CALCULUS AB FREE-RESPONSE QUESTIONS**

2. When a certain grocery store opens, it has 50 pounds of bananas on a display table. Customers remove bananas from the display table at a rate modeled by

$$f(t) = 10 + (0.8t)\sin\left(\frac{t^3}{100}\right) \text{ for } 0 < t \leq 12,$$

where  $f(t)$  is measured in pounds per hour and  $t$  is the number of hours after the store opened. After the store has been open for three hours, store employees add bananas to the display table at a rate modeled by

$$g(t) = 3 + 2.4 \ln(t^2 + 2t) \text{ for } 3 < t \leq 12,$$

where  $g(t)$  is measured in pounds per hour and  $t$  is the number of hours after the store opened.

- (a) How many pounds of bananas are removed from the display table during the first 2 hours the store is open?
- (b) Find  $f'(7)$ . Using correct units, explain the meaning of  $f'(7)$  in the context of the problem.
- (c) Is the number of pounds of bananas on the display table increasing or decreasing at time  $t = 5$ ? Give a reason for your answer.
- (d) How many pounds of bananas are on the display table at time  $t = 8$ ?
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**END OF PART A OF SECTION II**