

## Grass Clippings free response question

*AP Calculus*

Some reminders:

Part a: Since it asks for units of measure, you MUST include them (or you'll lose points)

Part b: "Interpret" means use words to describe clearly what the value means

Note: This is a calculator problem....so for this problem, use your graphing calculator. But for this year's AP exam, NO QUESTION will require a graphing calculator....you will, however, be able to use one if you choose.

Grass clippings are placed in a bin, where they decompose. For  $0 \leq t \leq 30$ , the amount of grass clippings remaining in the bin is modeled by  $A(t) = 6.687(0.931)^t$ , where  $A(t)$  is measured in pounds and  $t$  is measured in days.

- Find the average rate of change of  $A(t)$  over the interval  $0 \leq t \leq 30$ . Indicate units of measure.
- Find the value of  $A'(15)$ . Using correct units, interpret the meaning of the value in the context of the problem.
- Find the time  $t$  for which the amount of grass clippings in the bin is equal to the average amount of grass clippings in the bin over the interval  $0 \leq t \leq 30$ .
- For  $t > 30$ ,  $L(t)$ , the linear approximation to  $A$  at  $t = 30$ , is a better model for the amount of grass clippings remaining in the bin. Use  $L(t)$  to predict the time at which there will be 0.5 pound of grass clippings remaining in the bin. Show the work that leads to your answer.

