2) (10 pts) ANL (Algorithm Analysis)

An algorithm processes an array of size ***r*** by ***c*** in O(***rc²***) time. For an array of size ***r*** = 200 and ***c*** = 500, the algorithm takes 5.0 seconds. How long, in seconds, will the algorithm take to process an input array of size ***r*** = 800 and ***c*** = 300? Please express your answer with exactly one digit after the decimal point.

Let T(r, c) = Mrc^2, for some constant M and represent the run time of the algorithm processing the array. Using the given information, we have:

$$T(200, 500) = M(200)500^2 = 5sec$$

$$50{,}000{,}000M = 5sec$$
$$M = 10^{-7}sec$$

Now, we must solve for T(800, 300):

$$T(800, 300) = (10^{-7}sec)(800)300^2 = (10^{-7}\text{sec})(72)(10^6) = 7.2seconds$$

Grading: 2 pts for setting up equation with constant, r and c.
2 pts for solving for the constant (M in what's above)
2 pts for setting up equation for solution
4 pts for properly simplifying the answer to 7.2 seconds (may award partial)