Linear Partition Worksheet

Define $M[n, k]$ to be the minimum possible cost over all partitions of $(s_1, \ldots, s_n)$ into k ranges.

1. Consider the input $(100, 200, 300, 400, 500, 600, 700)$ with $k = 3$.
   What is $M[7, 3]$? (**Hint:** It should be possible to answer this by visual inspection.)

   $(100, 200, 300, 400), (500, 600), (700)$

   $M[7, 3] = 1,100$

2. What are $M[1, 2]$, $M[2, 2]$, $M[3, 2]$, $M[4, 2]$, $M[5, 2]$, $M[6, 2]$, and $M[7, 2]$?.

   $M[1, 2] = 100$
   $M[2, 2] = 200$
   $M[3, 2] = 300$
   $M[4, 2] = 600$
   $M[5, 2] = 900$
   $M[6, 2] = 1,100$
   $M[7, 2] = 1,500$

3. Can you write a formula for $M[7, 3]$ in terms of $M[1, 2]$, $M[2, 2]$, $M[3, 2]$, $M[4, 2]$, $M[5, 2]$, $M[6, 2]$, and $M[7, 2]$?

   $M[7, 3] = \max(M[6, 2], s[7]) = 1,100$