Ans 3. Let the array of drops be D with elements $d_1, d_2, d_3 \ldots d_n$

Also, let S_{ij} represent the subarray $d_i, d_{i+1} \ldots d_j$.

Thus $D = S_{1n}$ (n is the length of D)

& $d_i = S_{ii}$

~~a) Subproblem Description~~

→ Let $F(S_{ij})$ represent the set of possible ways to combine the drops according to the problem rules.

→ Let $F_0(S_{ij})$ be the optimal (required) solution from the set $F(S_{ij})$

a) Subproblem ~~Defin~~ Description

$F_0(S_{ij})$ can be reduced to finding $F_0(S_{ip})$ and $F_0(S_{(p+1)j})$ for some $i \le p \le j$ s.t. combining them gives $F_0(S_{ij})$

b) Recurrence Relation:

$$F_0(S_{ij}) = \begin{cases} 0 & ; \ j-i = 0 \\ d_i^2 + d_j^2 & ; \ j-i = 1 \\ \max\limits_{i \le k \le j} \left[F_0(S_{ik}) + F(S_{(k+1)j}) + \left(\sum\limits_{r=i}^{k} d_r\right)^2 + \left(\sum\limits_{r=k+1}^{j} d_r\right)^2 \right] & ; \ j-i > 1 \end{cases}$$