Consider water supply for a region consisting of three cities. The total available water supply is 8 units. Determine the optimal allocation of water to the three cities that maximizes the total economic return for the region. The relationship between the economic return and the quantity of water allocated for each city are given in the following table:

|  |  |  |  |
| --- | --- | --- | --- |
|  | City | | |
|  | 1 | 2 | 3 |
| q | r1(q) | r2(q) | r3(q) |
| 0 | 0 | 0 | 0 |
| 1 | 6 | 5 | 7 |
| 2 | 12 | 14 | 30 |
| 3 | 35 | 40 | 42 |
| 4 | 75 | 55 | 50 |
| 5 | 85 | 65 | 60 |
| 6 | 91 | 70 | 70 |
| 7 | 96 | 75 | 72 |
| 8 | 100 | 80 | 75 |