Scenario:

We assume that the business being considered is a tech consumer product retailer. Where the first product is a smartphone produced by a well-known manufacturer. The second product on the other hand is a smartwatch produced by a less known brand. In order to boost the sales of the smartwatches the retailer offer promotion bundles to customers who buy a smartphone. The number of promotion bundles is set by the business unit and are offered to customers based on the class of customers they belong to. The customers are classified into one of four classes each with different properties; the classes are the following:

1. Young customers under 30
   1. They are willing to pay considerable sums for product 1 however have a somewhat limited budget
   2. They are interested in buying smartwatches and will pay higher prices if they are justified by the product capabilities
2. Middle aged customers over 30 years of age
   1. They will pay larger sums for product 1 and have larger upper bound on their budgets
   2. They are not as interested in smartwatches as class 1 however they would buy it in case of an attractive offer
3. Older member aging over 60
   1. They are not as interested in buying tech products as the first two classes as such are not willing to pay as much
   2. They have little to no interest in buying a smartwatch and would not buy it unless in case of an extremely discounted price
4. Recurring loyalty card holder customers
   1. As loyal customers they expect attractive prices however they have a trusting relationship with the retailer therefore they are motivated to buy products from the shop
   2. They are motivated in buying smartwatches due to the bundle offered by the retailer and have increased interest as the bundle discount is increased

A smartphone costs the retailer 550/unit with the conversion rate for each candidate price and profit margin shown in the following table:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Price/Margin | 600/50 | 700/150 | 800/250 | 900/350 | 1000/450 | 1100/550 | 1200/650 |
| Class 1 | .45 | .6 | .57 | .52 | .37 | .15 | .08 |
| Class 2 | .5 | .55 | .51 | .47 | .42 | .35 | .21 |
| Class 3 | .45 | .42 | .35 | .27 | .14 | .1 | .05 |
| Class 4 | .65 | .7 | .67 | .55 | .3 | .21 | .11 |

The offered promos P0, P1, P2, P3 offer a discount on the price of a smartwatch of 0%, 10%, 20% and 25% respectively.

The cost of a smartwatch is 50/unit, the following table shows conversion rates for each class against different candidate prices and promo bundle combination:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Price/Margin | 70/20  63/13  56/6  52.5/2.5 | 75/25  67.5/17.5  60/10  56.25/6.25 | 80/30  72/22  64/14  60/10 | 85/35  76.5/26.5  68/18  63.75/13.75 | 90/40  81/31  72/22  67.5/17.5 | 95/45  85.5/35.5  76/26  71.25/21.25 | 100/50  90/40  80/30  75/25 |
| Class 1/P0 | .57 | .55 | .53 | .48 | .46 | .43 | .32 |
| Class 1/P1 | .6 | .58 | .56 | .55 | .53 | .48 | .46 |
| Class 1/P2 | .67 | .65 | .6 | .58 | .56 | .55 | .53 |
| Class 1/P3 | .69 | .67 | .65 | .6 | .58 | .56 | .55 |
|  | | | | | | | |
| Class 2/P0 | .38 | .35 | .31 | .25 | .22 | .2 | .18 |
| Class 2/P1 | .4 | .39 | .37 | .35 | .31 | .25 | .22 |
| Class 2/P2 | .49 | .43 | .4 | .39 | .37 | .35 | .31 |
| Class 2/P3 | .53 | .49 | .43 | .4 | .39 | .37 | .35 |
|  | | | | | | | |
| Class 3/P0 | .17 | .12 | .08 | .06 | .06 | .05 | .04 |
| Class 3/P1 | .24 | .2 | .15 | .12 | .08 | .06 | .06 |
| Class 3/P2 | .37 | .3 | .23 | .2 | .15 | .12 | .08 |
| Class 3/P3 | .39 | .36 | .3 | .23 | .2 | .16 | .12 |
|  | | | | | | | |
| Class 4/P0 | .49 | .35 | .29 | .25 | .21 | .18 | .15 |
| Class 4/P1 | .53 | .5 | .46 | .34 | .29 | .25 | .21 |
| Class 4/P2 | .65 | .55 | .52 | .5 | .46 | .34 | .26 |
| Class 4/P3 | .68 | .65 | .55 | .52 | .5 | .46 | .35 |

Some other parameters:

* On average there are 500 customers per day
* Average customer class distribution [200, 150, 50, 100] for classes 1, 2, 3 and 4 respectively
* Promo distribution settings:
  + Setting 1: [0.3, 0.15, 0.25] for promo levels P1, P2, and P3 respectively
  + Setting 2: [0.25, 0.35, 0.2] for promo levels P1, P2, and P3 respectively
  + P0 is unlimited in all cases since it corresponds to no discount
* Conversion rates for second phase:
  + Conversion rates for first product decreased for classes 1 & 2 while staying the same for classes 3 & 4
  + Conversion rates for second product decreased for classes 3 & 4 while staying the same for classes 1 & 2