**The Problem**

Finicky's Jewelers sells watches for $50 each. During the next month, they estimate that they will sell 15, 25, 35, or 45 watches with respective probabilities of 0.35, 0.25, 0.20, and ... (figure it out). They can only buy watches in lots of ten from their dealer. 10, 20, 30, 40, and 50 watches cost $40, 39, 37, 36, and 34 per watch respectively. Every month, Finicky's has a clearance sale and will get rid of any unsold watches for $24 (watches are only in style for a month and so they have to buy the latest model each month). Any customer that comes in during the month to buy a watch, but is unable to, costs Finicky's $6 in lost goodwill.

Find the best action under each of the four decision criteria.

**The Solution**

**Creating the Payoff Table**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **Buy 10** |  | **Buy 20** |  | **Buy 30** |  | **Buy 40** |  | **Buy 50** |  |
| **Demand 15** | 10 bought at $40 | -400 | 20 bought at $39 | -780 | 30 bought at $37 | -1110 | 40 bought at $36 | -1440 | 50 bought at $34 | -1700 |
|  | 10 sold @ $50 | 500 | 15 sold @ $50 | 750 | 15 sold @ $50 | 750 | 15 sold @ $50 | 750 | 15 sold @ $50 | 750 |
|  | 5 lost goodwill @ $6 | -30 | 5 clearance at $24 | 120 | 15 clearance at $24 | 360 | 25 clearance at $24 | 600 | 35 clearance at $24 | 840 |
| **Total** |  | 70 |  | 90 |  | 0 |  | -90 |  | -110 |
|  |  |  |  |  |  |  |  |  |  |  |
| **Demand 25** | 10 bought at $40 | -400 | 20 bought at $39 | -780 | 30 bought at $37 | -1110 | 40 bought at $36 | -1440 | 50 bought at $34 | -1700 |
|  | 10 sold @ $50 | 500 | 20 sold @ $50 | 1000 | 25 sold @ $50 | 1250 | 25 sold @ $50 | 1250 | 25 sold @ $50 | 1250 |
|  | 15 lost goodwill @ $6 | -90 | 5 lost goodwill @ $6 | -30 | 5 clearance at $24 | 120 | 15 clearance at $24 | 360 | 25 clearance at $24 | 600 |
| **Total** |  | 10 |  | 190 |  | 260 |  | 170 |  | 150 |
|  |  |  |  |  |  |  |  |  |  |  |
| **Demand 35** | 10 bought at $40 | -400 | 20 bought at $39 | -780 | 30 bought at $37 | -1110 | 40 bought at $36 | -1440 | 50 bought at $34 | -1700 |
|  | 10 sold @ $50 | 500 | 20 sold @ $50 | 1000 | 30 sold @ $50 | 1500 | 35 sold @ $50 | 1750 | 35 sold @ $50 | 1750 |
|  | 25 lost goodwill @ $6 | -150 | 15 lost goodwill @ $6 | -90 | 5 lost goodwill @ $6 | -30 | 5 clearance at $24 | 120 | 15 clearance at $24 | 360 |
| **Total** |  | -50 |  | 130 |  | 360 |  | 430 |  | 410 |
|  |  |  |  |  |  |  |  |  |  |  |
| **Demand 45** | 10 bought at $40 | -400 | 20 bought at $39 | -780 | 30 bought at $37 | -1110 | 40 bought at $36 | -1440 | 50 bought at $34 | -1700 |
|  | 10 sold @ $50 | 500 | 20 sold @ $50 | 1000 | 30 sold @ $50 | 1500 | 40 sold @ $50 | 2000 | 45 sold @ $50 | 2250 |
|  | 35 lost goodwill @ $6 | -210 | 25 lost goodwill @ $6 | -150 | 15 lost goodwill @ $6 | -90 | 5 lost goodwill @ $6 | -30 | 5 clearance at $24 | 120 |
| **Total** |  | -110 |  | 70 |  | 300 |  | 530 |  | 670 |

**Payoff Table**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  |  | **Buy** | | | | |
|  |  | **10** | **20** | **30** | **40** | **50** |
| **Demand** | **15** | 70 | 90 | 0 | -90 | -110 |
| **25** | 10 | 190 | 260 | 170 | 150 |
| **35** | -50 | 130 | 360 | 430 | 410 |
| **45** | -110 | 70 | 300 | 530 | 670 |

**Opportunistic Loss Table**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  |  | **Buy** | | | | |
|  |  | **10** | **20** | **30** | **40** | **50** |
| **Demand** | **15** | 20 | 0 | 90 | 180 | 200 |
| **25** | 250 | 70 | 0 | 90 | 110 |
| **35** | 480 | 300 | 70 | 0 | 20 |
| **45** | 780 | 600 | 370 | 140 | 0 |

**Best Choices**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **Buy** | | | | | **Best Action** |
| **Criteria** | **10** | **20** | **30** | **40** | **50** |
| **Expected value** | -5 | 119 | 197 | 203 | **215** | Buy 50 |
| **Maximax** | 70 | 190 | 360 | 530 | **670** | Buy 50 |
| **Maximin** | -110 | **70** | 0 | -90 | -110 | Buy 20 |
| **Minimax** | 780 | 600 | 370 | **180** | 200 | Buy 40 |