21-Dumoor Appliance Center sells and services several brands of major appliances. Past sales for a particular model of refrigerator have resulted in the following probability distribution for demand:

DEMAND PER WEEK	0	1	2	3	4
Probability	0.20	0.40	0.20	0.15	0.05

The lead time, in weeks, is described by the following distribution:

LEAD TIME (WEEKS)	1	2	3
Probability	0.15	0.35	0.50

Based on cost considerations as well as storage space, the company has decided to order 10 of these each time an order is placed. The holding cost is $1 per week for each unit that is left in inventory at the end of the week. The stock out cost has been set at $40 per stock out. The company has decided to place an order whenever there are only two refrigerators left at the end of the week. Simulate 10 weeks of operation for Dumoor Appliance assuming there are currently 5 units in inventory. Determine what the weekly stock out cost and weekly holding cost would be for the problem.

Solution

To simulate the random number intervals for the both demand for the week and lead time per the week

Random number intervals for the demand per week for the DA enter

Demand per week	Probability	Cumulative probability	Random number intervals
0	0.20	0.2	01 through 20
1	0.40	0.6	21 through 60
2	0.20	0.8	61 through 80
3	0.15	0.95	81 through 95
4	0.05	1.00	96 through 00

Random Number intervals for the lead time per week for the DA center

Lead time (weeks)	Probability	Cumulative probability	Random number intervals
1	0.15	0.15	01 through 15
2	0.35	0.50	16 through 50
3	0.50	1.00	51 through 00

Now allocate demand of the lead time and demand for the week using random number intervals

Random number	Random number intervals	Demand of the week	Random numbers	Random number intervals	Demand of the random of the week
52	21 through 60	1	06	01 through 15	1
37	21 through 60	1	63	51 through 00	3
82	81 through 95	3	57	51 through 00	3
69	61 through 80	2	02	1 through 15	1
98	96 through 00	4	94	51 through 00	3
96	96 through 00	4	52	51 through 00	3
33	21 through 60	1	69	51 through 00	3
50	21 through 60	1			
88	81 through 95	3			
90	81 through 95	3			

weeks	Units received	Beginning inventory	Random number	demand	Ending inventory	Lost sale	order	Random number	Lead time
1		5	52	1	4	0	No		
2		4	37	1	3	0	No		
3		3	82	3	0	0	Yes	06	1
4		0	69	2	0	2	No		
5	10	10	98	4	6	0	No		
6		6	96	4	2	0	Yes	63	3
7		2	33	1	1	0	No		
8		1	50	1	0	0	No		
9		0	88	3	0	3	No		
10	10	10	90	3	7	0	No		
					23	5			

Weekly stockout cost = (Cost per lost sale) * (Average number of lost sales per week)

Weekly stock out cost = (40) * (5/10) = 20

Weekly holding cost = (Cost of holding one unit for one day) * (Average ending inventory)

Weekly holding cost = (1) * (2.3) = 2.3