**Assignment #8 - Solution**

**(S7.15,S7.24,S7.25,S33)**



b, c) For both quantities, oven A is slightly more profitable (but oven B is catching up).

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | Oven A | Oven B | Unit Sales of |  |  |
| Fixed cost | $20,000.00 | $30,000.00 |  | Profit A— | Profit B— |
| Revenue | $14.00 | $14.00 | 9,000 → | $88,000 | $84,750 |
| Variable cost | $2.00 | $1.25 | 12,000 → | $124,000 | $123,000 |

(d)  20,000 + 2*X*a = 30,000 + 1.25*X*b

.75*X* = 10,000

*X* = 13,333 pizzas

**S7.24**(a)  Break-even volume:



|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | Selling Price | Volume | Revenue | | Percent of Total Revenue | | |
| Drinks | 1.50 | 30,000 | 45,000 | | 0.153 | | |
| Meals | 10.00 | 10,000 | 100,000 | | 0.339 | | |
| Desserts etc. | 2.50 | 10,000 | 25,000 | | 0.085 | | |
| Sandwiches | 6.25 | 20,000 | 125,000 | | 0.423 | | |
|  |  |  | | 295,000 |  | 1.000 |  |

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | *P* | *V* | *V*/*P* | 1–*V*/*P* | *Wi* | | | 1–(*V*/*P*)*Wi* | | |
| Drinks | 1.50 | 0.75 | 0.50 | 0.50 | 0.153 | | | 0.077 | | |
| Meals | 10.00 | 5.00 | 0.50 | 0.50 | 0.339 | | | 0.170 | | |
| Desserts | 2.50 | 1.00 | 0.40 | 0.60 | 0.085 | | | 0.051 | | |
| Lunch | 6.25 | 3.25 | 0.52 | 0.48 | 0.423 | | | 0.203 | | |
|  |  |  |  |  | | 1.000 |  | | 0.501 |  |



b)  Number of meals per day at break-even = 9

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | Selling Price | Fraction of Total Revenue | Dollar Volume | BE Units per Month | BE Units per Day |
| Drinks | 1.50 | 0.153 | 1,160.48 | 774→ | 26 |
| Meals | 10.00 | 0.339 | 2,571.26 | 258→ | 9 |
| Desserts etc. | 2.50 | 0.085 | 644.71 | 258→ | 8 |
| Sandwiches | 6.25 | 0.424 | 3,208.28 | 514→ | 18 |

**S7.25**(a)  Break-even volume:



|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Selling Price | Volume | Revenue | | | Percent of Total Revenue | | |
| Drinks | 1.50 | 30,000 | 45,000 | | | 0.153 | | |
| Meals | 10.00 | 10,000 | 100,000 | | | 0.339 | | |
| Desserts etc. | 2.50 | 10,000 | 25,000 | | | 0.085 | | |
| Sandwiches | 6.25 | 20,000 | 125,000 | | | 0.424 | | |
|  |  |  | | 295,000 |  | | 1.000 |  |

|  |  |  |  |
| --- | --- | --- | --- |
|  | Food Cost | Total Variable Cost Factor\* | Total Variable Cost |
| Drinks | 0.75 | 1.10 | 0.83 |
| Meals | 5.00 | 1.43 | 7.15 |
| Desserts etc. | 1.00 | 1.10 | 1.10 |
| Lunch/sandwiches | 3.25 | 1.43 | 4.65 |

\* The total variable cost factor for meals and sandwiches is developed as:  
1.00 food cost

0.33 labor, at one-third of food cost

variable expenses at 10% of food costs



The total variable cost factor for drinks and desserts/wines is   
developed as:

1.00 food cost

0.10 variable expenses at 10% of costs

1.10 total variable expense

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | *P* | *V* | *V*/*P* | 1 – *V*/*P* | *Wi* | 1 – (*V*/*P*)*Wi* | | |
| Drinks | 1.50 | 0.83 | 0.55 | 0.45 | 0.153 | 0.069 | | |
| Meals | 10.00 | 7.15 | 0.72 | 0.28 | 0.339 | 0.095 | | |
| Desserts | 2.50 | 1.10 | 0.44 | 0.56 | 0.085 | 0.048 | | |
| Lunch | 6.25 | 4.65 | 0.74 | 0.26 | 0.423 | 0.110 | | |
|  |  |  |  |  | 1.000 |  | 0.322 |  |



|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Selling Price | Fraction of Total Revenue | Dollar Volume | *BEP* Units |
| Drinks | 1.50 | 0.153 | 1,805.59 | 1204 |
| Meals | 10.00 | 0.339 | 4,000.62 | 401 |
| Desserts/wine | 2.50 | 0.085 | 1,003.11 | 402 |
| Lunch/ sandwiches | 6.25 | 0.424 | 5,003.73 | 810 |

(b) Monthly break-even, to include a profit of $35,000 per year





|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Selling Price | Fraction of Total Revenue | Dollar Volume | *BEP* Units |
| Drinks | 1.50 | 0.153 | 3,191.62 | 2,128 |
| Meals | 10.00 | 0.339 | 7,071.62 | 708 |
| Desserts/wine | 2.50 | 0.085 | 1,773.12 | 710 |
| Lunch/ sandwiches | 6.25 | 0.424 | 8,844.75 | 1,516 |

**S7.33**

|  |  |  |
| --- | --- | --- |
| Expense | Machine A | Machine B |
| Original cost | 10,000 | 20,000 |
| Labor per year | 2,000 | 4,000 |
| Maintenance per year | 4,000 | 1,000 |
| Salvage value | 2,000 | 7,000 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Year |  | Machine A | NPV Factor\* | NPV |
| Now | Expense | 10,000 | 1.000 | –10,000 |
| 1 | Expense | 6,000 | 0.893 | –5,358 |
| 2 | Expense | 6,000 | 0.797 | –4,782 |
| 3 | Expense | 6,000 | 0.712 | –4,272 |
|  |  |  |  | –24,412 |
| 3 | Salvage revenue | 2,000 | 0.712 | +1,424 |
|  |  |  |  | –22,988 |

\* NPV factor from Table S7.1.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Year |  | Machine B | NPV Factor\* | NPV |
| Now | Expense | 20,000 | 1.000 | –20,000 |
| 1 | Expense | 5,000 | 0.893 | –4,465 |
| 2 | Expense | 5,000 | 0.797 | –3,985 |
| 3 | Expense | 5,000 | 0.712 | –3,560 |
|  |  |  |  | –32,010 |
| 3 | Salvage revenue | 7,000 | 0.712 | +4,984 |
|  |  |  |  | –27,026 |

\* NPV factor from Table S7.1.

NPV for Machine A is –$22,988; NPV for Machine B is –$27,026. Therefore, Machine A should be recommended.