

## Appendix B

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# Frequently Used Formulas for Managing Operations

### Chapter 1—Managing Revenue and Expense

$$\begin{aligned} \text{Revenue} - \text{Expense} &= \text{Profit} \\ \text{Revenue} - \text{Desired Profit} &= \text{Ideal Expense} \end{aligned}$$

$$\frac{\text{Part}}{\text{Whole}} = \text{Percent}$$

$$\frac{\text{Expense}}{\text{Revenue}} = \text{Expense \%}$$

$$\frac{\text{Profit}}{\text{Revenue}} = \text{Profit \%}$$

$$\frac{\text{Desired profit}}{\text{Revenue}} = \text{Desired Profit \%}$$

$$\begin{aligned} \text{Revenue} - (\text{Food and Beverage Cost} + \text{Labor Cost} + \text{Other Expense}) \\ = \text{Profit} \end{aligned}$$

$$\frac{\text{Food and Beverage Cost}}{\text{Revenue}} = \text{Food and Beverage Cost \%}$$

$$\frac{\text{Labor Cost}}{\text{Revenue}} = \text{Labor Cost \%}$$

$$\frac{\text{Other Expense}}{\text{Revenue}} = \text{Other Expense \%}$$

$$\frac{\text{Total Expense}}{\text{Revenue}} = \text{Total Expense \%}$$

$$\frac{\text{Profit}}{\text{Revenue}} = \text{Profit \%}$$

$$\frac{\text{Actual}}{\text{Budget}} = \% \text{ of Budget}$$

## **Chapter 2—Determining Sales Forecasts**

$$\frac{\text{Total Sales}}{\text{Number of Guests Served}} = \text{Average Sales per Guest}$$

$$\text{Sales This Year} - \text{Sales Last Year} = \text{Variance}$$

$$\frac{\text{Sales This Year} - \text{Sales Last Year}}{\text{Sales Last Year}} = \text{Percentage Variance}$$

$$\frac{\text{Variance}}{\text{Sales Last Year}} = \text{Percentage Variance}$$

$$(\text{Sales This Year} / \text{Sales Last Year}) - 1 = \text{Percentage Variance}$$

$$\text{Sales Last Year} + (\text{Sales Last Year} \times \% \text{ Increase Estimate}) \\ = \text{Revenue Forecast}$$

$$\text{Sales Last Year} \times (1 + \% \text{ Increase Estimate}) = \text{Revenue Forecast}$$

$$\text{Guest Count Last Year} + (\text{Guest Count Last Year} \times \% \text{ Increase Estimate}) \\ = \text{Guest Count Forecast}$$

$$\text{Guests Last Year} \times (1 + \% \text{ Increase Estimate}) = \text{Guest Count Forecast}$$

$$\text{Last Year's Average Sales per Guest} \\ + \text{Estimated Increase in Sales per Guest} = \text{Sales per Guest Forecast}$$

$$\frac{\text{Revenue Forecast}}{\text{Guest Count Forecast}} = \text{Average Sales per Guest Forecast}$$

## **Chapter 3—Managing the Cost of Food**

$$\frac{\text{Total Number of a Specific Menu Item Sold}}{\text{Total Number of All Menu Items Sold}} = \text{Popularity Index}$$

Number of Guests Expected × Item Popularity Index  
= Predicted Number of That Item to Be Sold

$\frac{\text{Yield Desired}}{\text{Current Yield}} = \text{Conversion Factor}$

$\frac{\text{Ingredient Weight}}{\text{Total Recipe Weight}} = \% \text{ of Total}$

Ingredient % of Total × Total Amount Required = New Recipe Amount

Desired Servings × Ounces per Portion = Ounces Required

$\frac{\text{Product Loss}}{\text{AP Weight}} = \text{Waste \%}$

1 - Waste % = Yield %

$\frac{\text{EP Required}}{\text{Yield \%}} = \text{AP Required}$

AP Required × Yield % = EP Required

Par Value - On Hand + Special Order = Order Amount

Unit Price × Number of Units = Extended Price

Item Amount × Item Value = Item Inventory Value

Beginning Inventory  
+ Purchases  
Goods Available for Sale  
- Ending Inventory  
Cost of Food Consumed  
- Employee Meals  
Cost of Food Sold

Beginning Inventory  
+ Purchases  
Goods Available for Sale  
- Ending Inventory  
- Value of Transfers Out  
+ Value of Transfers In  
Cost of Food Sold

$$\frac{\text{Cost of Food Sold}}{\text{Food Sales}} = \text{Food Cost \%}$$

$$\frac{\text{Purchases Today}}{\text{Sales Today}} = \text{Cost \% Today (six-column food cost \% estimate)}$$

$$\frac{\text{Purchases to Date}}{\text{Sales to Date}} = \text{Cost \% to Date (six-column food cost \% estimate)}$$

### **Chapter 4—Managing the Cost of Beverages**

$$\frac{\text{Cost of Beverage Sold}}{\text{Beverage Sales}} = \text{Beverage Cost \%}$$

$$\begin{aligned} & \text{Beginning Inventory} \\ & + \text{Purchases} \\ & \text{Goods Available for Sale} \\ & - \text{Ending Inventory} \\ & - \text{Transfers from Bar} \\ & + \text{Transfers to Bar} \\ & \text{Cost of Beverages Sold} \end{aligned}$$

$$\frac{\text{Item Dollar Sales}}{\text{Total Beverage Sales}} = \text{Item \% of Total Beverage Sales}$$

### **Chapter 5—Managing the Food and Beverage Production Process**

$$\begin{aligned} & \text{Prior-Day Carryover} + \text{Today's Production} \\ & = \text{Today's Sales Forecast} \pm \text{Margin of Error} \end{aligned}$$

$$\frac{\text{Issues Today}}{\text{Sales Today}} = \text{Beverage Cost Estimate Today}$$

$$\frac{\text{Issues to Date}}{\text{Sales to Date}} = \text{Beverage Cost Estimate to Date}$$

$$\frac{\text{Issues to Date} - \text{Inventory Adjustment}}{\text{Sales to Date}} = \text{Cost of Beverage Sold}$$

$$\frac{\text{Cost in Product Category}}{\text{Total Cost in All Categories}} = \text{Proportion of Total Product Cost}$$

$$\frac{\text{Product Loss}}{\text{AP Weight}} = \text{Net Waste \%}$$

$$1 - \text{Net Waste} = \text{Product Yield}$$

$$\frac{\text{EP Weight}}{\text{AP Weight}} = \text{Product Yield \%}$$

$$\frac{\text{AP Price per Pound}}{\text{Product Yield \%}} = \text{EP Cost (per pound)}$$

$$\frac{\text{Actual Product Cost}}{\text{Attainable Product Cost}} = \text{Operational Efficiency Ratio}$$

$$\frac{\text{Cost as per Standardized Recipes}}{\text{Total Sales}} = \text{Attainable Food Cost \%}$$

## **Chapter 6—Managing Food and Beverage Pricing**

$$\text{Revenue} - \text{Expense} = \text{Profit}$$

$$\text{Price} \times \text{Number Sold} = \text{Total Revenues}$$

$$\frac{\text{Cost of Food Sold}}{\text{Food Sales}} = \text{Food Cost \%}$$

$$\frac{\text{Cost of a Specific Food Item Sold}}{\text{Food Sales of That Item}} = \text{Food Cost \% of That Item}$$

$$\frac{\text{Cost of a Specific Food Item Sold}}{\text{Food Cost \% of That Item}} = \text{Food Sales (Selling Price) of That Item}$$

$$\frac{1}{\text{Desired Product Cost \%}} = \text{Pricing Factor}$$

$$\text{Pricing Factor} \times \text{Product Cost} = \text{Menu Price}$$

$$\text{Selling Price} - \text{Product Cost} = \text{Contribution Margin}$$

$$\text{Product Cost} + \text{Contribution Margin Desired} = \text{Selling Price}$$

$$\frac{\text{Total Buffet Product Cost}}{\text{Guests Served}} = \text{Buffet Product Cost per Guest}$$

## Chapter 7—Managing the Cost of Labor

$$\frac{\text{Output}}{\text{Input}} = \text{Productivity Ratio}$$

$$\frac{\text{Number of Employees Separated}}{\text{Number of Employees in Workforce}} = \text{Employee Turnover Rate}$$

$$\frac{\text{Number of Employees Involuntarily Separated}}{\text{Number of Employees in Workforce}} = \text{Involuntary Employee Turnover Rate}$$

$$\frac{\text{Number of Employees Voluntarily Separated}}{\text{Number of Employees in Workforce}} = \text{Voluntary Employee Turnover Rate}$$

$$\frac{\text{Cost of Labor}}{\text{Total Sales}} = \text{Labor Cost \%}$$

$$\frac{\text{Total Sales}}{\text{Labor Hours Used}} = \text{Sales per Labor Hour}$$

$$\frac{\text{Cost of Labor}}{\text{Guests Served}} = \text{Labor Dollars per Guest Served}$$

$$\frac{\text{Guests Served}}{\text{Cost of Labor}} = \text{Guests Served per Labor Dollar}$$

$$\frac{\text{Guests Served}}{\text{Labor Hours Used}} = \text{Guests Served per Labor Hour}$$

$$\frac{\text{Number of Estimated Guests Served}}{\text{Guests Served per Labor Dollar}} = \text{Estimated Cost of Labor}$$

$$\text{Forecasted Total Sales} \times \text{Labor Cost \% Standard} = \text{Cost of Labor Budget}$$

$$\frac{\text{Forecasted Number of Guests Served}}{\text{Guests Served per Labor Hour Standard}} = \text{Labor Hours Budget}$$

$$\frac{\text{Actual Amount}}{\text{Budgeted Amount}} = \% \text{ of Budget}$$

## Chapter 8—Controlling Other Expenses

$$\frac{\text{Other Expense}}{\text{Total Sales}} = \text{Other Expense Cost \%}$$

$$\frac{\text{Other Expense}}{\text{Number of Guests Served}} = \text{Other Expense Cost per Guest}$$

### Chapter 9—Analyzing Results Using the Income Statement

$$\frac{\text{Food Category Cost}}{\text{Total Food Sales}} = \text{Food Category Cost \%}$$

$$\frac{\text{Cost of Food Consumed}}{\text{Average Inventory Value}} = \text{Food Inventory Turnover}$$

$$\frac{\text{Beginning Inventory Value} + \text{Ending Inventory Value}}{2} = \text{Average Inventory Value}$$

$$\frac{\text{Cost of Beverages Consumed}}{\text{Average Beverage Inventory Value}} = \text{Beverage Inventory Turnover}$$

$$\text{This Year's Sales} \times \text{Last Year's Adjusted Labor Cost \%} = \text{This Year's Projected Labor Cost}$$

$$\frac{\text{Net Income}}{\text{Total Sales}} = \text{Profit Margin (Return on Sales)}$$

$$\frac{\text{Net Income This Period} - \text{Net Income Last Period}}{\text{Net Income Last Period}} = \text{Profit Variance \%}$$

### Chapter 10—Planning for Profit

$$\text{Selling Price} - \text{Product Cost} = \text{Contribution Margin per Menu Item}$$

$$\text{Total Sales} - \text{Total Product Costs} = \text{Total Contribution Margin}$$

$$\frac{\text{Total Contribution Margin}}{\text{Number of Items Sold}} = \text{Average Contribution Margin per Item}$$

$$A \times B \times C \times D = \text{Goal Value}$$

where

$$A = 1 - \text{Food Cost \%}$$

$$B = \text{Item Popularity}$$

$$C = \text{Selling Price}$$

$$D = 1 - (\text{Variable Cost \%} + \text{Food Cost \%})$$

$$\text{Total Sales} - \text{Variable Costs} = \text{Contribution Margin}$$

$$\text{Selling Price} - \text{Variable Cost/Unit} = \text{Contribution Margin/Unit}$$

$$\text{SP/Unit} - \text{VC/Unit} = \text{CM/Unit}$$

$$\text{SP}\% - \text{VC}\% = \text{CM}\%$$

$$100\% - \text{VC}\% = \text{CM}\%$$

$$\frac{\text{Fixed Costs}}{\text{Contribution Margin \%}} = \text{Break-Even Point in Sales}$$

$$\frac{\text{Fixed Costs}}{\text{Contribution Margin per Unit (Guest)}} = \text{Break-Even Point in Guests Served}$$

$$\frac{\text{After-Tax Profit}}{(1 - \text{Tax Rate})} = \text{Before-Tax Profit}$$

$$\frac{\text{Fixed Costs} + \text{Before-Tax Profit}}{\text{Contribution Margin \%}} = \text{Sales Dollars to Achieve Desired After-Tax Profit}$$

$$\frac{\text{Fixed Costs} + \text{Before-Tax Profit}}{\text{Contribution Margin per Unit (Guest)}} = \text{Guests to Be Served to Achieve Desired After-Tax Profit}$$

$$\frac{\text{Minimum Labor Cost}}{1 - \text{Minimum Operating Cost}} = \text{MSP}$$

*or*

$$\frac{\text{Minimum Labor Cost}}{1 - (\text{Food Cost \%} + \text{Variable Cost \%})} = \text{MSP}$$

$$\text{Budgeted Revenue} - \text{Budgeted Expense} = \text{Budgeted Profit}$$

$$\frac{\text{Total Sales}}{\text{Available Seats}} = \text{Sales per Seat}$$



**Chapter 11—Maintaining and Improving the Revenue Control System**

Product Issues = Guest Charges = Sales Receipts = Sales Deposits

Documented Product Requests = Product Issues

Product Issues = Guest Charges

Guest Charges = Sales Receipts

Sales Receipts = Sales Deposits