Stella's Basic Business Math and Finance

I. Averages, Fractions, Ratios, and Percentages

Averages: Averages provide valuable information when it comes to doing business and determining the significance of a group of numbers. Mean, median, and mode are the main types. The mean average of a group of numbers is determined by adding all numbers and then dividing by the number of individual numbers in the group (Pickerden & Wright, 2016).

For example, if Stella (a cookie company owner) is trying to determine average cookie sales for a week, she will add up the number of cookies sold each day for seven days. She will then divide that number by 7 to determine her average cookie sales for the week.

Monday: 200

Tuesday: 250

Wednesday: 300

Thursday: 275

Friday: 350

Saturday: 400

Sunday: 500

Total Cookies Sold: 2,275

I will divide the total cookies sold (2.275) by 7 = 325

I sold an average of 325 cookies per day for the week.

Fractions: Fractions are another important element of business because they can be used to determine what fraction of time should be devoted to certain duties, what fraction of a product line is defective, or even what fraction of the company is performing at a high level (Pickerden & Wright, 2016). If a manager notes that ½ of the workforce is performing at or above expectations, that means that the other ½ is not meeting expectations. If there are 100 employees, the mathematical equation would be 100 divided by 2 = 50. After additional training and coaching, the same manager notes that ¾ of the workforce is now meeting or exceeding expectations, which means that only ¼ is now failing to meet expectations. This is quite an improvement! The mathematical equation now becomes 100 divided by 4 = 25. This means that 75 employees are meeting or exceeding expectations (25 x 3 = 75) and 25 employees are not meeting expectations (25 x 1).

For example, Stella is trying to determine how to minimize the production of defective cookies. For the past several months she have been testing three different cooking-making processes. Process A resulted in 2000 cookies in a cycle with 2/5 being defective. Process B resulted in 3000 cookies in a cycle with 5/8 being defective. Process C resulted in 1500 cookies in a cycle with 1/12 being defective.

Process A: 2000 cookies produced, 2/5 defective = 2000/5 = 400 x 2 = 800 defective cookies.

1200 acceptable cookies produced.

Process B: 3000 cookies produced, 5/8 defective = 3000/8 = 375 x 5 = 1875 defective cookies.

1125 acceptable cookies produced.

Process C: 1500 cookies produced, 1/12 defective = 1500/12 = 125 x 1 = 125 defective cookies.

1375 acceptable cookies produced.

At first glance, Process B seemed to be the big producer; however, the fractions are able to tell the real story and reveal that Process C is the frontrunner!

Ratios: Ratios add yet another dimension when it comes to understanding day-to-day business operations as they help us to compare quantities. Ratios can be used in many different ways and function much like fractions. A manager might use ratios to determine product offerings based on recent sales data (Pickerden & Wright, 2016).

For example, Stella might want to figure out how to adjust her dairy order for busy weekend sales volumes. She knows that for every dozen cookies sold, she sells two pints of milk. This can be expressed as a 12: 2 ratio or 6:1. In preparing for her dairy order then, she estimates that she will sell 1200 cookies on a busy weekend, which means that she will need to order at least 200 pints of milk. 1200/6 = 200.

Percentages: Percentages are extremely important when it comes to business operations. A percentage is a fraction of a number out of 100. In other words, a 10% drop in profits would mean that a business is losing $10 out of every $100 earned. To determine a percentage, divide the number to be expressed as a percentage by the total number and then multiply by 100 (Pickerden & Wright, 2016). What percent of my workforce is over 60 if I have 150 employees and 20 are over 60?

Calculate: 20 divided by 150 = 0.13 x 100 = 13.3 %

A manager might use percentages to determine an employee discount amount. If employees are entitled to a 12% discount on all store items, this means that they are entitled to a deduction of $12 on every $100 purchased. An item that sells for $225 would end up costing the employee how much? Multiply the percentage by the whole amount: 12% or .12 x 225 = 27. The cost with the discount would be $198.

For example, Stella (the cookie company owner) might want to figure out what percentage of days in a recent 28-day month profits exceeded projections. Upon looking at her books, she notes that profits exceeded projections on 10 days. She would then divide 10 by 28 which equals 0.36. Next, she would multiply 0.36 by 100, which equals 35.7. This means that she exceeded projected profits 35.7% of the month.

II. Costs, Revenue, Profit

Costs: An understanding of costs and how to calculate them is critical for business success. For every product or service sold, there are behind-the-scenes costs that take a bite out of the final profits. **Fixed costs** are those costs that are constant and do not fluctuate based on the

number of products or services sold. These costs might include shop rent, insurance, electricity, internet fees, etc. **Variable costs**, on the other hand, are costs that fluctuate based on the number of products or services sold. These costs might include packaging, ingredients, supplies, gas, etc. Total cost is determined by adding fixed and variable costs; unit cost is determined by dividing total costs by the number of units (Pickerden & Wright, 2016). If a small business has fixed costs of $500 and variable costs of $300 during a month when it sells 100 products, the total unit cost would be calculated as follows:

Calculation:
Total Cost (Fixed costs + Variable Costs) = Cost per Unit
# of Units

The answer would be:

$500 + $300
100 Units = Unit Cost of: $8.00

Revenue: Revenue is the money brought in by the business during a certain period of time. Revenue does not include any of the fixed or variable costs described earlier, so do not confuse revenue with profit (Pickerden & Wright, 2016).

For example, Stella's total revenue for the month of December might be $8000, yet this does not mean that the business actually earned $8000 because costs have not yet been deducted.

Profit: Businesses exist to make profits, so an understanding of the different types of profits is essential for business success. In general, profit is the money earned by the business after total costs have been subtracted; however, there are different ways of looking at profit as illustrated below:

Gross Profit: Revenue – costs of goods sold (variable costs).

Operating Profit: Revenue – costs of goods sold (variable costs) – operating costs (fixed costs).

Net Profit: Net profit includes operating profits in addition to profits made by other business activities such as investments.

Net profit = operating profit + profit from other business activities – finance costs – taxes (Pickerden & Wright, 2016).

For example, Stella's gross profit for the month of December might be $8000 (revenue) - $1000 (costs of goods sold). Gross profit = $7000. Stella's operating profit for the same month might be $8000 (revenue) - $1000 (costs of goods sold) - $500 (operating costs). Operating profit = $6500. Finally, Stella earns $500 in the month of December for an investment made in the company's name, she pays $100 in interest on a business loan, and she pays $100 in taxes. She will then calculate her net profit for the month of December in the following manner: $6500 (operating profit) + $500 (investment) - $100 (interest on loan) - $100 (tax payment). Net profit = $6800.

Reference

Pickerden, M., & Wright, C. (2016). *Essential maths skills for AS/A level business*.

Hodder Education Group.