

A DELI OWNER SOLD 90 SANDWICHES IN ONE DAY. OF THOSE SANDWICHES, 36 WERE PASTRAMI. WRITE AND SOLVE AN

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INTRODUCTION

EVERY DAY, DELIS ACROSS THE WORLD SERVE COUNTLESS SANDWICHES TO HUNGRY CUSTOMERS. AMONG THESE, SOME SANDWICHES STAND OUT DUE TO THEIR POPULARITY OR UNIQUE INGREDIENTS. RECENTLY, A DELI OWNER EXPERIENCED AN INTERESTING SALES DAY, SELLING A TOTAL OF 90 SANDWICHES, WITH 36 OF THOSE BEING PASTRAMI SANDWICHES. THIS SCENARIO OFFERS AN EXCELLENT OPPORTUNITY TO EXPLORE BASIC PROBLEM-SOLVING SKILLS INVOLVING FRACTIONS, RATIOS, AND PERCENTAGES. IN THIS ARTICLE, WE WILL ANALYZE THE SALES DATA, FORMULATE RELEVANT PROBLEMS, AND PROVIDE DETAILED SOLUTIONS TO DEEPEN UNDERSTANDING OF THESE MATHEMATICAL CONCEPTS.

UNDERSTANDING THE SALES DATA

BEFORE DIVING INTO THE CALCULATIONS, IT'S ESSENTIAL TO UNDERSTAND THE KEY FIGURES:

- TOTAL SANDWICHES SOLD: 90
- NUMBER OF PASTRAMI SANDWICHES SOLD: 36

USING THIS INFORMATION, WE CAN EXPLORE VARIOUS QUESTIONS, SUCH AS:

- WHAT PROPORTION OF THE TOTAL SANDWICHES WERE PASTRAMI?
- WHAT PERCENTAGE OF THE TOTAL SANDWICHES DID PASTRAMI SANDWICHES CONSTITUTE?
- HOW MANY NON-PASTRAMI SANDWICHES WERE SOLD?
- IF THE OWNER WANTS TO INCREASE PASTRAMI SALES BY A CERTAIN PERCENTAGE, WHAT WOULD THE NEW TOTAL LOOK LIKE?

LET'S ANALYZE EACH OF THESE QUESTIONS STEP-BY-STEP.

CALCULATING THE PROPORTION OF PASTRAMI SANDWICHES

THE PROPORTION (OR RATIO) GIVES US AN IDEA OF HOW MUCH OF THE TOTAL SALES CONSISTED OF PASTRAMI SANDWICHES.

PROBLEM 1: WHAT FRACTION OF THE TOTAL SANDWICHES WERE PASTRAMI?

TO FIND THIS, WE DIVIDE THE NUMBER OF PASTRAMI SANDWICHES BY THE TOTAL SANDWICHES SOLD:

$$\begin{aligned} \text{Proportion} &= \frac{\text{Number of Pastrami Sandwiches}}{\text{Total Sandwiches}} = \\ &= \frac{36}{90} \end{aligned}$$

SIMPLIFY THE FRACTION:

$$\frac{36}{90} = \frac{36 \div 18}{90 \div 18} = \frac{2}{5}$$

\]

ANSWER: $\boxed{\frac{2}{5}}$

THIS MEANS THAT 2 OUT OF EVERY 5 SANDWICHES SOLD WERE PASTRAMI.

CALCULATING THE PERCENTAGE OF PASTRAMI SANDWICHES

THE PERCENTAGE TELLS US WHAT PORTION OF THE TOTAL SANDWICHES WAS PASTRAMI, EXPRESSED AS A PERCENT.

PROBLEM 2: WHAT PERCENTAGE OF THE SANDWICHES SOLD WERE PASTRAMI?

TO CONVERT THE FRACTION INTO A PERCENTAGE:

$$\left[\frac{36}{90} \times 100 = \frac{2}{5} \times 100 = 0.4 \times 100 = 40\% \right]$$

ANSWER: $\boxed{40\%}$

SO, 40% OF THE SANDWICHES SOLD WERE PASTRAMI.

CALCULATING NON-PASTRAMI SANDWICHES SOLD

KNOWING THE TOTAL AND THE NUMBER OF PASTRAMI SANDWICHES, WE CAN DETERMINE HOW MANY SANDWICHES WERE NOT PASTRAMI.

PROBLEM 3: HOW MANY SANDWICHES WERE NOT PASTRAMI?

SUBTRACT PASTRAMI SANDWICHES FROM THE TOTAL:

$$\left[90 - 36 = 54 \right]$$

ANSWER: $\boxed{54}$

THEREFORE, 54 SANDWICHES WERE OF OTHER VARIETIES.

EXPLORING RATIOS AND PERCENTAGES

UNDERSTANDING RATIOS AND PERCENTAGES HELPS IN MAKING BUSINESS DECISIONS, SUCH AS ESTIMATING SALES, PLANNING INVENTORY, OR MARKETING STRATEGIES.

PROBLEM 4: WHAT IS THE RATIO OF PASTRAMI TO NON-PASTRAMI SANDWICHES?

EXPRESSED AS A RATIO:

$$\frac{\text{PASTRAMI}}{\text{NON-PASTRAMI}} = 36 : 54$$

SIMPLIFY THE RATIO BY DIVIDING BOTH NUMBERS BY THEIR GREATEST COMMON DIVISOR, WHICH IS 18:

$$\frac{36}{18} : \frac{54}{18} = 2 : 3$$

ANSWER: $\boxed{2 : 3}$

THIS RATIO INDICATES THAT FOR EVERY 2 PASTRAMI SANDWICHES SOLD, 3 OTHER TYPES WERE SOLD.

PROBLEM 5: WHAT IS THE PERCENTAGE INCREASE IF THE OWNER WANTS TO INCREASE PASTRAMI SALES TO 50 SANDWICHES?

SUPPOSE THE OWNER AIMS TO SELL 50 PASTRAMI SANDWICHES INSTEAD OF 36. HOW MUCH WOULD THAT BE AS A PERCENTAGE INCREASE?

CALCULATE THE INCREASE:

$$50 - 36 = 14$$

PERCENTAGE INCREASE:

$$\frac{14}{36} \times 100 \approx 0.3889 \times 100 \approx 38.89\%$$

ANSWER: $\boxed{\text{APPROXIMATELY A } 38.89\% \text{ INCREASE}}$

THE OWNER WOULD NEED TO INCREASE PASTRAMI SALES BY ABOUT 38.89% TO REACH 50 SANDWICHES.

IMPLICATIONS FOR BUSINESS STRATEGY

UNDERSTANDING THE BREAKDOWN OF SANDWICH SALES CAN HELP THE DELI OWNER MAKE INFORMED DECISIONS.

- MENU PLANNING: SINCE 40% OF SALES ARE PASTRAMI, EMPHASIZING THIS ITEM IN MARKETING CAN BOOST SALES.
- INVENTORY MANAGEMENT: KNOWING THE RATIO HELPS ESTIMATE THE AMOUNT OF PASTRAMI AND OTHER INGREDIENTS NEEDED DAILY.
- TARGETED PROMOTIONS: OFFERING DISCOUNTS OR SPECIALS ON PASTRAMI SANDWICHES COULD ENCOURAGE HIGHER SALES, ESPECIALLY IF THE OWNER WANTS TO INCREASE THESE SALES FURTHER.
- CUSTOMER PREFERENCES: THE HIGH PERCENTAGE OF PASTRAMI INDICATES A STRONG CUSTOMER PREFERENCE, WHICH CAN INFLUENCE MENU DIVERSIFICATION.

ADDITIONAL MATHEMATICAL PROBLEMS BASED ON THE SCENARIO

TO DEEPEN UNDERSTANDING, HERE ARE SOME ADDITIONAL QUESTIONS:

- WHAT IS THE AVERAGE NUMBER OF SANDWICHES SOLD PER HOUR IF THE DELI OPERATES FOR 8 HOURS?
- IF THE DELI WANTS TO INCREASE TOTAL SALES TO 120 SANDWICHES IN A DAY, MAINTAINING THE SAME PROPORTION OF PASTRAMI, HOW MANY PASTRAMI SANDWICHES SHOULD THEY AIM TO SELL?
- WHAT PERCENTAGE OF SANDWICHES ARE NON-PASTRAMI?

LET'S BRIEFLY SOLVE THESE:

AVERAGE SANDWICHES PER HOUR:

$$\begin{aligned} & \backslash[\\ & \backslash\text{FRAC}\{90\}{8} = 11.25 \\ & \backslash] \end{aligned}$$

THE DELI SELLS APPROXIMATELY 11.25 SANDWICHES PER HOUR.

PROJECTED PASTRAMI SALES FOR TOTAL OF 120 SANDWICHES:

USING THE SAME PROPORTION (40%):

$$\begin{aligned} & \backslash[\\ & 120 \backslash\text{TIMES} 0.4 = 48 \\ & \backslash] \end{aligned}$$

RESULT: SELL APPROXIMATELY 48 PASTRAMI SANDWICHES.

PERCENTAGE OF NON-PASTRAMI SANDWICHES:

$$\begin{aligned} & \backslash[\\ & \backslash\text{FRAC}\{54\}{90} \backslash\text{TIMES} 100 = 60\% \\ & \backslash] \end{aligned}$$

ANSWER: 60% OF SANDWICHES ARE NOT PASTRAMI.

CONCLUSION

ANALYZING SALES DATA SUCH AS THE NUMBER OF SANDWICHES SOLD AND THE PROPORTION OF PASTRAMI SANDWICHES PROVIDES VALUABLE INSIGHTS INTO CUSTOMER PREFERENCES AND OPERATIONAL PLANNING. THE SCENARIO OF A DELI OWNER SELLING 90 SANDWICHES WITH 36 BEING PASTRAMI OFFERS A PRACTICAL EXAMPLE OF APPLYING BASIC MATHEMATICAL CONCEPTS—FRACTIONS, RATIOS, AND PERCENTAGES—TO REAL-WORLD BUSINESS SITUATIONS. BY UNDERSTANDING THESE CONCEPTS, DELI OWNERS AND MANAGERS CAN OPTIMIZE THEIR MENUS, MANAGE INVENTORY EFFICIENTLY, AND IMPLEMENT MARKETING STRATEGIES TO ENHANCE SALES.

WHETHER YOU'RE A BUSINESS OWNER, A STUDENT, OR SIMPLY INTERESTED IN PROBLEM-SOLVING, MASTERING THESE FUNDAMENTAL CALCULATIONS EQUIPS YOU TO MAKE DATA-DRIVEN DECISIONS AND ANALYZE SALES SCENARIOS EFFECTIVELY.

FREQUENTLY ASKED QUESTIONS

WHAT PERCENTAGE OF THE SANDWICHES SOLD BY THE DELI OWNER WERE PASTRAMI?

THE PERCENTAGE OF PASTRAMI SANDWICHES IS $(36/90) \times 100 = 40\%$.

IF THE DELI OWNER SOLD 90 SANDWICHES IN ONE DAY, HOW MANY SANDWICHES WERE NOT PASTRAMI?

NUMBER OF NON-PASTRAMI SANDWICHES = $90 - 36 = 54$.

WHAT IS THE RATIO OF PASTRAMI SANDWICHES TO TOTAL SANDWICHES SOLD?

THE RATIO IS 36:90, WHICH SIMPLIFIES TO 2:5.

IF THE DELI OWNER WANTS TO INCREASE PASTRAMI SALES BY 25%, HOW MANY PASTRAMI SANDWICHES WOULD BE SOLD?

INCREASED PASTRAMI SANDWICHES = $36 + (25\% \text{ OF } 36) = 36 + 9 = 45$.

WHAT IS THE AVERAGE NUMBER OF SANDWICHES SOLD PER HOUR IF THE DELI WAS OPEN FOR 8 HOURS?

AVERAGE SANDWICHES PER HOUR = $90 / 8 = 11.25$.

IF THE OWNER PLANS TO SELL TWICE AS MANY PASTRAMI SANDWICHES TOMORROW, HOW MANY PASTRAMI SANDWICHES SHOULD THEY AIM TO SELL?

THEY SHOULD AIM TO SELL $2 \times 36 = 72$ PASTRAMI SANDWICHES.

WHAT FRACTION OF THE SANDWICHES SOLD WERE PASTRAMI?

THE FRACTION IS $36/90$, WHICH SIMPLIFIES TO $2/5$.

IF 10% OF THE SANDWICHES SOLD WERE VEGETARIAN, HOW MANY VEGETARIAN SANDWICHES WERE SOLD?

VEGETARIAN SANDWICHES = $10\% \text{ OF } 90 = 9$.

WHAT IS THE DIFFERENCE BETWEEN THE NUMBER OF PASTRAMI SANDWICHES AND VEGETARIAN SANDWICHES IF 9 WERE VEGETARIAN?

DIFFERENCE = $36 \text{ (PASTRAMI)} - 9 \text{ (VEGETARIAN)} = 27$.

IF THE DELI OWNER WANTS TO KEEP THE SAME RATIO OF PASTRAMI TO TOTAL SANDWICHES BUT SELL 120 SANDWICHES IN A DAY, HOW MANY SHOULD BE PASTRAMI?

NUMBER OF PASTRAMI SANDWICHES = $(36/90) 120 = (2/5) 120 = 48$.

ADDITIONAL RESOURCES

A DELI OWNER SOLD 90 SANDWICHES IN ONE DAY. OF THOSE SANDWICHES, 36 WERE PASTRAMI. WRITE AND SOLVE AN EQUATION TO FIND THE NUMBER OF NON-PASTRAMI SANDWICHES SOLD THAT DAY.

INTRODUCTION

IN THE BUSTLING WORLD OF DELIS AND SANDWICH SHOPS, EVERY DAY BRINGS NEW OPPORTUNITIES AND CHALLENGES FOR OWNERS TO MEET CUSTOMER PREFERENCES WHILE MANAGING INVENTORY AND SALES EFFICIENTLY. RECENTLY, A LOCAL DELI OWNER EXPERIENCED A REMARKABLE DAY OF SALES, SUCCESSFULLY SELLING 90 SANDWICHES IN A SINGLE DAY. AMONG THESE, A SIGNIFICANT PORTION—36 SANDWICHES—WERE MADE WITH PASTRAMI. THIS SCENARIO PROMPTS A COMMON QUESTION IN BUSINESS ANALYSIS: HOW MANY SANDWICHES SOLD THAT DAY WERE NOT PASTRAMI? TO ANSWER THIS, WE NEED TO CRAFT AND SOLVE AN APPROPRIATE EQUATION, ILLUSTRATING HOW BASIC ALGEBRA CAN HELP IN REAL-WORLD BUSINESS CONTEXTS.

UNDERSTANDING THE SCENARIO

BEFORE DIVING INTO THE MATHEMATICS, IT'S IMPORTANT TO UNDERSTAND THE DETAILS OF THE SCENARIO:

- TOTAL SANDWICHES SOLD: 90
- PASTRAMI SANDWICHES SOLD: 36
- NON-PASTRAMI SANDWICHES: ? (THE UNKNOWN WE WANT TO FIND)

THIS SITUATION IS STRAIGHTFORWARD BUT OFFERS AN EXCELLENT EXAMPLE OF HOW TO SET UP AND SOLVE AN ALGEBRAIC PROBLEM RELATED TO SALES DATA.

SETTING UP THE MATHEMATICAL MODEL

TO FIND THE NUMBER OF NON-PASTRAMI SANDWICHES SOLD, WE NEED TO CONSIDER THE TOTAL NUMBER OF SANDWICHES SOLD AND THE NUMBER OF PASTRAMI SANDWICHES. SINCE THE TOTAL IS THE SUM OF PASTRAMI AND NON-PASTRAMI SANDWICHES, WE CAN SET UP AN EQUATION:

LET x BE THE NUMBER OF NON-PASTRAMI SANDWICHES SOLD.

THE RELATIONSHIP CAN BE EXPRESSED AS:

TOTAL SANDWICHES SOLD = PASTRAMI SANDWICHES + NON-PASTRAMI SANDWICHES

SUBSTITUTING THE KNOWN VALUES:

$$90 = 36 + x$$

THIS IS A SIMPLE LINEAR EQUATION, WHICH CAN BE SOLVED TO DETERMINE x .

SOLVING THE EQUATION

TO ISOLATE x , PERFORM THE FOLLOWING STEPS:

1. SUBTRACT 36 FROM BOTH SIDES OF THE EQUATION:

$$90 - 36 = x$$

2. CALCULATE THE DIFFERENCE:

$$54 = x$$

RESULT: THE DELI OWNER SOLD 54 NON-PASTRAMI SANDWICHES THAT DAY.

THIS STRAIGHTFORWARD CALCULATION PROVIDES VALUABLE INSIGHT INTO CUSTOMER PREFERENCES AND SALES COMPOSITION, INDICATING THAT PASTRAMI SANDWICHES MADE UP ROUGHLY 40% OF TOTAL SALES (36 OUT OF 90), WHILE NON-PASTRAMI SANDWICHES ACCOUNTED FOR APPROXIMATELY 60%.

BUSINESS IMPLICATIONS OF THE DATA

UNDERSTANDING THE PROPORTION OF DIFFERENT SANDWICH TYPES SOLD CAN INFLUENCE INVENTORY MANAGEMENT, MARKETING, AND MENU PLANNING. HERE'S WHAT THE DATA SUGGESTS:

- CUSTOMER PREFERENCE: A MAJORITY OF CUSTOMERS OPTED FOR NON-PASTRAMI SANDWICHES, INDICATING A DIVERSE TASTE PROFILE.
- STOCK MANAGEMENT: THE OWNER SHOULD ENSURE SUFFICIENT SUPPLIES OF INGREDIENTS FOR BOTH PASTRAMI AND OTHER SANDWICH TYPES TO MEET DAILY DEMAND.
- PROMOTIONAL STRATEGIES: KNOWING THE POPULAR ITEMS CAN HELP IN DESIGNING TARGETED PROMOTIONS OR SPECIALS TO BOOST SALES FURTHER.

EXTENDING THE ANALYSIS: WHAT IF THE OWNER WANTED TO INCREASE PASTRAMI SALES?

SUPPOSE THE OWNER AIMS TO INCREASE PASTRAMI SANDWICHES BY 50% IN THE NEXT SALES DAY. HOW MANY PASTRAMI SANDWICHES WOULD THAT BE, AND WHAT WOULD THE TOTAL SALES LOOK LIKE?

- CURRENT PASTRAMI SANDWICHES: 36
- INCREASE BY 50%: $36 \times 0.5 = 18$
- NEW PASTRAMI SALES: $36 + 18 = 54$

ASSUMING TOTAL SANDWICHES INCREASE PROPORTIONALLY OR REMAIN SIMILAR, THE OWNER CAN PLAN INVENTORY ACCORDINGLY, FOCUSING ON INGREDIENT REPLENISHMENT FOR PASTRAMI. IF TOTAL SALES ALSO INCREASE, THE OWNER MIGHT NEED TO ADJUST STAFFING OR MARKETING EFFORTS.

ADVANCED CONSIDERATIONS: MULTIPLE VARIABLES AND PERCENTAGES

WHILE THE INITIAL PROBLEM IS STRAIGHTFORWARD, REAL-WORLD SCENARIOS OFTEN INVOLVE MULTIPLE VARIABLES, SUCH AS:

- DIFFERENT SANDWICH TYPES (E.G., TURKEY, ROAST BEEF, VEGGIE)
- PRICE DIFFERENCES AFFECTING SALES VOLUME
- TIME-BASED SALES TRENDS
- CUSTOMER DEMOGRAPHICS

IN SUCH CASES, MORE COMPLEX ALGEBRAIC MODELS OR STATISTICAL ANALYSES MIGHT BE NECESSARY. FOR INSTANCE, IF THE OWNER TRACKS DAILY SALES OVER A WEEK, THEY COULD MODEL TRENDS, FORECAST FUTURE SALES, OR IDENTIFY SEASONAL PATTERNS.

CONCLUSION

THE SCENARIO OF A DELI OWNER SELLING 90 SANDWICHES, INCLUDING 36 PASTRAMI, EXEMPLIFIES HOW SIMPLE ALGEBRA CAN BE APPLIED TO EVERYDAY BUSINESS DECISIONS. SETTING UP AN EQUATION AND SOLVING FOR THE UNKNOWN PROVIDES CLEAR INSIGHT INTO SALES COMPOSITION, HELPING OWNERS MAKE INFORMED INVENTORY AND MARKETING CHOICES. WHETHER FOR SMALL LOCAL BUSINESSES OR LARGER OPERATIONS, UNDERSTANDING AND APPLYING THESE FUNDAMENTAL MATHEMATICAL PRINCIPLES ARE ESSENTIAL TOOLS FOR EFFECTIVE MANAGEMENT AND GROWTH.

BY ANALYZING SALES DATA THROUGH SUCH EQUATIONS, ENTREPRENEURS CAN BETTER UNDERSTAND CUSTOMER PREFERENCES, OPTIMIZE STOCK LEVELS, AND STRATEGIZE FOR INCREASED PROFITABILITY—ALL ROOTED IN THE POWER OF BASIC MATHEMATICS.

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