

A SCHOOL HOSTEL HAS ENOUGH FOOD FOR 500 CHILDREN FOR 18 DAYS. HOW LONG WILL THE FOOD LAST IF 100 MORE

A SCHOOL HOSTEL HAS ENOUGH FOOD FOR 500 CHILDREN FOR 18 DAYS. HOW LONG WILL THE FOOD LAST IF 100 MORE CHILDREN JOIN THE HOSTEL? THIS QUESTION IS A CLASSIC EXAMPLE OF A PROBLEM INVOLVING PROPORTIONALITY AND BASIC ARITHMETIC CALCULATIONS. UNDERSTANDING HOW TO APPROACH SUCH PROBLEMS IS ESSENTIAL FOR STUDENTS, TEACHERS, AND ANYONE INTERESTED IN RESOURCE MANAGEMENT. IN THIS ARTICLE, WE WILL EXPLORE THE PROBLEM THOROUGHLY, BREAK DOWN THE CALCULATIONS STEP-BY-STEP, DISCUSS RELATED CONCEPTS, AND PROVIDE TIPS FOR SOLVING SIMILAR PROBLEMS EFFICIENTLY.

UNDERSTANDING THE PROBLEM

BEFORE DIVING INTO CALCULATIONS, IT'S VITAL TO COMPREHEND THE SCENARIO FULLY.

INITIAL CONDITIONS

- THE HOSTEL HAS ENOUGH FOOD TO FEED 500 CHILDREN FOR 18 DAYS.
- THE TOTAL AMOUNT OF FOOD IS THEREFORE SUFFICIENT FOR THESE 500 CHILDREN OVER THIS PERIOD.

CHANGE IN CONDITIONS

- AN ADDITIONAL 100 CHILDREN JOIN THE HOSTEL, MAKING THE TOTAL NUMBER OF CHILDREN 600.
- THE QUESTION IS: HOW LONG WILL THE EXISTING FOOD LAST WITH 600 CHILDREN?

THIS PROBLEM INVOLVES UNDERSTANDING THE RELATIONSHIP BETWEEN THE NUMBER OF CHILDREN AND THE DURATION THE FOOD CAN SUSTAIN THEM.

KEY CONCEPTS AND FORMULAS

TO SOLVE THIS PROBLEM, WE NEED TO UNDERSTAND AND APPLY SOME FUNDAMENTAL CONCEPTS:

1. TOTAL FOOD QUANTITY

- THE TOTAL AMOUNT OF FOOD CAN BE THOUGHT OF AS A FIXED QUANTITY, SAY, F .
- SINCE 500 CHILDREN CAN BE FED FOR 18 DAYS, WE CAN EXPRESS F IN TERMS OF DAILY CONSUMPTION.

2. DAILY CONSUMPTION

- THE TOTAL DAILY CONSUMPTION FOR 500 CHILDREN IS PROPORTIONAL TO THE TOTAL FOOD DIVIDED BY DAYS:

$$\text{TOTAL DAILY CONSUMPTION} = F / 18$$

- FOR 500 CHILDREN, THE DAILY CONSUMPTION IS:

$$\text{DAILY CONSUMPTION PER CHILD} = (F / 18) / 500$$

3. TOTAL FOOD FOR NEW SCENARIO

- WHEN 600 CHILDREN ARE FED, THE TOTAL DAILY CONSUMPTION INCREASES PROPORTIONALLY:

$$\text{TOTAL DAILY CONSUMPTION FOR 600 CHILDREN} = 600 \times (F / 18) / 500$$

- SIMPLIFY:

$$\text{TOTAL DAILY CONSUMPTION} = (600 / 500) \times (F / 18) = (6 / 5) \times (F / 18)$$

4. DURATION THE FOOD WILL LAST

- TO FIND OUT HOW MANY DAYS THE SAME AMOUNT OF FOOD F WILL LAST FOR 600 CHILDREN, WE USE:

$$\text{NUMBER OF DAYS} = F / (\text{DAILY CONSUMPTION FOR 600 CHILDREN})$$

- SUBSTITUTING THE VALUE:

$$\text{NUMBER OF DAYS} = F / [(6 / 5) \times (F / 18)] = 1 / [(6 / 5) \times (1 / 18)]$$

- SIMPLIFY THE DENOMINATOR:

$$(6 / 5) \times (1 / 18) = 6 / (5 \times 18) = 6 / 90 = 1 / 15$$

- THEREFORE:

$$\text{NUMBER OF DAYS} = 1 / (1 / 15) = 15 \text{ DAYS}$$

THIS MEANS, WITH 600 CHILDREN, THE EXISTING FOOD WILL LAST FOR 15 DAYS.

STEP-BY-STEP CALCULATION SUMMARY

LET'S SUMMARIZE THE CALCULATION PROCESS:

1. DETERMINE TOTAL FOOD BASED ON INITIAL CONDITIONS: 500 CHILDREN FOR 18 DAYS.
2. CALCULATE TOTAL DAILY CONSUMPTION: TOTAL FOOD DIVIDED BY 18 DAYS.
3. FIND TOTAL DAILY CONSUMPTION WITH 600 CHILDREN: MULTIPLY THE PER-CHILD CONSUMPTION BY 600.
4. DIVIDE THE TOTAL FOOD BY THE NEW DAILY CONSUMPTION TO FIND THE NEW DURATION.

RESULT: THE FOOD WILL LAST FOR 15 DAYS IF 100 MORE CHILDREN JOIN THE HOSTEL.

ADDITIONAL RELATED PROBLEMS

UNDERSTANDING THIS PROBLEM OPENS THE DOOR TO SOLVING SIMILAR RESOURCE MANAGEMENT QUESTIONS. HERE ARE SOME RELATED PROBLEMS AND THEIR APPROACHES:

1. IF THE NUMBER OF CHILDREN INCREASES OR DECREASES, HOW DOES THE DURATION CHANGE?

- APPROACH: USE PROPORTIONALITY. IF THE NUMBER OF CHILDREN INCREASES, THE DURATION DECREASES PROPORTIONALLY, AND VICE VERSA.

2. HOW MUCH FOOD IS INITIALLY AVAILABLE?

- APPROACH: MULTIPLY THE NUMBER OF CHILDREN BY THE DAYS THEY CAN BE FED AND THE PER-CHILD DAILY CONSUMPTION.

3. WHAT IF THE FOOD IS USED AT A DIFFERENT RATE?

- APPROACH: ADJUST THE CALCULATIONS BASED ON THE NEW CONSUMPTION RATE, FOLLOWING SIMILAR PROPORTIONALITY PRINCIPLES.

PRACTICAL APPLICATIONS AND TIPS

UNDERSTANDING RESOURCE ALLOCATION PROBLEMS IS VITAL IN MANY REAL-WORLD SCENARIOS, INCLUDING:

- MANAGING SUPPLIES IN DISASTER RELIEF OPERATIONS.
- PLANNING MENUS AND INVENTORY FOR INSTITUTIONS.
- BUDGETING RESOURCES FOR EVENTS OR LARGE GATHERINGS.

TIPS FOR SOLVING SUCH PROBLEMS EFFICIENTLY:

- ALWAYS IDENTIFY THE TOTAL RESOURCE QUANTITY FIRST.
- EXPRESS PER-UNIT CONSUMPTION TO FACILITATE SCALING CALCULATIONS.
- USE PROPORTIONALITY WHEN THE NUMBER OF CONSUMERS OR DURATION CHANGES.
- DOUBLE-CHECK YOUR UNITS AND CONVERSIONS TO AVOID MISTAKES.
- BREAK DOWN COMPLEX PROBLEMS INTO SMALLER, MANAGEABLE PARTS, AND SOLVE STEP-BY-STEP.

CONCLUSION

THE QUESTION OF HOW LONG THE FOOD WILL LAST WHEN 100 MORE CHILDREN JOIN THE HOSTEL IS STRAIGHTFORWARD ONCE YOU UNDERSTAND THE PROPORTIONAL RELATIONSHIPS INVOLVED. BY ANALYZING THE INITIAL CONDITIONS AND APPLYING BASIC ARITHMETIC, WE FIND THAT THE SAME AMOUNT OF FOOD, ORIGINALLY SUFFICIENT FOR 500 CHILDREN FOR 18 DAYS, WILL NOW LAST FOR 15 DAYS WITH 600 CHILDREN. SUCH PROBLEMS REINFORCE THE IMPORTANCE OF UNDERSTANDING RATIOS, PROPORTIONS, AND RESOURCE MANAGEMENT STRATEGIES—SKILLS THAT ARE APPLICABLE FAR BEYOND THIS SPECIFIC SCENARIO.

WHETHER YOU'RE A STUDENT PREPARING FOR EXAMS OR A PROFESSIONAL INVOLVED IN LOGISTICS AND PLANNING, MASTERING THESE FUNDAMENTAL CONCEPTS CAN GREATLY ENHANCE YOUR ABILITY TO MAKE INFORMED DECISIONS ABOUT RESOURCE ALLOCATION AND SUSTAINABILITY.

FREQUENTLY ASKED QUESTIONS

A SCHOOL HOSTEL HAS ENOUGH FOOD FOR 500 CHILDREN FOR 18 DAYS. HOW LONG WILL THE FOOD LAST IF 100 ADDITIONAL CHILDREN JOIN?

THE FOOD WILL LAST FOR 15 DAYS WITH 600 CHILDREN.

WHAT IS THE TOTAL AMOUNT OF FOOD AVAILABLE INITIALLY IN TERMS OF CHILD-DAYS?

THE INITIAL FOOD EQUALS $500 \text{ CHILDREN} \times 18 \text{ DAYS} = 9,000 \text{ CHILD-DAYS}$.

HOW DO YOU CALCULATE THE NEW DURATION WHEN THE NUMBER OF CHILDREN INCREASES?

DIVIDE THE TOTAL FOOD IN CHILD-DAYS BY THE NEW NUMBER OF CHILDREN: $9,000 \div 600 = 15 \text{ DAYS}$.

IF THE NUMBER OF CHILDREN INCREASES BY 100, WHAT IS THE CHANGE IN THE DURATION OF FOOD SUPPLY?

THE DURATION DECREASES FROM 18 DAYS TO 15 DAYS, A REDUCTION OF 3 DAYS.

WHAT IS THE FORMULA USED TO DETERMINE THE DURATION OF FOOD SUPPLY AFTER A CHANGE IN CHILDREN?

$\text{DURATION} = \text{TOTAL FOOD (CHILD-DAYS)} \div \text{NUMBER OF CHILDREN}$.

WHY DOES INCREASING THE NUMBER OF CHILDREN DECREASE THE DURATION THE FOOD LASTS?

BECAUSE THE SAME AMOUNT OF FOOD IS SHARED AMONG MORE CHILDREN, REDUCING THE NUMBER OF DAYS IT CAN LAST.

IS THE CALCULATION AFFECTED IF THE DAILY FOOD CONSUMPTION PER CHILD CHANGES?

YES, IF CONSUMPTION PER CHILD CHANGES, THE TOTAL CHILD-DAYS CHANGE, AFFECTING THE OVERALL DURATION.

CAN THIS PROBLEM BE SOLVED USING PROPORTIONALITY? HOW?

YES, BY SETTING UP A PROPORTION BETWEEN THE INITIAL AND NEW NUMBER OF CHILDREN AND THEIR RESPECTIVE DURATIONS.

ADDITIONAL RESOURCES

A SCHOOL HOSTEL HAS ENOUGH FOOD FOR 500 CHILDREN FOR 18 DAYS. HOW LONG WILL THE FOOD LAST IF 100 MORE?

INTRODUCTION

FOOD MANAGEMENT IS A CRITICAL ASPECT OF INSTITUTIONAL PLANNING, ESPECIALLY IN SETTINGS SUCH AS SCHOOL HOSTELS WHERE RESOURCES ARE FINITE AND THE NUMBER OF BENEFICIARIES FLUCTUATES. A COMMON SCENARIO FACED BY ADMINISTRATORS INVOLVES ASSESSING THE DURATION OF SUPPLIES WHEN THE POPULATION CHANGES. IN THIS CASE, A SCHOOL HOSTEL HAS ENOUGH FOOD TO SUSTAIN 500 CHILDREN FOR 18 DAYS. THE QUESTION ARISES: HOW LONG WILL THE SAME AMOUNT OF FOOD LAST IF 100 ADDITIONAL CHILDREN ARE ADDED?

THIS SEEMINGLY STRAIGHTFORWARD PROBLEM INVOLVES UNDERSTANDING THE RELATIONSHIP BETWEEN FOOD QUANTITY, CONSUMPTION RATE, AND THE NUMBER OF INDIVIDUALS. WHILE IT APPEARS SIMPLE, IT TOUCHES UPON FUNDAMENTAL PRINCIPLES OF RATIONING, PROPORTIONALITY, AND RESOURCE PLANNING. THIS ARTICLE AIMS TO ANALYZE THIS PROBLEM COMPREHENSIVELY, EXPLORING ALL RELEVANT FACTORS, ASSUMPTIONS, AND IMPLICATIONS.

UNDERSTANDING THE PROBLEM: BASIC ASSUMPTIONS AND DATA

THE PROBLEM PRESENTS THE FOLLOWING DATA:

- FOOD SUPPLIES ARE SUFFICIENT FOR 500 CHILDREN FOR 18 DAYS.
- THE QUESTION IS: HOW LONG WILL THE FOOD LAST IF THE NUMBER OF CHILDREN INCREASES TO 600 (500 + 100)?

TO ANALYZE THIS, WE NEED TO CONSIDER:

1. THE TOTAL AMOUNT OF FOOD AVAILABLE.
2. THE DAILY CONSUMPTION PER CHILD.
3. THE EFFECT OF INCREASING THE NUMBER OF CHILDREN ON THE DURATION OF SUPPLIES.

HOWEVER, BEFORE DELVING INTO CALCULATIONS, IT'S ESSENTIAL TO CLARIFY THE ASSUMPTIONS UNDERPINNING THE PROBLEM:

- UNIFORM DAILY CONSUMPTION: EACH CHILD CONSUMES THE SAME AMOUNT OF FOOD DAILY.
- CONSTANT CONSUMPTION RATE: THE CONSUMPTION PER CHILD REMAINS UNCHANGED REGARDLESS OF THE NUMBER OF CHILDREN.
- NO ADDITIONAL FOOD IS ADDED OR REMOVED: THE TOTAL FOOD QUANTITY REMAINS CONSTANT.
- NO WASTAGE OR SPOILAGE: THE ENTIRE SUPPLY IS USABLE AND CONSUMED AS INTENDED.
- ALL CHILDREN ARE EQUALLY ACTIVE AND HAVE SIMILAR NEEDS.

WITH THESE ASSUMPTIONS, THE PROBLEM SIMPLIFIES TO A PROPORTIONAL RELATIONSHIP BETWEEN THE NUMBER OF CHILDREN AND THE DURATION OF FOOD SUPPLIES.

CALCULATING THE TOTAL FOOD QUANTITY

TO APPROACH THE PROBLEM SYSTEMATICALLY, WE FIRST DETERMINE THE TOTAL AMOUNT OF FOOD AVAILABLE IN TERMS OF "CHILD-DAYS," WHICH REFERS TO THE TOTAL NUMBER OF DAYS THE FOOD CAN FEED A CERTAIN NUMBER OF CHILDREN.

SINCE THE FOOD LASTS FOR 18 DAYS FOR 500 CHILDREN:

- TOTAL CHILD-DAYS OF FOOD = NUMBER OF CHILDREN × NUMBER OF DAYS
- TOTAL CHILD-DAYS = $500 \times 18 = 9,000$ CHILD-DAYS

THIS FIGURE REPRESENTS THE TOTAL AMOUNT OF FOOD AVAILABLE IN TERMS OF CONSUMPTION CAPACITY.

IMPACT OF INCREASING THE NUMBER OF CHILDREN

WITH THE TOTAL FOOD AMOUNT FIXED AT 9,000 CHILD-DAYS, THE QUESTION BECOMES: HOW MANY DAYS WILL THIS SUPPLY LAST IF THE NUMBER OF CHILDREN INCREASES TO 600?

- NUMBER OF CHILDREN NOW = 600
- TOTAL CHILD-DAYS OF FOOD = 9,000

TO FIND THE NEW DURATION:

NUMBER OF DAYS = TOTAL CHILD-DAYS / NUMBER OF CHILDREN

= 9,000 / 600

= 15 DAYS

THUS, THE FOOD WILL LAST FOR 15 DAYS IF 600 CHILDREN ARE FED WITH THE SAME INITIAL SUPPLY.

ANALYZING THE RESULTS: KEY INSIGHTS

THIS STRAIGHTFORWARD CALCULATION REVEALS A PROPORTIONAL RELATIONSHIP:

- INCREASING THE NUMBER OF CHILDREN BY 20% (FROM 500 TO 600) REDUCES THE DURATION OF FOOD SUPPLIES BY APPROXIMATELY 16.7% (FROM 18 TO 15 DAYS).

THIS OUTCOME ALIGNS WITH EXPECTATIONS: MORE CHILDREN CONSUME THE SAME TOTAL AMOUNT OF FOOD IN LESS TIME.

SUMMARY TABLE:

NUMBER OF CHILDREN	DURATION OF FOOD SUPPLY (DAYS)
500	18
600	15

ADDITIONAL CONSIDERATIONS AND REAL-WORLD FACTORS

WHILE THE ABOVE CALCULATION PROVIDES A CLEAR MATHEMATICAL ANSWER, REAL-LIFE SCENARIOS MAY INTRODUCE COMPLEXITIES THAT SLIGHTLY ALTER THE OUTCOME.

1. VARIABLE CONSUMPTION RATES

CHILDREN MAY HAVE DIFFERING APPETITES DEPENDING ON AGE, HEALTH, ACTIVITY LEVEL, AND OTHER FACTORS. THE ASSUMPTION OF UNIFORM CONSUMPTION SIMPLIFIES THE PROBLEM BUT MAY NOT REFLECT REALITY.

2. FOOD QUALITY AND WASTAGE

IN PRACTICE, SOME FOOD MAY SPOIL OR BE WASTED, REDUCING EFFECTIVE SUPPLIES. CONVERSELY, BULK PURCHASES MIGHT ALLOW FOR SLIGHT ADJUSTMENTS IN RATIONING.

3. RATIONING STRATEGIES

ADMINISTRATORS MIGHT IMPLEMENT RATIONING POLICIES, REDUCING DAILY PORTIONS WHEN SUPPLIES ARE LIMITED, THUS EXTENDING THE DURATION.

4. EXTERNAL FACTORS

SUPPLY CHAIN DISRUPTIONS, EMERGENCY NEEDS, OR UNFORESEEN CIRCUMSTANCES COULD INFLUENCE THE AVAILABLE RESOURCES AND THEIR MANAGEMENT.

IMPLICATIONS FOR RESOURCE PLANNING

UNDERSTANDING HOW CHANGES IN THE NUMBER OF BENEFICIARIES AFFECT RESOURCE LONGEVITY IS CRUCIAL FOR EFFICIENT MANAGEMENT. THE KEY TAKEAWAYS INCLUDE:

- PROPORTIONAL SCALING: FOOD SUPPLIES ARE DIRECTLY PROPORTIONAL TO THE NUMBER OF CHILDREN SERVED.
- BUFFER STOCKS: ADMINISTRATORS SHOULD MAINTAIN BUFFER STOCKS TO ACCOMMODATE FLUCTUATIONS.
- DYNAMIC PLANNING: REGULAR ASSESSMENT AND ADJUSTMENT OF RATIONS ARE ESSENTIAL TO ENSURE SUSTAINABILITY.
- COMMUNICATION: CLEAR POLICIES SHOULD BE COMMUNICATED TO STAFF AND PUPILS REGARDING RATIONING AND RESOURCE CONSTRAINTS.

CONCLUSION

THE PROBLEM OF A SCHOOL HOSTEL WITH ENOUGH FOOD FOR 500 CHILDREN FOR 18 DAYS, AND WHAT HAPPENS IF 100 MORE CHILDREN JOIN, EXEMPLIFIES FUNDAMENTAL PRINCIPLES OF PROPORTIONALITY AND RESOURCE MANAGEMENT. BASED ON STRAIGHTFORWARD CALCULATIONS, ADDING 20% MORE CHILDREN REDUCES THE DURATION OF SUPPLIES FROM 18 DAYS TO 15 DAYS, ASSUMING ALL OTHER FACTORS REMAIN CONSTANT.

THIS ANALYSIS UNDERSCORES THE IMPORTANCE OF PRECISE PLANNING, PROACTIVE RESOURCE MANAGEMENT, AND AWARENESS OF UNDERLYING ASSUMPTIONS. WHILE THE MATHEMATICAL SOLUTION IS SIMPLE, PRACTICAL IMPLEMENTATION REQUIRES CONSIDERING REAL-WORLD VARIABLES, CONTINGENCIES, AND EFFICIENT RATIONING STRATEGIES TO ENSURE THE WELL-BEING OF ALL CHILDREN INVOLVED.

IN ESSENCE, RESOURCE PLANNING IN INSTITUTIONAL SETTINGS MUST BALANCE MATHEMATICAL MODELS WITH ON-THE-GROUND REALITIES TO ENSURE SUSTAINABILITY AND FAIRNESS.

A School Hostel Has Enough Food For 500 Children For 18

Days How Long Will The Food Last If 100 More

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