

LUCAS IS 5 INCHES TALLER THAN TAMIKA, AND THE SUM OF THEIR HEIGHTS IS 137 INCHES?

LUCAS IS 5 INCHES TALLER THAN TAMIKA, AND THE SUM OF THEIR HEIGHTS IS 137 INCHES? THIS INTRIGUING STATEMENT OPENS THE DOOR TO EXPLORING HOW BASIC ALGEBRA CAN HELP DETERMINE INDIVIDUAL HEIGHTS, THE IMPORTANCE OF UNDERSTANDING MEASUREMENTS, AND PRACTICAL APPLICATIONS OF SUCH CALCULATIONS IN EVERYDAY LIFE. WHETHER YOU'RE A STUDENT BRUSHING UP ON ALGEBRA, A PARENT CURIOUS ABOUT HEIGHT COMPARISONS, OR SIMPLY INTERESTED IN PROBLEM-SOLVING, THIS ARTICLE PROVIDES AN IN-DEPTH LOOK AT HOW TO APPROACH AND SOLVE SUCH HEIGHT-RELATED PUZZLES.

UNDERSTANDING THE PROBLEM: BREAKING DOWN THE STATEMENT

BEFORE DIVING INTO CALCULATIONS, IT'S IMPORTANT TO INTERPRET THE PROBLEM ACCURATELY. THE STATEMENT PROVIDES TWO KEY PIECES OF INFORMATION:

- LUCAS IS 5 INCHES TALLER THAN TAMIKA.
- THE COMBINED HEIGHT OF LUCAS AND TAMIKA IS 137 INCHES.

THESE CLUES SET THE STAGE FOR FORMING AN ALGEBRAIC EQUATION TO FIND EACH PERSON'S HEIGHT.

SETTING UP VARIABLES AND EQUATIONS

DEFINING VARIABLES

TO SOLVE THE PROBLEM SYSTEMATICALLY, ASSIGN VARIABLES TO THE UNKNOWN:

- LET T REPRESENT TAMIKA'S HEIGHT IN INCHES.
- SINCE LUCAS IS 5 INCHES TALLER, LUCAS'S HEIGHT CAN BE EXPRESSED AS $(T + 5)$.

FORMULATING THE EQUATION

USING THE INFORMATION ABOUT THEIR COMBINED HEIGHT:

$$T + (T + 5) = 137$$

SUBSTITUTING THE VARIABLES:

$$T + (T + 5) = 137$$

SIMPLIFY THE EQUATION:

$$2T + 5 = 137$$

FROM HERE, SOLVING FOR T WILL GIVE TAMIKA'S HEIGHT, AND SUBSEQUENTLY, LUCAS'S HEIGHT CAN BE DETERMINED.

SOLVING THE EQUATION STEP-BY-STEP

ISOLATING THE VARIABLE

SUBTRACT 5 FROM BOTH SIDES:

$$\begin{aligned} & \backslash[\\ 2T &= 137 - 5 \\ & \backslash] \end{aligned}$$

$$\begin{aligned} & \backslash[\\ 2T &= 132 \\ & \backslash] \end{aligned}$$

DIVIDE BOTH SIDES BY 2:

$$\begin{aligned} & \backslash[\\ T &= \frac{132}{2} = 66 \\ & \backslash] \end{aligned}$$

THUS, TAMIKA'S HEIGHT IS 66 INCHES.

FINDING LUCAS'S HEIGHT

RECALL THAT LUCAS IS 5 INCHES TALLER:

$$\begin{aligned} & \backslash[\\ L &= T + 5 = 66 + 5 = 71 \\ & \backslash] \end{aligned}$$

THEREFORE, LUCAS'S HEIGHT IS 71 INCHES.

INTERPRETING THE RESULTS AND REAL-WORLD APPLICATIONS

KNOWING INDIVIDUAL HEIGHTS CAN HAVE VARIOUS PRACTICAL USES, FROM FASHION AND CLOTHING FIT TO HEALTH ASSESSMENTS AND SPORTS ANALYTICS.

PRACTICAL USES OF HEIGHT CALCULATIONS

- CLOTHING AND FASHION: UNDERSTANDING HEIGHT DIFFERENCES HELPS IN TAILORING CLOTHES FOR PROPER FIT.
- HEALTH MONITORING: TRACKING HEIGHT OVER TIME CAN INDICATE GROWTH PATTERNS OR HEALTH ISSUES.
- SPORTS AND FITNESS: HEIGHT PLAYS A ROLE IN DETERMINING SUITABILITY FOR CERTAIN SPORTS OR POSITIONS.
- DESIGN AND ERGONOMICS: DESIGNING FURNITURE AND WORKSPACES THAT ACCOMMODATE DIFFERENT HEIGHTS.

ADDITIONAL EXAMPLES AND VARIATIONS

UNDERSTANDING HOW TO APPROACH SIMILAR PROBLEMS IS VALUABLE BEYOND THIS SPECIFIC CASE.

EXAMPLE 1: DIFFERENT HEIGHT DIFFERENCE

SUPPOSE LUCAS IS 8 INCHES TALLER THAN TAMIKA, AND THEIR COMBINED HEIGHT IS 150 INCHES. HOW TALL ARE EACH?

SOLUTION:

LET (T) BE TAMIKA'S HEIGHT.

$$T + (T + 8) = 150$$

$$2T + 8 = 150$$

$$2T = 142$$

$$T = 71$$

LUCAS'S HEIGHT:

$$L = T + 8 = 71 + 8 = 79$$

RESULTS: TAMIKA IS 71 INCHES TALL; LUCAS IS 79 INCHES TALL.

EXAMPLE 2: DIFFERENT TOTAL HEIGHT

IF LUCAS IS 5 INCHES TALLER THAN TAMIKA, BUT THEIR COMBINED HEIGHT IS ONLY 130 INCHES, WHAT ARE THEIR HEIGHTS?

SOLUTION:

$$T + (T + 5) = 130$$

$$2T + 5 = 130$$

$$2T = 125$$

$$T = 62.5$$

LUCAS'S HEIGHT:

$$L = 62.5 + 5 = 67.5$$

RESULTS: TAMIKA IS 62.5 INCHES, LUCAS IS 67.5 INCHES.

UNDERSTANDING THE IMPORTANCE OF ACCURATE MEASUREMENTS

ACCURATE HEIGHT MEASUREMENTS ARE CRUCIAL FOR VARIOUS DOMAINS:

- MEDICAL ASSESSMENTS: PRECISE MEASUREMENTS ARE VITAL FOR DIAGNOSING GROWTH DISORDERS.
- CLOTHING INDUSTRY: ACCURATE SIZING ENSURES COMFORT AND FIT.
- SPORTS: HEIGHT INFLUENCES TRAINING AND STRATEGY.
- PERSONAL RECORDS: MANY INDIVIDUALS TRACK THEIR HEIGHT OVER TIME FOR PERSONAL OR HEALTH REASONS.

THE ROLE OF ALGEBRA IN EVERYDAY LIFE

THIS PROBLEM EXEMPLIFIES HOW ALGEBRA HELPS SOLVE REAL-WORLD ISSUES. BY SETTING VARIABLES AND FORMING EQUATIONS, YOU CAN:

- QUANTIFY RELATIONSHIPS BETWEEN DIFFERENT QUANTITIES.
- PREDICT UNKNOWN VALUES BASED ON KNOWN DATA.
- DEVELOP PROBLEM-SOLVING SKILLS APPLICABLE IN MANY FIELDS.

TIPS FOR SOLVING SIMILAR PROBLEMS

- IDENTIFY WHAT IS KNOWN AND WHAT IS UNKNOWN.
- ASSIGN CLEAR VARIABLES TO UNKNOWN QUANTITIES.
- TRANSLATE WORD PROBLEMS INTO ALGEBRAIC EQUATIONS.
- SIMPLIFY AND SOLVE THE EQUATIONS STEP-BY-STEP.
- DOUBLE-CHECK YOUR SOLUTIONS BY SUBSTITUTING BACK INTO THE ORIGINAL CONDITIONS.

CONCLUSION

IN SUMMARY, UNDERSTANDING THAT LUCAS IS 5 INCHES TALLER THAN TAMIKA AND THEIR COMBINED HEIGHT TOTALS 137 INCHES ALLOWS US TO APPLY ALGEBRAIC METHODS TO FIND THEIR INDIVIDUAL HEIGHTS—LUCAS IS 71 INCHES TALL, AND TAMIKA IS 66 INCHES TALL. SUCH PROBLEMS HIGHLIGHT THE IMPORTANCE OF ALGEBRA IN EVERYDAY LIFE, FROM HEALTH ASSESSMENTS TO CLOTHING DESIGN. MASTERING THESE BASIC PROBLEM-SOLVING TECHNIQUES ENHANCES ANALYTICAL SKILLS AND ENABLES US TO APPROACH SIMILAR CHALLENGES WITH CONFIDENCE.

WHETHER YOU'RE A STUDENT, EDUCATOR, OR JUST A CURIOUS MIND, RECOGNIZING HOW SIMPLE EQUATIONS UNDERPIN MANY REAL-WORLD SCENARIOS IS BOTH EMPOWERING AND PRACTICAL. BY PRACTICING THESE TYPES OF PROBLEMS, YOU'LL DEVELOP A STRONGER GRASP OF ALGEBRA AND ITS APPLICATIONS, MAKING EVERYDAY MEASUREMENTS AND COMPARISONS MORE MANAGEABLE AND INSIGHTFUL.

FREQUENTLY ASKED QUESTIONS

WHAT IS LUCAS'S HEIGHT IF HE IS 5 INCHES TALLER THAN TAMIKA AND THEIR COMBINED HEIGHT IS 137 INCHES?

LUCAS IS 71 INCHES TALL, AND TAMIKA IS 66 INCHES TALL.

HOW CAN I DETERMINE TAMIKA'S HEIGHT GIVEN LUCAS IS 5 INCHES TALLER AND THEIR TOTAL HEIGHT IS 137 INCHES?

YOU CAN SET TAMIKA'S HEIGHT AS x INCHES; THEN LUCAS'S HEIGHT IS $x + 5$ INCHES. USING THE EQUATION $x + (x + 5) = 137$, SOLVE FOR x TO FIND TAMIKA'S HEIGHT.

WHAT IS THE MATHEMATICAL FORMULA TO FIND LUCAS AND TAMIKA'S HEIGHTS IN THIS PROBLEM?

SET TAMIKA'S HEIGHT AS x ; THEN LUCAS'S HEIGHT IS $x + 5$. THE SUM IS $x + (x + 5) = 137$. SOLVING FOR x GIVES TAMIKA'S HEIGHT, AND ADDING 5 INCHES GIVES LUCAS'S HEIGHT.

WHY IS IT IMPORTANT TO KNOW THE SUM OF THEIR HEIGHTS WHEN SOLVING THIS PROBLEM?

KNOWING THE SUM ALLOWS YOU TO SET UP AN EQUATION AND SOLVE FOR ONE VARIABLE, ENABLING YOU TO FIND EACH PERSON'S HEIGHT ACCURATELY.

IF LUCAS IS 5 INCHES TALLER THAN TAMIKA, AND THEIR TOTAL HEIGHT IS 137 INCHES, WHAT IS TAMIKA'S HEIGHT?

TAMIKA'S HEIGHT IS 66 INCHES.

WHAT IS THE STEP-BY-STEP PROCESS TO SOLVE FOR LUCAS'S HEIGHT IN THIS PROBLEM?

FIRST, LET TAMIKA'S HEIGHT BE x INCHES. THEN LUCAS'S HEIGHT IS $x + 5$. WRITE THE EQUATION $x + (x + 5) = 137$, COMBINE LIKE TERMS TO GET $2x + 5 = 137$, SUBTRACT 5 FROM BOTH SIDES TO GET $2x = 132$, THEN DIVIDE BOTH SIDES BY 2 TO FIND $x = 66$ INCHES. LUCAS'S HEIGHT IS $x + 5 = 71$ INCHES.

COULD THIS PROBLEM BE SOLVED USING ALGEBRA? HOW?

YES, BY SETTING VARIABLES FOR EACH HEIGHT AND FORMING AN EQUATION BASED ON THEIR SUM, THEN SOLVING FOR THE VARIABLES ALGEBRAICALLY.

WHAT REAL-LIFE SCENARIOS COULD THIS TYPE OF PROBLEM APPLY TO?

IT CAN APPLY TO SITUATIONS INVOLVING COMPARING HEIGHTS, SUCH AS DETERMINING THE HEIGHT OF INDIVIDUALS IN A GROUP, OR MEASURING DIFFERENT OBJECTS WITH KNOWN DIFFERENCES.

IS THERE AN ALTERNATIVE METHOD TO SOLVE FOR LUCAS AND TAMIKA'S HEIGHTS WITHOUT ALGEBRA?

YES, USING LOGICAL REASONING OR TRIAL AND ERROR, BUT ALGEBRA PROVIDES A STRAIGHTFORWARD AND PRECISE SOLUTION.

ADDITIONAL RESOURCES

LUCAS IS 5 INCHES TALLER THAN TAMIKA, AND THE SUM OF THEIR HEIGHTS IS 137 INCHES. THIS SIMPLE-SOUNDING STATEMENT OPENS THE DOOR TO A CLASSIC ALGEBRAIC PROBLEM THAT MANY ENCOUNTER DURING SCHOOL MATH LESSONS OR IN REAL-LIFE SCENARIOS INVOLVING MEASUREMENTS. WHILE THE PROBLEM APPEARS STRAIGHTFORWARD AT FIRST GLANCE, IT PROVIDES AN EXCELLENT OPPORTUNITY TO DELVE INTO ALGEBRAIC REASONING, PROBLEM-SOLVING STRATEGIES, AND PRACTICAL APPLICATIONS OF BASIC MATHEMATICS. IN THIS COMPREHENSIVE GUIDE, WE'LL EXPLORE HOW TO APPROACH SUCH PROBLEMS, BREAK DOWN THEIR COMPONENTS, AND UNDERSTAND THE UNDERLYING CONCEPTS, ALL WHILE ILLUSTRATING THE PROCESS WITH CLEAR STEPS.

BEFORE JUMPING INTO CALCULATIONS, IT'S ESSENTIAL TO CAREFULLY INTERPRET THE PROBLEM STATEMENT:

- LUCAS IS 5 INCHES TALLER THAN TAMIKA.

THIS INDICATES A RELATIONSHIP BETWEEN THEIR HEIGHTS, WITH LUCAS'S HEIGHT BEING TAMIKA'S HEIGHT PLUS 5 INCHES.

- THE SUM OF THEIR HEIGHTS IS 137 INCHES.

THE COMBINED HEIGHT OF BOTH INDIVIDUALS TOTALS 137 INCHES.

THE KEY GOAL HERE IS TO FIND OUT THE INDIVIDUAL HEIGHTS OF LUCAS AND TAMIKA BASED ON THIS INFORMATION.

SETTING UP THE VARIABLES

TO TRANSLATE THE PROBLEM INTO A MATHEMATICAL MODEL, ASSIGN VARIABLES TO THE UNKNOWN:

- LET T BE TAMIKA'S HEIGHT IN INCHES.

- SINCE LUCAS IS 5 INCHES TALLER THAN TAMIKA, DEFINE LUCAS'S HEIGHT AS L .

FROM THE PROBLEM:

- $L = T + 5$

- THE SUM OF THEIR HEIGHTS: $L + T = 137$

THIS SETUP CREATES A SYSTEM OF EQUATIONS THAT WE CAN SOLVE STEP-BY-STEP.

SOLVING THE PROBLEM STEP-BY-STEP

STEP 1: WRITE DOWN THE EQUATIONS

BASED ON THE ABOVE DEFINITIONS:

1. $L = T + 5$

2. $L + T = 137$

STEP 2: SUBSTITUTE AND SIMPLIFY

REPLACE L IN THE SECOND EQUATION WITH $T + 5$:

$$(T + 5) + T = 137$$

SIMPLIFY:

$$2T + 5 = 137$$

STEP 3: ISOLATE THE VARIABLE

SUBTRACT 5 FROM BOTH SIDES:

$$2T = 137 - 5$$

$$2T = 132$$

DIVIDE BOTH SIDES BY 2:

$$T = 132 / 2$$

$$T = 66$$

STEP 4: FIND LUCAS'S HEIGHT

RECALL THAT $L = T + 5$:

$$L = 66 + 5$$

$$L = 71$$

FINAL ANSWER

- TAMIKA'S HEIGHT: 66 INCHES
- LUCAS'S HEIGHT: 71 INCHES

THESE NUMBERS SATISFY BOTH CONDITIONS:

- LUCAS IS 5 INCHES TALLER THAN TAMIKA: 71 INCHES VS. 66 INCHES (DIFFERENCE OF 5 INCHES).
- THE SUM OF THEIR HEIGHTS: $66 + 71 = 137$ INCHES.

PRACTICAL APPLICATIONS AND REAL-WORLD RELEVANCE

WHILE THIS PROBLEM MAY SEEM PURELY ACADEMIC, UNDERSTANDING SUCH RELATIONSHIPS HAS PRACTICAL RELEVANCE:

- HEALTH AND FITNESS: TRACKING GROWTH PATTERNS OR COMPARING HEIGHTS.
- CLOTHING AND APPAREL: ENSURING PROPER FIT BASED ON HEIGHT DIFFERENCES.
- SPORTS AND ATHLETICS: ESTIMATING TEAM COMPOSITIONS OR UNDERSTANDING ATHLETE PROFILES.
- ENGINEERING AND DESIGN: CALCULATING DIMENSIONS WHERE RELATIVE MEASUREMENTS MATTER.

KNOWING HOW TO SET UP AND SOLVE SUCH PROBLEMS ENHANCES CRITICAL THINKING AND QUANTITATIVE REASONING SKILLS, WHICH ARE VALUABLE IN NUMEROUS FIELDS.

COMMON VARIATIONS AND EXTENDED SCENARIOS

UNDERSTANDING THIS PROBLEM ALSO OPENS THE DOOR TO TACKLING SIMILAR OR MORE COMPLEX SCENARIOS:

1. DIFFERENT HEIGHT DIFFERENCES

SUPPOSE LUCAS IS n INCHES TALLER THAN TAMIKA, AND THE TOTAL HEIGHT IS KNOWN. HOW WOULD THE SOLUTION ADAPT?

- REPLACE 5 WITH n IN THE EQUATIONS.
- THE PROCESS REMAINS THE SAME: SUBSTITUTE AND SOLVE FOR T , THEN FIND L .

2. MULTIPLE PEOPLE

EXTEND THE PROBLEM TO INCLUDE MORE INDIVIDUALS, EACH WITH KNOWN OR UNKNOWN RELATIONSHIPS. THIS INVOLVES SYSTEMS OF EQUATIONS WITH MORE VARIABLES.

3. PERCENT DIFFERENCES

INSTEAD OF FIXED INCHES, CONSIDER PERCENTAGE DIFFERENCES (E.G., LUCAS IS 10% TALLER THAN TAMIKA). THIS INTRODUCES PROPORTIONAL REASONING AND MORE ADVANCED ALGEBRA.

TIPS FOR SOLVING SIMILAR PROBLEMS

- DEFINE VARIABLES CLEARLY: ASSIGN MEANINGFUL SYMBOLS TO UNKNOWN QUANTITIES.
- TRANSLATE WORDS INTO EQUATIONS: CAREFULLY INTERPRET THE RELATIONSHIPS DESCRIBED.
- USE SUBSTITUTION OR ELIMINATION: SIMPLIFY SYSTEMS OF EQUATIONS SYSTEMATICALLY.
- CHECK YOUR WORK: VERIFY THAT THE SOLUTIONS SATISFY ALL ORIGINAL CONDITIONS.
- VISUALIZE WHEN POSSIBLE: DRAWING DIAGRAMS OR NUMBER LINES CAN AID UNDERSTANDING.

CONCLUSION

THE PROBLEM "LUCAS IS 5 INCHES TALLER THAN TAMIKA, AND THE SUM OF THEIR HEIGHTS IS 137 INCHES" EXEMPLIFIES FUNDAMENTAL ALGEBRAIC PROBLEM-SOLVING. BY SETTING UP VARIABLES, TRANSLATING WORD PROBLEMS INTO EQUATIONS, AND SYSTEMATICALLY SOLVING, WE GAIN NOT ONLY THE ANSWER BUT ALSO A DEEPER APPRECIATION FOR MATHEMATICAL REASONING. WHETHER APPLIED TO EVERYDAY SITUATIONS OR ACADEMIC EXERCISES, MASTERING SUCH TECHNIQUES ENHANCES ANALYTICAL SKILLS AND EMPOWERS YOU TO TACKLE A WIDE RANGE OF QUANTITATIVE CHALLENGES WITH CONFIDENCE.

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