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WHEN IT COMES TO SOLVING AGE-RELATED WORD PROBLEMS, UNDERSTANDING THE RELATIONSHIPS BETWEEN DIFFERENT AGES OVER TIME IS CRUCIAL. ONE SUCH INTRIGUING PROBLEM INVOLVES A MAN AND HIS SON, WHERE WE ARE GIVEN SPECIFIC AGE DIFFERENCES AND RATIOS AT DIFFERENT POINTS IN TIME. THE PROBLEM STATEMENT READS: A MAN IS 32 YEARS OLDER THAN HIS SON. TEN YEARS AGO, HE WAS THREE TIMES AS OLD AS HIS SON WAS THEN. FIND THEIR CURRENT AGES.

THIS TYPE OF PROBLEM IS COMMON IN ALGEBRA AND TESTS YOUR ABILITY TO SET UP EQUATIONS BASED ON WORD CLUES. IN THIS ARTICLE, WE WILL EXPLORE HOW TO APPROACH AND SOLVE THIS PROBLEM STEP BY STEP, PROVIDING CLEAR EXPLANATIONS AND TIPS FOR TACKLING SIMILAR AGE-RELATED WORD PROBLEMS.

UNDERSTANDING THE PROBLEM

BEFORE DIVING INTO CALCULATIONS, IT'S ESSENTIAL TO CAREFULLY INTERPRET THE PROBLEM STATEMENT. LET'S BREAK DOWN WHAT IS GIVEN:

- THE MAN IS CURRENTLY OLDER THAN HIS SON.
- TEN YEARS AGO, THE MAN WAS 32 YEARS OLDER THAN HIS SON.
- TEN YEARS AGO, THE MAN WAS THREE TIMES AS OLD AS HIS SON WAS THEN.
- THE GOAL: FIND THE CURRENT AGES OF BOTH THE MAN AND HIS SON.

THE KEY POINTS INVOLVE AGE DIFFERENCES OVER TIME AND RATIOS OF AGES AT SPECIFIC MOMENTS.

DEFINING VARIABLES

TO TRANSLATE THE PROBLEM INTO MATHEMATICAL EQUATIONS, WE NEED TO ASSIGN VARIABLES:

LET'S DEFINE:

- S = THE CURRENT AGE OF THE SON
- M = THE CURRENT AGE OF THE MAN

WITH THESE VARIABLES, WE CAN EXPRESS THE GIVEN CONDITIONS:

- THE CURRENT AGE DIFFERENCE: $M = S + 32$
- THE AGES TEN YEARS AGO: SON: $S - 10$, MAN: $M - 10$

SETTING UP EQUATIONS BASED ON THE CONDITIONS

USING THE INFORMATION PROVIDED, WE CAN NOW FORMULATE EQUATIONS:

1. AGE DIFFERENCE TEN YEARS AGO

TEN YEARS AGO, THE MAN WAS 32 YEARS OLDER THAN HIS SON:

- $(M - 10) = (S - 10) + 32$

2. AGE RATIO TEN YEARS AGO

TEN YEARS AGO, THE MAN WAS THREE TIMES AS OLD AS HIS SON WAS THEN:

- $(M - 10) = 3(S - 10)$

SOLVING THE EQUATIONS STEP-BY-STEP

NOW, LET'S SOLVE THESE EQUATIONS TO FIND THE CURRENT AGES.

STEP 1: EXPRESS M IN TERMS OF S

FROM THE FIRST EQUATION:

$$M = S + 32$$

STEP 2: SUBSTITUTE INTO THE SECOND EQUATION

THE SECOND EQUATION:

$$(M - 10) = 3(S - 10)$$

SUBSTITUTE M:

$$(S + 32 - 10) = 3(S - 10)$$

SIMPLIFY:

$$S + 22 = 3S - 30$$

STEP 3: SOLVE FOR S

BRING ALL S TERMS TO ONE SIDE:

$$S + 22 = 3S - 30$$

SUBTRACT S FROM BOTH SIDES:

$$22 = 2S - 30$$

ADD 30 TO BOTH SIDES:

$$22 + 30 = 2S$$

$$52 = 2S$$

DIVIDE BOTH SIDES BY 2:

$$S = 26$$

STEP 4: FIND M

RECALL:

$$M = S + 32 = 26 + 32 = 58$$

VERIFICATION OF THE SOLUTION

TO ENSURE OUR SOLUTION MAKES SENSE, VERIFY THE CONDITIONS:

- TEN YEARS AGO, SON'S AGE: $26 - 10 = 16$
- TEN YEARS AGO, MAN'S AGE: $58 - 10 = 48$

CHECK IF THE MAN WAS THREE TIMES AS OLD AS HIS SON THEN:

$$48 = 3 \times 16$$

YES, THIS HOLDS TRUE.

THEREFORE, THE CURRENT AGES ARE:

- SON'S CURRENT AGE: 26 YEARS
- MAN'S CURRENT AGE: 58 YEARS

ADDITIONAL TIPS FOR SOLVING AGE PROBLEMS

SOLVING AGE-RELATED WORD PROBLEMS CAN SOMETIMES BE TRICKY, BUT FOLLOWING THESE TIPS CAN MAKE THE PROCESS SMOOTHER:

1. DEFINE VARIABLES CLEARLY

USE SIMPLE LETTERS LIKE S AND M FOR AGES; THIS KEEPS EQUATIONS MANAGEABLE.

2. CAREFULLY INTERPRET WORDS

IDENTIFY KEYWORDS SUCH AS “OLDER,” “YEARS AGO,” “TIMES AS OLD AS,” ETC., AND TRANSLATE THEM INTO EQUATIONS.

3. WRITE EQUATIONS SYSTEMATICALLY

BASED ON THE PROBLEM STATEMENTS, SET UP EQUATIONS BEFORE SUBSTITUTING VALUES.

4. CHECK YOUR SOLUTIONS

ALWAYS VERIFY BY SUBSTITUTING YOUR ANSWERS BACK INTO THE ORIGINAL CONDITIONS.

5. PRACTICE SIMILAR PROBLEMS

THE MORE YOU PRACTICE, THE MORE INTUITIVE SOLVING AGE PUZZLES BECOMES.

CONCLUSION

THE PROBLEM OF FINDING THE CURRENT AGES OF A MAN AND HIS SON GIVEN THEIR AGE DIFFERENCE AND RATIOS AT A SPECIFIC TIME CAN BE EFFECTIVELY SOLVED USING ALGEBRA. BY DEFINING VARIABLES, TRANSLATING WORD CLUES INTO EQUATIONS, AND SOLVING SYSTEMATICALLY, YOU CAN ARRIVE AT ACCURATE SOLUTIONS.

IN OUR EXAMPLE, WE FOUND THAT THE MAN IS CURRENTLY 58 YEARS OLD, AND HIS SON IS 26 YEARS OLD. UNDERSTANDING THESE STEPS NOT ONLY HELPS IN SOLVING THIS PARTICULAR PROBLEM BUT ALSO PREPARES YOU TO TACKLE SIMILAR AGE-RELATED PUZZLES WITH CONFIDENCE.

REMEMBER, THE KEY TO MASTERING AGE PROBLEMS IS CAREFUL INTERPRETATION, SYSTEMATIC SETUP OF EQUATIONS, AND THOROUGH VERIFICATION. WITH PRACTICE, YOU’LL FIND THESE PROBLEMS BECOMING EASIER AND MORE INTUITIVE OVER TIME.

KEYWORDS FOR SEO OPTIMIZATION:

AGE PROBLEM, SOLVE AGE WORD PROBLEM, ALGEBRA AGE PUZZLE, CURRENT AGES SOLUTION, AGE DIFFERENCE, AGE RATIO, AGE PROBLEM EXAMPLE, ALGEBRAIC EQUATIONS, MATH WORD PROBLEMS, AGE CALCULATION TIPS

FREQUENTLY ASKED QUESTIONS

HOW DO YOU SET UP EQUATIONS TO FIND THE CURRENT AGES OF A MAN AND HIS SON BASED ON THE GIVEN INFORMATION?

LET THE SON’S CURRENT AGE BE S AND THE MAN’S CURRENT AGE BE M . TEN YEARS AGO, THE MAN WAS $M - 10$ AND THE SON WAS $S - 10$. THE PROBLEM STATES THAT TEN YEARS AGO, THE MAN WAS THREE TIMES AS OLD AS HIS SON: $M - 10 = 3(S - 10)$. ALSO, THE MAN IS 32 YEARS OLDER THAN HIS SON NOW: $M = S + 32$.

WHAT IS THE STEP-BY-STEP SOLUTION TO FIND THE CURRENT AGES OF THE MAN AND

HIS SON?

START WITH $M = S + 32$. SUBSTITUTE INTO THE FIRST EQUATION: $(S + 32) - 10 = 3(S - 10)$. SIMPLIFY: $S + 22 = 3S - 30$. BRING ALL TO ONE SIDE: $22 + 30 = 3S - S$, so $52 = 2S$. THEREFORE, $S = 26$. THEN, $M = 26 + 32 = 58$. THE SON IS 26 YEARS OLD, AND THE MAN IS 58 YEARS OLD NOW.

WHAT IS THE SIGNIFICANCE OF THE AGE DIFFERENCE REMAINING CONSTANT OVER TIME IN THIS PROBLEM?

THE CONSTANT AGE DIFFERENCE OF 32 YEARS HELPS SET UP THE RELATIONSHIP BETWEEN THE AGES AND SIMPLIFIES THE CALCULATION BY ALLOWING US TO EXPRESS ONE AGE IN TERMS OF THE OTHER, MAKING IT EASIER TO SOLVE THE EQUATIONS.

HOW DOES THE INFORMATION 'TEN YEARS AGO HE WAS THREE TIMES AS OLD AS HIS SON' HELP IN SOLVING THE PROBLEM?

IT PROVIDES A SPECIFIC RATIO OF AGES AT A PAST POINT IN TIME, ALLOWING US TO CREATE AN EQUATION RELATING THE AGES AT THAT TIME, WHICH, COMBINED WITH THE CURRENT AGE DIFFERENCE, LEADS TO SOLVING FOR THE CURRENT AGES.

CAN THIS PROBLEM BE SOLVED WITHOUT ALGEBRA? IF SO, HOW?

WHILE ALGEBRA PROVIDES A STRAIGHTFORWARD SOLUTION, A LOGICAL APPROACH OR TRIAL AND ERROR COULD WORK BY TESTING POSSIBLE AGES THAT SATISFY THE CONDITIONS, BUT ALGEBRA IS THE MOST EFFICIENT AND ACCURATE METHOD.

WHAT REAL-LIFE SCENARIOS RESEMBLE THIS AGE PROBLEM IN TERMS OF RELATIONSHIPS AND RATIOS?

SIMILAR SCENARIOS INCLUDE CALCULATING THE AGES OF FAMILY MEMBERS AT DIFFERENT TIMES BASED ON AGE DIFFERENCES AND RATIOS, SUCH AS KNOWING GRANDPARENTS ARE A CERTAIN NUMBER OF YEARS OLDER THAN GRANDCHILDREN AT VARIOUS POINTS IN TIME.

WHAT ARE COMMON MISTAKES TO AVOID WHEN SOLVING THIS TYPE OF AGE PROBLEM?

COMMON MISTAKES INCLUDE MIXING UP THE AGES AT DIFFERENT TIMES, FORGETTING TO SUBTRACT 10 YEARS WHEN CALCULATING AGES TEN YEARS AGO, OR CONFUSING THE RELATIONSHIPS BETWEEN THE CURRENT AGES. ALWAYS DOUBLE-CHECK THE LOGIC AND CALCULATIONS.

HOW CAN UNDERSTANDING THIS PROBLEM HELP IMPROVE PROBLEM-SOLVING SKILLS IN ALGEBRA?

THIS PROBLEM REINFORCES TRANSLATING WORD PROBLEMS INTO ALGEBRAIC EQUATIONS, UNDERSTANDING RATIOS AND DIFFERENCES, AND APPLYING LOGICAL REASONING—ALL VALUABLE SKILLS IN ALGEBRA AND MATHEMATICAL PROBLEM-SOLVING.

ADDITIONAL RESOURCES

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INTRODUCTION

MATHEMATICAL WORD PROBLEMS OFTEN APPEAR STRAIGHTFORWARD AT FIRST GLANCE BUT UNRAVEL INTO INTRICATE PUZZLES THAT TEST OUR REASONING SKILLS. AMONG THESE, AGE-RELATED PROBLEMS ARE CLASSIC EXAMPLES THAT BLEND ALGEBRAIC

CONCEPTS WITH REAL-WORLD SCENARIOS. TODAY'S FOCUS IS A PARTICULARLY ENGAGING PROBLEM: A MAN WAS 32 YEARS OLDER THAN HIS SON TEN YEARS AGO. AT THAT TIME, HE WAS THREE TIMES AS OLD AS HIS SON WAS THEN. FIND THE CURRENT AGES OF BOTH THE MAN AND HIS SON. ALTHOUGH SEEMINGLY SIMPLE, SOLVING THIS PROBLEM INVOLVES CAREFUL SETUP, LOGICAL DEDUCTION, AND ALGEBRAIC MANIPULATION. THIS ARTICLE AIMS TO GUIDE READERS THROUGH THE PROCESS STEP-BY-STEP, PROVIDING A DETAILED UNDERSTANDING OF HOW TO APPROACH AND SOLVE SUCH AGE PROBLEMS.

UNDERSTANDING THE PROBLEM: BREAKING DOWN THE SCENARIO

BEFORE JUMPING INTO CALCULATIONS, IT'S CRUCIAL TO INTERPRET THE PROBLEM CAREFULLY. THE KEY INFORMATION PROVIDED IS:

- TEN YEARS AGO, THE MAN WAS 32 YEARS OLDER THAN HIS SON.
- TEN YEARS AGO, THE MAN WAS THREE TIMES AS OLD AS HIS SON WAS AT THAT TIME.
- THE GOAL IS TO DETERMINE THEIR CURRENT AGES.

TO NAVIGATE THIS, CONSIDER WHAT VARIABLES TO ASSIGN AND HOW TO TRANSLATE WORDS INTO ALGEBRAIC EQUATIONS.

DEFINING VARIABLES

LET:

- S = THE CURRENT AGE OF THE SON
- M = THE CURRENT AGE OF THE MAN

SINCE THE PROBLEM REFERENCES AGES TEN YEARS AGO, WE CAN EXPRESS THEIR AGES AT THAT TIME AS:

- SON'S AGE TEN YEARS AGO: $S - 10$
- MAN'S AGE TEN YEARS AGO: $M - 10$

THE NEXT STEP INVOLVES TRANSLATING THE TWO KEY STATEMENTS INTO ALGEBRAIC EQUATIONS.

TRANSLATING WORDS INTO EQUATIONS

1. AGE DIFFERENCE (TEN YEARS AGO)

THE STATEMENT: "TEN YEARS AGO HE WAS 32 YEARS OLDER THAN HIS SON."

THIS BECOMES:

$$\text{MAN'S AGE TEN YEARS AGO} = \text{SON'S AGE TEN YEARS AGO} + 32$$

MATHEMATICALLY:

$$M - 10 = (S - 10) + 32$$

2. AGE RATIO (TEN YEARS AGO)

THE STATEMENT: "TEN YEARS AGO HE WAS THREE TIMES AS OLD AS HIS SON WAS THEN."

TRANSLATES TO:

$$M - 10 = 3 \times (S - 10)$$

FORMULATING THE EQUATIONS

FROM THE ABOVE, WE HAVE TWO EQUATIONS:

1. $M - 10 = (S - 10) + 32$
2. $M - 10 = 3(S - 10)$

SIMPLIFY EACH:

- EQUATION (1):
 $M - 10 = S - 10 + 32$
 $M - 10 = S + 22$

- EQUATION (2):
 $M - 10 = 3S - 30$

SOLVING THE SYSTEM OF EQUATIONS

NOW, WE HAVE:

- EQUATION (1): $M = S + 22 + 10$ $\Rightarrow$ $M = S + 32$
- EQUATION (2): $M - 10 = 3S - 30$

SUBSTITUTE $M = S + 32$ INTO THE SECOND EQUATION:

$$(S + 32) - 10 = 3S - 30$$

SIMPLIFY:

$$S + 22 = 3S - 30$$

BRING ALL TERMS TO ONE SIDE:

$$3S - S = 22 + 30$$

$$2S = 52$$

SOLVE FOR S:

$$S = 26$$

NOW, FIND M:

$$M = S + 32 = 26 + 32 = 58$$

VERIFYING THE SOLUTION

IT'S ALWAYS GOOD PRACTICE TO VERIFY THE SOLUTION BY PLUGGING THE VALUES BACK INTO THE ORIGINAL CONDITIONS.

- TEN YEARS AGO:
- SON'S AGE: $26 - 10 = 16$
- MAN'S AGE: $58 - 10 = 48$

- CHECK IF THE MAN WAS 32 YEARS OLDER:

$$48 - 16 = 32 \text{ (CORRECT)}$$

- CHECK IF THE MAN WAS THREE TIMES AS OLD:

$$48 = 3 \times 16 \text{ (CORRECT)}$$

BOTH CONDITIONS ARE SATISFIED, CONFIRMING THE SOLUTION'S ACCURACY.

PRESENT AGES OF THE MAN AND SON

BASED ON THE CALCULATIONS:

- SON'S CURRENT AGE: 26 YEARS
- MAN'S CURRENT AGE: 58 YEARS

THESE AGES SATISFY ALL THE CONDITIONS LAID OUT IN THE PROBLEM.

BROADER IMPLICATIONS AND APPLICATIONS

AGE-RELATED PROBLEMS LIKE THIS ARE MORE THAN JUST MATHEMATICAL EXERCISES; THEY HAVE PRACTICAL APPLICATIONS IN VARIOUS FIELDS SUCH AS:

- FORENSIC SCIENCE: ESTIMATING AGES BASED ON HISTORICAL DATA.
- LEGAL AND FINANCIAL PLANNING: DETERMINING AGE ELIGIBILITY OR PENSION CALCULATIONS.
- EDUCATIONAL ASSESSMENTS: ENHANCING LOGICAL REASONING AMONG STUDENTS.

UNDERSTANDING HOW TO SET UP AND SOLVE SUCH PROBLEMS ENHANCES CRITICAL THINKING SKILLS, WHICH ARE VALUABLE IN DIVERSE REAL-WORLD SCENARIOS.

COMMON PITFALLS AND TIPS FOR SOLVING AGE PROBLEMS

WHILE THIS PARTICULAR PROBLEM WAS STRAIGHTFORWARD, SIMILAR CHALLENGES CAN BE MORE COMPLEX. HERE ARE SOME TIPS:

- CLEARLY DEFINE VARIABLES: ALWAYS ASSIGN VARIABLES TO UNKNOWNNS.
- TRANSLATE WORDS CAREFULLY: AVOID MISINTERPRETATION BY BREAKING DOWN SENTENCES.
- USE CONSISTENT UNITS: AGES SHOULD BE IN THE SAME UNITS THROUGHOUT THE PROBLEM.
- CHECK YOUR SOLUTION: VERIFY BY PLUGGING VALUES BACK INTO ORIGINAL CONDITIONS.
- BE CAUTIOUS WITH ASSUMPTIONS: CONFIRM WHETHER THE PROBLEM INVOLVES CURRENT AGE OR AGE AT A SPECIFIC TIME.

CONCLUSION

MATHEMATICAL PUZZLES INVOLVING AGES ARE EXCELLENT EXERCISES IN ALGEBRAIC REASONING AND PROBLEM-SOLVING. THE PROBLEM OF A MAN BEING 32 YEARS OLDER THAN HIS SON TEN YEARS AGO AND BEING THREE TIMES AS OLD AT THAT TIME OFFERS A CLEAR PATHWAY TO APPLYING ALGEBRA TO REAL-WORLD SCENARIOS. BY TRANSLATING WORDS INTO EQUATIONS, SOLVING SYSTEMATICALLY, AND VERIFYING RESULTS, ONE CAN CONFIDENTLY DETERMINE THE AGES INVOLVED. THIS APPROACH NOT ONLY SOLVES THE PROBLEM AT HAND BUT ALSO FOSTERS ANALYTICAL SKILLS APPLICABLE ACROSS NUMEROUS DISCIPLINES. WHETHER IN ACADEMIC SETTINGS OR EVERYDAY REASONING, MASTERING SUCH PROBLEMS ENHANCES LOGICAL THINKING AND QUANTITATIVE LITERACY.

A Man Is 32 Years Older Than His Son Ten Year Ago He Was Three Times As Old As His Son Was Then Find

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