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UNDERSTANDING HOW TO FIND THE SPECIFIC VALUES OF A IN FUNCTIONS IS AN ESSENTIAL SKILL IN ALGEBRA AND MATHEMATICS AT LARGE. WHEN GIVEN A FUNCTION SUCH AS $F(x) = x + 1 - 5x + 1$, AND INSTRUCTED TO DETERMINE THE VALUE(S) OF A THAT SATISFY THE CONDITION $F(A) = -2$, IT INVOLVES SIMPLIFYING THE FUNCTION FIRST AND THEN SOLVING FOR THE UNKNOWN VARIABLE. THIS PROBLEM PROVIDES A SOLID OPPORTUNITY TO REVIEW FUNDAMENTAL ALGEBRAIC TECHNIQUES, INCLUDING COMBINING LIKE TERMS, SETTING UP EQUATIONS, AND SOLVING FOR UNKNOWN.

IN THIS COMPREHENSIVE GUIDE, WE WILL EXPLORE THE STEP-BY-STEP PROCESS OF SIMPLIFYING THE FUNCTION, SETTING UP THE EQUATION BASED ON THE GIVEN CONDITION, SOLVING FOR THE VARIABLE, AND VERIFYING THE SOLUTIONS. WE WILL ALSO DISCUSS COMMON MISTAKES TO AVOID AND PROVIDE ADDITIONAL TIPS TO ENHANCE YOUR PROBLEM-SOLVING SKILLS.

UNDERSTANDING THE FUNCTION: $F(x) = x + 1 - 5x + 1$

BEFORE SOLVING THE PROBLEM, IT IS CRUCIAL TO UNDERSTAND THE STRUCTURE OF THE FUNCTION PROVIDED. THE FUNCTION $F(x)$ IS GIVEN AS:

$$F(x) = x + 1 - 5x + 1$$

AT FIRST GLANCE, THE FUNCTION APPEARS TO BE A COMBINATION OF SEVERAL ALGEBRAIC TERMS. THE GOAL IS TO SIMPLIFY THIS EXPRESSION TO A MORE MANAGEABLE FORM, WHICH WILL MAKE SOLVING FOR THE SPECIFIC VALUE(S) OF A MUCH EASIER.

BREAKING DOWN THE FUNCTION

THE FUNCTION CONTAINS FOUR TERMS:

- x
- $+ 1$
- $- 5x$
- $+ 1$

TO SIMPLIFY, THE KEY STEPS INVOLVE COMBINING LIKE TERMS. THE TERMS INVOLVING x ARE x AND $-5x$, WHICH ARE LIKE TERMS, AND THE CONSTANT TERMS ARE $+1$ AND $+1$.

COMBINING LIKE TERMS

- COMBINE THE x TERMS: $x - 5x = -4x$
- COMBINE THE CONSTANTS: $1 + 1 = 2$

THEREFORE, THE SIMPLIFIED FORM OF THE FUNCTION BECOMES:

$$F(x) = -4x + 2$$

SETTING UP THE EQUATION: $F(A) = -2$

NOW THAT THE FUNCTION IS SIMPLIFIED, WE CAN PROCEED TO FIND THE VALUES OF A SUCH THAT $F(A) = -2$.

SUBSTITUTING A INTO THE SIMPLIFIED FUNCTION

REPLACE X WITH A IN THE SIMPLIFIED EXPRESSION:

$$F(A) = -4A + 2$$

GIVEN THAT $F(A) = -2$, WE CAN SET UP THE EQUATION:

$$-4A + 2 = -2$$

THIS IS A STRAIGHTFORWARD LINEAR EQUATION, AND SOLVING FOR A INVOLVES ISOLATING THE VARIABLE ON ONE SIDE.

SOLVING FOR A: STEP-BY-STEP APPROACH

THE PROCESS INVOLVES BASIC ALGEBRAIC OPERATIONS LIKE SUBTRACTION AND DIVISION.

STEP 1: SUBTRACT 2 FROM BOTH SIDES

$$-4A + 2 - 2 = -2 - 2$$

$$-4A = -4$$

STEP 2: DIVIDE BOTH SIDES BY -4

$$A = (-4) / (-4)$$

$$A = 1$$

THE SOLUTION INDICATES THAT WHEN $A = 1$, THE FUNCTION $F(A)$ EQUALS -2.

VERIFICATION OF THE SOLUTION

VERIFYING THE SOLUTION IS AN ESSENTIAL STEP TO ENSURE ACCURACY.

SUBSTITUTE $a = 1$ BACK INTO $F(x)$

$$F(1) = -4(1) + 2 = -4 + 2 = -2$$

SINCE THE CALCULATION CONFIRMS THE FUNCTION VALUE IS INDEED -2 WHEN $a = 1$, THE SOLUTION IS VALID.

ADDITIONAL CONSIDERATIONS AND COMMON MISTAKES

WHEN SOLVING SIMILAR PROBLEMS, BE MINDFUL OF THE FOLLOWING POINTS TO AVOID COMMON ERRORS.

1. CORRECT SIMPLIFICATION

- ALWAYS COMBINE LIKE TERMS CAREFULLY.
- WATCH OUT FOR SIGNS, ESPECIALLY WITH SUBTRACTION AND NEGATIVE COEFFICIENTS.

2. PROPER EQUATION SETUP

- ENSURE THAT YOU CORRECTLY SUBSTITUTE THE VARIABLE INTO THE SIMPLIFIED FUNCTION.
- CONFIRM THAT THE GIVEN FUNCTION VALUE MATCHES THE RIGHT SIDE OF THE EQUATION.

3. ALGEBRAIC OPERATIONS

- PERFORM OPERATIONS IN THE CORRECT ORDER (PEMDAS/BODMAS).
- WHEN DIVIDING, REMEMBER TO DIVIDE EVERY TERM IF NECESSARY.

4. MULTIPLE SOLUTIONS

- SOME FUNCTIONS OR EQUATIONS MAY HAVE MORE THAN ONE SOLUTION.
- ALWAYS CHECK IF THE PROBLEM'S STRUCTURE ALLOWS FOR MULTIPLE SOLUTIONS AND VERIFY ACCORDINGLY.

SUMMARY AND FINAL THOUGHTS

IN THIS PROBLEM, WE STARTED WITH THE FUNCTION $F(x) = x + 1 - 5x + 1$. THE INITIAL STEP WAS TO SIMPLIFY THE FUNCTION BY COMBINING LIKE TERMS, WHICH RESULTED IN $F(x) = -4x + 2$. THE TASK WAS TO FIND ALL VALUES OF a SUCH THAT $F(a) = -2$. SETTING UP THE EQUATION LED US TO:

$$-4a + 2 = -2$$

SOLVING FOR a YIELDED:

$$a = 1$$

VERIFICATION CONFIRMED THAT SUBSTITUTING $a = 1$ INTO THE SIMPLIFIED FUNCTION RESULTED IN $F(1) = -2$, SATISFYING THE ORIGINAL CONDITION. THEREFORE, THE ONLY VALUE OF a THAT MAKES $F(a) = -2$ IS $a = 1$.

THIS PROBLEM HIGHLIGHTS THE IMPORTANCE OF SIMPLIFYING ALGEBRAIC EXPRESSIONS BEFORE SOLVING, AS WELL AS THE VALUE OF STEP-BY-STEP PROBLEM-SOLVING TECHNIQUES. WHETHER DEALING WITH LINEAR FUNCTIONS, QUADRATIC EQUATIONS, OR MORE COMPLEX EXPRESSIONS, THESE FUNDAMENTAL SKILLS ARE CRUCIAL FOR MASTERING ALGEBRA AND ADVANCING YOUR MATHEMATICAL PROFICIENCY.

ADDITIONAL PRACTICE AND RESOURCES

TO STRENGTHEN YOUR UNDERSTANDING FURTHER, CONSIDER PRACTICING SIMILAR PROBLEMS, SUCH AS:

- FIND ALL VALUES OF x SUCH THAT $F(x) = 5$ FOR FUNCTIONS LIKE $F(x) = 3x - 4 + 2x$
- SOLVE FOR x IN FUNCTIONS WITH MORE COMPLEX EXPRESSIONS, SUCH AS QUADRATIC OR RATIONAL FUNCTIONS
- PRACTICE VERIFYING SOLUTIONS BY SUBSTITUTING BACK INTO THE ORIGINAL FUNCTION

NUMEROUS ONLINE RESOURCES, TUTORIALS, AND ALGEBRA TEXTBOOKS OFFER EXERCISES AND EXPLANATIONS THAT CAN HELP YOU MASTER THESE SKILLS.

CONCLUSION

UNDERSTANDING HOW TO ANALYZE AND SOLVE FOR SPECIFIC VALUES WITHIN FUNCTIONS IS FOUNDATIONAL TO ALGEBRA. BY CAREFULLY SIMPLIFYING THE FUNCTION, SETTING UP THE CORRECT EQUATION, SOLVING SYSTEMATICALLY, AND VERIFYING YOUR SOLUTIONS, YOU CAN CONFIDENTLY APPROACH SIMILAR PROBLEMS. REMEMBER TO PAY ATTENTION TO SIGNS, COMBINE LIKE TERMS CORRECTLY, AND CHECK YOUR WORK THOROUGHLY. WITH CONSISTENT PRACTICE, THESE TECHNIQUES WILL BECOME SECOND NATURE, EMPOWERING YOU TO TACKLE INCREASINGLY COMPLEX ALGEBRAIC CHALLENGES WITH CONFIDENCE.

FREQUENTLY ASKED QUESTIONS

GIVEN THE FUNCTION $F(x) = x + 1 - 5x + 1$, HOW DO YOU SIMPLIFY IT TO FIND ITS EXPLICIT FORM?

COMBINE LIKE TERMS: $x - 5x = -4x$, AND $1 + 1 = 2$, SO $F(x) = -4x + 2$.

WHAT IS THE VALUE OF $F(x)$ AFTER SIMPLIFYING THE EXPRESSION?

$F(x) = -4x + 2$.

HOW DO YOU FIND THE VALUE(S) OF A SUCH THAT $F(A) = -2$?

SET $F(A) = -2$ AND SOLVE FOR A : $-4A + 2 = -2$.

WHAT IS THE EQUATION TO SOLVE FOR A WHEN $F(A) = -2$?

THE EQUATION IS $-4A + 2 = -2$.

HOW DO YOU SOLVE THE EQUATION $-4A + 2 = -2$ FOR A?

SUBTRACT 2 FROM BOTH SIDES: $-4A = -4$, THEN DIVIDE BOTH SIDES BY -4: $A = 1$.

WHAT IS THE SOLUTION FOR A WHEN $F(A)$ EQUALS -2?

$A = 1$.

ARE THERE MULTIPLE VALUES OF A THAT SATISFY $F(A) = -2$?

NO, THERE IS ONLY ONE VALUE: $A = 1$.

HOW CAN YOU VERIFY THAT $A = 1$ SATISFIES THE ORIGINAL FUNCTION?

SUBSTITUTE $A = 1$ INTO $F(x)$: $F(1) = -4(1) + 2 = -4 + 2 = -2$, WHICH CONFIRMS THE SOLUTION.

WHAT IS THE IMPORTANCE OF SIMPLIFYING THE FUNCTION BEFORE SOLVING FOR A?

SIMPLIFYING MAKES THE EQUATION EASIER TO SOLVE ACCURATELY AND ENSURES CORRECT SOLUTIONS.

CAN THIS METHOD BE APPLIED TO OTHER LINEAR FUNCTIONS TO FIND A FOR A GIVEN OUTPUT?

YES, FOR ANY LINEAR FUNCTION, SETTING $F(A)$ EQUAL TO THE DESIRED OUTPUT AND SOLVING FOR A IS A STANDARD APPROACH.

ADDITIONAL RESOURCES

IF $F(x) = x + 1 - 5x + 1$, FIND ALL VALUE(S) A SUCH THAT $F(A) = -2$ IS AN INTRIGUING ALGEBRAIC PROBLEM THAT CHALLENGES STUDENTS AND ENTHUSIASTS TO ENGAGE DEEPLY WITH THE PROCESS OF SIMPLIFYING FUNCTIONS AND SOLVING EQUATIONS. THIS PROBLEM ENCAPSULATES FUNDAMENTAL CONCEPTS IN ALGEBRA SUCH AS COMBINING LIKE TERMS, UNDERSTANDING FUNCTION NOTATION, AND SOLVING FOR SPECIFIC VALUES. DIVING INTO THIS PROBLEM OFFERS A VALUABLE OPPORTUNITY TO REINFORCE BASIC ALGEBRAIC SKILLS, IMPROVE PROBLEM-SOLVING STRATEGIES, AND APPRECIATE THE LOGICAL STRUCTURE BEHIND FUNCTIONS AND EQUATIONS. IN THIS COMPREHENSIVE REVIEW, WE WILL DISSECT THE PROBLEM STEP-BY-STEP, EXPLORE VARIOUS METHODS TO FIND SOLUTIONS, DISCUSS COMMON PITFALLS, AND REFLECT ON THE BROADER SIGNIFICANCE OF SUCH EXERCISES IN MATHEMATICAL LEARNING.

UNDERSTANDING THE PROBLEM

BEFORE DIVING INTO THE SOLUTION, IT IS CRUCIAL TO INTERPRET THE PROBLEM STATEMENT CORRECTLY:

- THE FUNCTION GIVEN IS $F(x) = x + 1 - 5x + 1$.
- THE TASK IS TO FIND ALL VALUES OF A SUCH THAT $F(A) = -2$.

THIS PROBLEM INVOLVES TWO PRIMARY COMPONENTS:

1. COMPREHENDING AND SIMPLIFYING THE GIVEN FUNCTION.
2. SOLVING FOR THE SPECIFIC INPUT A THAT MAKES THE FUNCTION OUTPUT -2.

BY UNDERSTANDING THESE COMPONENTS, LEARNERS CAN APPROACH THE PROBLEM SYSTEMATICALLY AND AVOID COMMON MISTAKES SUCH AS MISINTERPRETING THE FUNCTION OR INCORRECTLY APPLYING ALGEBRAIC RULES.

STEP-BY-STEP BREAKDOWN OF THE SOLUTION

1. SIMPLIFY THE FUNCTION $F(x)$

THE FIRST STEP IN SOLVING THE PROBLEM IS TO SIMPLIFY THE GIVEN FUNCTION AS MUCH AS POSSIBLE. THE FUNCTION IS:

$$F(x) = x + 1 - 5x + 1$$

COMBINE LIKE TERMS:

- COMBINE THE x TERMS: $x - 5x = -4x$
- COMBINE THE CONSTANT TERMS: $1 + 1 = 2$

SO, THE SIMPLIFIED FUNCTION BECOMES:

$$F(x) = -4x + 2$$

THIS SIMPLIFIED FORM MAKES IT EASIER TO ANALYZE AND SOLVE THE EQUATION.

2. SET THE FUNCTION EQUAL TO -2

ACCORDING TO THE PROBLEM, $F(A) = -2$. SUBSTITUTING THE SIMPLIFIED FUNCTION:

$$-4A + 2 = -2$$

THIS EQUATION NOW RELATES A DIRECTLY AND CAN BE SOLVED USING BASIC ALGEBRA.

3. SOLVE FOR A

SUBTRACT 2 FROM BOTH SIDES:

$$-4A + 2 - 2 = -2 - 2$$

WHICH SIMPLIFIES TO:

$$-4A = -4$$

DIVIDE BOTH SIDES BY -4:

$$A = (-4) / (-4) = 1$$

THUS, $A = 1$.

VERIFICATION OF THE SOLUTION

ALWAYS VERIFY THE SOLUTION BY SUBSTITUTING $A = 1$ BACK INTO THE ORIGINAL FUNCTION TO ENSURE CORRECTNESS:

ORIGINAL FUNCTION:

$$F(1) = 1 + 1 - 5(1) + 1$$

CALCULATE STEP-BY-STEP:

- $1 + 1 = 2$
- $-5(1) = -5$
- SUM: $2 - 5 + 1 = (2 - 5) + 1 = -3 + 1 = -2$

SINCE $F(1) = -2$, THE SOLUTION $A = 1$ IS CORRECT.

DISCUSSION OF THE SOLUTION APPROACH

THE APPROACH EMPLOYED HERE EMPHASIZES CLARITY AND SYSTEMATIC PROBLEM-SOLVING:

- SIMPLIFICATION OF THE FUNCTION: AVOIDS ERRORS AND MAKES THE ALGEBRA MANAGEABLE.
- SUBSTITUTION INTO THE SIMPLIFIED FORM: STREAMLINES THE PROCESS OF SOLVING FOR A .
- VERIFICATION STEP: CONFIRMS THE CORRECTNESS, REINFORCING UNDERSTANDING AND CONFIDENCE.

THIS METHOD EXEMPLIFIES BEST PRACTICES IN ALGEBRA: SIMPLIFYING FIRST, SOLVING SYSTEMATICALLY, AND VERIFYING RESULTS. IT ALSO HIGHLIGHTS THE IMPORTANCE OF CAREFULLY HANDLING CONSTANTS AND COEFFICIENTS.

FEATURES, PROS, AND CONS OF THE APPROACH

FEATURES:

- CLEAR STEP-BY-STEP METHODOLOGY.
- EMPHASIS ON SIMPLIFICATION BEFORE SOLVING.
- VERIFICATION OF SOLUTION ENHANCES UNDERSTANDING.

PROS:

- REDUCES LIKELIHOOD OF ALGEBRAIC ERRORS.
- MAKES COMPLEX-LOOKING FUNCTIONS MANAGEABLE.
- REINFORCES FUNDAMENTAL ALGEBRA SKILLS.

CONS:

- ASSUMES FAMILIARITY WITH ALGEBRAIC MANIPULATION.
- MIGHT BE TOO STRAIGHTFORWARD FOR ADVANCED PROBLEMS REQUIRING MORE NUANCED TECHNIQUES.
- DOES NOT EXPLORE ALTERNATIVE METHODS SUCH AS GRAPHICAL SOLUTIONS OR INEQUALITIES, WHICH COULD ENRICH UNDERSTANDING.

ALTERNATIVE METHODS AND BROADER CONTEXT

WHILE THE DIRECT ALGEBRAIC APPROACH IS STRAIGHTFORWARD HERE, UNDERSTANDING ALTERNATIVE STRATEGIES CAN DEEPEN COMPREHENSION:

GRAPHICAL APPROACH

PLOTTING THE FUNCTION $F(x) = -4x + 2$ AND LOCATING WHERE IT INTERSECTS -2 ON THE Y-AXIS VISUALLY CONFIRMS THE SOLUTION. THE INTERSECTION POINT $x=1$ ALIGNS WITH OUR ALGEBRAIC RESULT.

ADVANTAGES:

- VISUAL LEARNER-FRIENDLY.
- USEFUL FOR UNDERSTANDING THE BEHAVIOR OF FUNCTIONS.

DISADVANTAGES:

- LESS PRECISE WITHOUT GRAPHING TOOLS.
- NOT PRACTICAL FOR COMPLEX FUNCTIONS.

USING FUNCTION PROPERTIES

RECOGNIZING THAT $F(x)$ IS LINEAR SIMPLIFIES SOLVING. FOR NON-LINEAR FUNCTIONS, MORE ADVANCED TECHNIQUES SUCH AS FACTORING OR SUBSTITUTION MAY BE NECESSARY.

COMMON MISTAKES AND TIPS FOR AVOIDANCE

- MISINTERPRETING THE FUNCTION: ALWAYS VERIFY THE EXPRESSION BEFORE SIMPLIFYING.
- INCORRECTLY COMBINING LIKE TERMS: BE CAUTIOUS WITH SIGNS AND COEFFICIENTS.
- FORGETTING TO VERIFY SOLUTIONS: ALWAYS SUBSTITUTE BACK TO CHECK CORRECTNESS.
- OVERLOOKING THE DOMAIN: FOR THIS PROBLEM, THE DOMAIN IS ALL REAL NUMBERS, BUT FOR OTHER FUNCTIONS, RESTRICTIONS MIGHT EXIST.

TIPS:

- WRITE EACH STEP CLEARLY.
- DOUBLE-CHECK ALGEBRAIC MANIPULATIONS.
- USE SUBSTITUTION TO VERIFY SOLUTIONS.

BROADER SIGNIFICANCE OF THE PROBLEM

THIS PROBLEM EXEMPLIFIES THE CORE SKILLS NECESSARY FOR ALGEBRA AND HIGHER MATHEMATICS:

- MASTERY OF MANIPULATING ALGEBRAIC EXPRESSIONS.
- DEVELOPING PROBLEM-SOLVING FLUENCY.

- BUILDING FOUNDATIONS FOR CALCULUS, LINEAR ALGEBRA, AND BEYOND.

IT ALSO DEMONSTRATES HOW TO APPROACH REAL-WORLD PROBLEMS: SIMPLIFYING COMPLEX EXPRESSIONS, SOLVING FOR UNKNOWN, AND VERIFYING SOLUTIONS. SUCH SKILLS ARE VITAL NOT JUST IN ACADEMIC CONTEXTS BUT ALSO IN PRACTICAL APPLICATIONS ACROSS ENGINEERING, COMPUTER SCIENCE, ECONOMICS, AND DATA ANALYSIS.

CONCLUSION

THE PROBLEM "If $F(x) = x^2 - 5x + 1$, FIND ALL VALUE(S) A SUCH THAT $F(A) = -2$ " OFFERS A STRAIGHTFORWARD YET INSTRUCTIVE EXAMPLE OF ALGEBRAIC PROBLEM-SOLVING. THROUGH CAREFUL SIMPLIFICATION AND SYSTEMATIC SOLVING, WE FIND THAT $A = 1$ SATISFIES THE CONDITION, AND VERIFICATION CONFIRMS ITS CORRECTNESS. THE PROCESS UNDERSCORES THE IMPORTANCE OF CLEAR STEPS, VERIFICATION, AND UNDERSTANDING THE STRUCTURE OF FUNCTIONS. WHETHER APPROACHED ALGEBRAICALLY OR GRAPHICALLY, TACKLING SUCH PROBLEMS BUILDS CRITICAL THINKING, PRECISION, AND CONFIDENCE IN MATHEMATICAL REASONING. AS LEARNERS CONTINUE TO PRACTICE THESE TECHNIQUES, THEY DEVELOP A SOLID FOUNDATION ESSENTIAL FOR MORE ADVANCED MATHEMATICAL PURSUITS AND REAL-WORLD PROBLEM-SOLVING SCENARIOS.

4 If $F(x) = x^2 - 5x + 1$ Find All Value S A Such That $F(A) = -2$

4 If $F(x) = x^2 - 5x + 1$ Find All Value S A Such That $F(A) = -2$

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