

DETERMINE IF THE ORDERED PAIR (6, 4) IS A SOLUTION TO THE INEQUALITY $y > -\frac{1}{2}$

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UNDERSTANDING WHETHER A SPECIFIC ORDERED PAIR SATISFIES A GIVEN INEQUALITY IS A FUNDAMENTAL SKILL IN ALGEBRA AND MATHEMATICS AS A WHOLE. THIS PROCESS INVOLVES SUBSTITUTING THE VALUES OF THE ORDERED PAIR INTO THE INEQUALITY AND ANALYZING THE RESULTING STATEMENT. IN THIS ARTICLE, WE WILL EXAMINE HOW TO DETERMINE IF THE ORDERED PAIR (6, 4) IS A SOLUTION TO THE INEQUALITY $y > -\frac{1}{2}$, PROVIDING DETAILED EXPLANATIONS AND STEP-BY-STEP INSTRUCTIONS TO ENHANCE YOUR UNDERSTANDING OF SOLVING INEQUALITIES.

INTRODUCTION TO INEQUALITIES AND ORDERED PAIRS

BEFORE DIVING INTO THE SPECIFIC PROBLEM, IT'S ESSENTIAL TO GRASP SOME FOUNDATIONAL CONCEPTS:

WHAT ARE INEQUALITIES?

INEQUALITIES ARE MATHEMATICAL EXPRESSIONS THAT COMPARE TWO VALUES OR EXPRESSIONS USING SYMBOLS SUCH AS $>$ (GREATER THAN), $<$ (LESS THAN), $\geq$ (GREATER THAN OR EQUAL TO), AND $\leq$ (LESS THAN OR EQUAL TO). THEY DEFINE RELATIONSHIPS THAT ARE NOT EQUAL BUT HAVE A RANGE OF POSSIBLE SOLUTIONS.

FOR EXAMPLE:

- $y > -\frac{1}{2}$ MEANS y IS ANY VALUE GREATER THAN $-\frac{1}{2}$.
- $x + y \leq 10$ INDICATES THE SUM OF x AND y IS LESS THAN OR EQUAL TO 10.

UNDERSTANDING INEQUALITIES IS CRUCIAL IN NUMEROUS AREAS OF MATHEMATICS, INCLUDING GRAPHING, SOLVING REAL-WORLD PROBLEMS, AND ANALYZING RELATIONSHIPS BETWEEN VARIABLES.

WHAT IS AN ORDERED PAIR?

AN ORDERED PAIR (x, y) REPRESENTS A POINT IN A COORDINATE PLANE, WHERE:

- x IS THE HORIZONTAL COORDINATE (ALONG THE x -AXIS),
- y IS THE VERTICAL COORDINATE (ALONG THE y -AXIS).

IN OUR CASE, THE ORDERED PAIR (6, 4) INDICATES A POINT LOCATED 6 UNITS ALONG THE x -AXIS AND 4 UNITS ALONG THE y -AXIS.

UNDERSTANDING THE INEQUALITY $y > -\frac{1}{2}$

THE INEQUALITY $y > -\frac{1}{2}$ SPECIFIES THAT THE y -VALUE OF ANY SOLUTION MUST BE STRICTLY GREATER THAN $-\frac{1}{2}$.

GRAPHICAL REPRESENTATION

- THE BOUNDARY LINE FOR THIS INEQUALITY IS THE HORIZONTAL LINE $y = -\frac{1}{2}$.
- SINCE THE INEQUALITY IS "GREATER THAN" ($>$), THE SOLUTION SET LIES ABOVE THIS LINE.

- THE LINE $y = -1/2$ IS DASHED (NOT SOLID) BECAUSE THE INEQUALITY DOES NOT INCLUDE EQUALITY (I.E., $y \neq -1/2$).

IMPLICATIONS FOR THE POINT (6, 4)

- THE Y-COORDINATE OF THE POINT IS 4.
- BECAUSE 4 IS GREATER THAN $-1/2$, THE POINT IS ABOVE THE BOUNDARY LINE $y = -1/2$.

STEP-BY-STEP PROCESS TO DETERMINE IF (6, 4) IS A SOLUTION

TO VERIFY WHETHER (6, 4) SATISFIES THE INEQUALITY $y > -1/2$, FOLLOW THE STEPS BELOW:

STEP 1: WRITE DOWN THE INEQUALITY AND THE POINT

- INEQUALITY: $y > -1/2$
- POINT: $(x, y) = (6, 4)$

STEP 2: SUBSTITUTE THE Y-COORDINATE INTO THE INEQUALITY

- REPLACE Y WITH 4:

$$4 > -1/2$$

STEP 3: EVALUATE THE STATEMENT

- IS 4 GREATER THAN $-1/2$?

SINCE 4 IS A POSITIVE NUMBER AND $-1/2$ IS NEGATIVE, 4 IS INDEED GREATER THAN $-1/2$.

STEP 4: CONFIRM THE SOLUTION

- BECAUSE THE INEQUALITY HOLDS TRUE WHEN $y = 4$, THE POINT (6, 4) SATISFIES THE INEQUALITY $y > -1/2$.

ADDITIONAL CONSIDERATIONS

WHILE THE ABOVE STEPS CONFIRM THAT (6, 4) IS A SOLUTION, IT'S HELPFUL TO CONSIDER SOME RELATED CONCEPTS:

1. WHAT IF THE INEQUALITY WAS $y \geq -1/2$?

- IN THAT CASE, THE POINT (6, 4) WOULD STILL BE A SOLUTION BECAUSE $4 > -1/2$.
- THE DIFFERENCE IS THAT THE BOUNDARY LINE $y = -1/2$ WOULD BE INCLUDED IN THE SOLUTION SET IF THE INEQUALITY USED $\geq$.

2. GRAPHING THE INEQUALITY

- TO VISUALIZE THE SOLUTIONS, DRAW THE BOUNDARY LINE $y = -1/2$ WITH A DASHED LINE.
- SHADE THE REGION ABOVE THE LINE, REPRESENTING ALL POINTS WHERE $y > -1/2$.
- CONFIRM THAT THE POINT $(6, 4)$ LIES WITHIN THE SHADED REGION.

3. TESTING OTHER POINTS

- TO FURTHER UNDERSTAND THE INEQUALITY, TEST POINTS BELOW THE BOUNDARY LINE, SUCH AS $(0, -1)$.
- SUBSTITUTE $y = -1$:

$-1 > -1/2$? NO, BECAUSE -1 IS LESS THAN $-1/2$.

- THEREFORE, POINTS BELOW THE LINE ARE NOT SOLUTIONS.

UNDERSTANDING THE CONTEXT AND APPLICATIONS

DETERMINING WHETHER A POINT SATISFIES AN INEQUALITY HAS PRACTICAL APPLICATIONS ACROSS VARIOUS FIELDS:

1. MATHEMATICS AND EDUCATION

- HELPS STUDENTS LEARN HOW TO INTERPRET INEQUALITIES AND GRAPH SOLUTIONS.
- FUNDAMENTAL IN SOLVING SYSTEMS OF INEQUALITIES.

2. ENGINEERING AND PHYSICS

- USED TO DEFINE PERMISSIBLE RANGES FOR VARIABLES IN DESIGN CONSTRAINTS.
- FOR EXAMPLE, ENSURING A TEMPERATURE (y) REMAINS ABOVE A CERTAIN THRESHOLD.

3. ECONOMICS AND BUSINESS

- ESTABLISHING BOUNDS ON VARIABLES LIKE PROFIT, COST, OR PRODUCTION LEVELS.

4. COMPUTER GRAPHICS

- DETERMINING PIXEL RENDERING REGIONS BASED ON COORDINATE INEQUALITIES.

SUMMARY AND KEY TAKEAWAYS

- TO DETERMINE IF AN ORDERED PAIR SATISFIES AN INEQUALITY, SUBSTITUTE THE RELEVANT VARIABLE(S) AND EVALUATE THE STATEMENT.
- FOR THE INEQUALITY $y > -1/2$, ANY POINT WITH A Y-COORDINATE GREATER THAN $-1/2$ IS A SOLUTION.
- THE POINT $(6, 4)$ HAS $y = 4$, WHICH IS GREATER THAN $-1/2$, SO IT DOES SATISFY THE INEQUALITY.
- GRAPHING THE INEQUALITY HELPS VISUALIZE THE SOLUTION SET, ESPECIALLY FOR MORE COMPLEX INEQUALITIES.

CONCLUSION

IN CONCLUSION, THE PROCESS OF VERIFYING WHETHER AN ORDERED PAIR SATISFIES AN INEQUALITY IS STRAIGHTFORWARD YET FUNDAMENTAL IN UNDERSTANDING MATHEMATICAL RELATIONSHIPS. FOR THE SPECIFIC CASE OF THE INEQUALITY $y > -1/2$, THE POINT $(6, 4)$ SATISFIES THE CONDITION BECAUSE ITS Y-COORDINATE (4) EXCEEDS $-1/2$. RECOGNIZING HOW TO SUBSTITUTE AND EVALUATE SUCH INEQUALITIES ENHANCES PROBLEM-SOLVING SKILLS AND DEEPENS COMPREHENSION OF ALGEBRAIC CONCEPTS.

ALWAYS REMEMBER TO CAREFULLY ANALYZE THE INEQUALITY'S BOUNDARY AND THE NATURE OF THE INEQUALITY SIGN TO ACCURATELY DETERMINE SOLUTIONS. WHETHER YOU'RE GRAPHING, SOLVING SYSTEMS, OR APPLYING INEQUALITIES TO REAL-WORLD PROBLEMS, MASTERING THIS FUNDAMENTAL SKILL IS ESSENTIAL FOR SUCCESS IN MATHEMATICS AND RELATED FIELDS.

KEYWORDS: INEQUALITY, ORDERED PAIR, SOLUTION, $y > -1/2$, GRAPHING INEQUALITIES, ALGEBRA, COORDINATE PLANE, SOLVING INEQUALITIES, POINT VERIFICATION, MATHEMATICAL SOLUTIONS

FREQUENTLY ASKED QUESTIONS

DOES THE ORDERED PAIR $(6, 4)$ SATISFY THE INEQUALITY $y > -1/2$?

YES, BECAUSE WHEN $y = 4$, WHICH IS GREATER THAN $-1/2$, THE INEQUALITY HOLDS TRUE.

HOW DO YOU CHECK IF $(6, 4)$ IS A SOLUTION TO $y > -1/2$?

SUBSTITUTE $y = 4$ INTO THE INEQUALITY. SINCE $4 > -1/2$, THE POINT SATISFIES THE INEQUALITY.

IS THE POINT $(6, 4)$ ON OR ABOVE THE LINE $y = -1/2$?

IT IS ABOVE THE LINE $y = -1/2$, SINCE THE Y-COORDINATE 4 IS GREATER THAN $-1/2$.

CAN $(6, 4)$ BE CONSIDERED A SOLUTION TO THE INEQUALITY $y > -0.5$?

YES, BECAUSE 4 IS GREATER THAN -0.5 , SO THE POINT SATISFIES THE INEQUALITY.

WHAT IS THE SIGNIFICANCE OF THE Y-VALUE 4 IN RELATION TO $y > -1/2$?

SINCE 4 IS GREATER THAN $-1/2$, ANY POINT WITH $y = 4$ WILL SATISFY THE INEQUALITY $y > -1/2$.

IF THE Y-COORDINATE WAS -1 , WOULD $(6, -1)$ BE A SOLUTION TO $y > -1/2$?

NO, BECAUSE -1 IS NOT GREATER THAN $-1/2$; IT IS LESS THAN $-1/2$.

DOES THE INEQUALITY $y > -1/2$ INCLUDE POINTS WHERE $y = -1/2$?

NO, BECAUSE THE INEQUALITY IS STRICT ($>$), SO y CANNOT BE EQUAL TO $-1/2$.

IS THE POINT $(6, 4)$ AN EXAMPLE OF A SOLUTION TO THE INEQUALITY $y > -1/2$?

YES, BECAUSE ITS y -VALUE 4 IS GREATER THAN $-1/2$.

HOW WOULD YOU GRAPH THE INEQUALITY $y > -1/2$?

YOU WOULD DRAW A DASHED HORIZONTAL LINE AT $y = -1/2$ AND SHADE THE REGION ABOVE IT, INDICATING ALL POINTS WHERE y IS GREATER THAN $-1/2$.

WHAT DOES THE POINT $(6, 4)$ TELL US ABOUT SOLUTIONS TO $y > -1/2$?

IT CONFIRMS THAT ANY POINT WITH $y > -1/2$, INCLUDING $(6, 4)$, IS A SOLUTION TO THE INEQUALITY.

ADDITIONAL RESOURCES

DETERMINE IF THE ORDERED PAIR $(6, 4)$ IS A SOLUTION TO THE INEQUALITY y IS GREATER THAN NEGATIVE ONE HALF

IN THE REALM OF ALGEBRA AND INEQUALITIES, ASSESSING WHETHER A SPECIFIC ORDERED PAIR SATISFIES A GIVEN INEQUALITY IS A FUNDAMENTAL SKILL THAT UNDERPINS A BROAD SPECTRUM OF MATHEMATICAL APPLICATIONS. THE FOCUS OF THIS INVESTIGATION IS TO RIGOROUSLY DETERMINE IF THE ORDERED PAIR $(6, 4)$ SATISFIES THE INEQUALITY:

$$y > -1/2$$

THIS SEEMINGLY STRAIGHTFORWARD PROBLEM INVITES A DEEPER EXPLORATION INTO THE NATURE OF INEQUALITIES, THE INTERPRETATION OF ORDERED PAIRS, AND THE METHODS USED TO VERIFY SOLUTION SETS. THROUGH SYSTEMATIC ANALYSIS, THIS ARTICLE WILL DISSECT THE PROBLEM, EXAMINE THE RELEVANT CONCEPTS, AND PROVIDE A COMPREHENSIVE CONCLUSION BASED ON MATHEMATICAL REASONING.

UNDERSTANDING THE COMPONENTS OF THE PROBLEM

WHAT IS AN ORDERED PAIR?

AN ORDERED PAIR, DENOTED AS (x, y) , IS A PAIR OF NUMBERS WHERE THE ORDER OF THE ELEMENTS IS SIGNIFICANT. IN THE CONTEXT OF COORDINATE GEOMETRY, (x, y) REPRESENTS A POINT ON THE CARTESIAN PLANE, WITH x INDICATING THE HORIZONTAL POSITION AND y INDICATING THE VERTICAL POSITION.

IN OUR CASE, THE SPECIFIC ORDERED PAIR IS $(6, 4)$:

$$- x = 6$$

$$- y = 4$$

INTERPRETING THE INEQUALITY $y > -1/2$

THE INEQUALITY $y > -1/2$ DESCRIBES A SET OF ALL POINTS ON THE CARTESIAN PLANE WHERE THE y -COORDINATE EXCEEDS $-1/2$. GRAPHICALLY, THIS CORRESPONDS TO ALL POINTS ABOVE THE HORIZONTAL LINE $y = -1/2$, EXCLUDING THE LINE ITSELF BECAUSE THE INEQUALITY IS STRICT.

THIS INEQUALITY DEFINES AN OPEN HALF-PLANE:

- SOLUTION SET: ALL POINTS WITH Y-COORDINATE GREATER THAN $-1/2$.
- BOUNDARY LINE: $y = -1/2$ (NOT INCLUDED).

STEP-BY-STEP APPROACH TO VERIFY THE SOLUTION

THE CORE TASK IS TO EVALUATE WHETHER THE SPECIFIC POINT $(6, 4)$ LIES WITHIN THE SOLUTION SET OF THE INEQUALITY $y > -1/2$.

STEP 1: SUBSTITUTING THE COORDINATES

SINCE THE INEQUALITY INVOLVES y , WE SUBSTITUTE THE y -COORDINATE OF THE POINT INTO THE INEQUALITY:

$$- y = 4$$

CHECK IF:

$$4 > -1/2$$

STEP 2: EVALUATING THE INEQUALITY

IS 4 GREATER THAN -0.5 ?

YES, BECAUSE 4 IS SIGNIFICANTLY LARGER THAN -0.5 .

MATHEMATICALLY:

$$4 > -0.5 \quad ? \quad \text{TRUE}$$

STEP 3: INTERPRETING THE RESULT

BECAUSE THE INEQUALITY HOLDS TRUE WHEN SUBSTITUTING $y = 4$, AND THE x -COORDINATE (6) DOES NOT INFLUENCE THE INEQUALITY (SINCE IT DOES NOT INVOLVE x), THE POINT $(6, 4)$ SATISFIES THE INEQUALITY $y > -1/2$.

GRAPHICAL INTERPRETATION AND VISUALIZATION

UNDERSTANDING THE SOLUTION SET VISUALLY ENHANCES COMPREHENSION. PLOTTING THE BOUNDARY LINE $y = -1/2$ AND THE POINT $(6, 4)$:

- THE LINE $y = -1/2$ IS A HORIZONTAL LINE CROSSING THE y -AXIS AT -0.5 .
- THE INEQUALITY $y > -1/2$ INDICATES THE REGION ABOVE THIS LINE.
- THE POINT $(6, 4)$ IS LOCATED WELL ABOVE $y = -0.5$, CONFIRMING IT LIES WITHIN THE SOLUTION REGION.

THIS GRAPHICAL APPROACH REINFORCES THE ALGEBRAIC CONCLUSION THAT THE POINT SATISFIES THE INEQUALITY.

POSSIBLE EDGE CASES AND CLARIFICATIONS

WHAT IF THE INEQUALITY WAS $y \geq -1/2$?

IN CASES WHERE THE INEQUALITY IS $y \geq -1/2$, THE BOUNDARY LINE $y = -1/2$ WOULD BE INCLUDED IN THE SOLUTION SET. SINCE OUR INEQUALITY IS STRICT ($>$), THE BOUNDARY LINE IS EXCLUDED, BUT THE POINT $(6, 4)$, BEING ABOVE THE LINE, REMAINS A SOLUTION.

WHAT IF THE POINT WAS $(6, -0.5)$?

SUBSTITUTE $y = -0.5$:

$$-0.5 > -0.5 \quad ? \quad \text{FALSE}$$

BECAUSE THE INEQUALITY IS STRICT, THE POINT ON THE BOUNDARY LINE DOES NOT SATISFY $y > -1/2$.

BROADER CONTEXT AND APPLICATIONS

UNDERSTANDING WHETHER A POINT IS A SOLUTION TO AN INEQUALITY EXTENDS BEYOND ACADEMIC EXERCISES INTO PRACTICAL FIELDS SUCH AS:

- GRAPHICAL DATA ANALYSIS: DETERMINING FEASIBLE REGIONS IN OPTIMIZATION PROBLEMS.
- ENGINEERING DESIGN: ENSURING PARAMETERS MEET SPECIFIC INEQUALITY CONSTRAINTS.
- PHYSICS: DESCRIBING CONDITIONS SUCH AS VELOCITY OR FORCE CONSTRAINTS.
- ECONOMICS: ANALYZING INEQUALITY CONDITIONS IN MODELS.

ACCURATELY VERIFYING SOLUTIONS IS ESSENTIAL FOR MODELING REAL-WORLD SCENARIOS ACCURATELY.

CONCLUSION: FINAL VERDICT

BASED ON THE SUBSTITUTION AND EVALUATION, THE ORDERED PAIR $(6, 4)$ SATISFIES THE INEQUALITY $y > -1/2$. THE Y-COORDINATE OF 4 IS INDEED GREATER THAN -0.5 , CONFIRMING THAT THE POINT LIES WITHIN THE SOLUTION SET.

THEREFORE, THE ORDERED PAIR $(6, 4)$ IS A SOLUTION TO THE INEQUALITY $y > -1/2$.

THIS ANALYSIS UNDERSCORES THE IMPORTANCE OF FUNDAMENTAL ALGEBRAIC TECHNIQUES IN SOLVING INEQUALITIES AND HIGHLIGHTS HOW SIMPLE SUBSTITUTIONS, COMBINED WITH VISUAL UNDERSTANDING, CAN LEAD TO CLEAR, DEFINITIVE CONCLUSIONS. WHETHER IN EDUCATIONAL SETTINGS OR REAL-WORLD APPLICATIONS, SUCH SYSTEMATIC APPROACHES ARE INDISPENSABLE FOR ACCURATE PROBLEM-SOLVING.

IN SUMMARY:

- THE POINT $(6, 4)$ HAS $y = 4$.
- SINCE $4 > -0.5$, $(6, 4)$ SATISFIES $y > -1/2$.
- THE POINT LIES IN THE HALF-PLANE ABOVE $y = -1/2$.
- THE INEQUALITY IS STRICT, EXCLUDING THE BOUNDARY LINE $y = -1/2$, BUT INCLUDING POINTS WITH $y > -1/2$.

THIS DETAILED INVESTIGATION CONFIRMS THE SOLUTION STATUS OF THE POINT AND EXEMPLIFIES THE PROCESS OF EVALUATING INEQUALITIES WITH SPECIFIC POINTS.

Determine If The Ordered Pair 6 4 Is A Solution To The Inequality Y Is Greater Than Negative One Half

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