

8) Which Number Is NOT In The Solution Set Of $X - 8 < 14$? A) 17 B) 19 C) 21 D) 23

8) Which Number Is NOT In The Solution Set Of $X - 8 < 14$? A) 17 B) 19 C) 21 D) 23

Understanding inequalities is a fundamental aspect of algebra that helps us analyze relationships between numbers. In this article, we will explore the inequality $X - 8 < 14$, determine its solution set, and identify which of the given options—17, 19, 21, or 23—is not part of that solution set. We will walk through each step of solving the inequality, interpret the results, and reinforce the concepts with clear explanations, making it easy for learners to grasp the key ideas involved in solving inequalities.

What Is an Inequality and How Do We Solve It?

Before diving into the specific problem, it's important to understand what inequalities are and the general methods used to solve them.

Definition of an Inequality

An inequality is a mathematical statement that compares two expressions using inequality signs such as:

- $<$ (less than)
- $>$ (greater than)
- $\leq$ (less than or equal to)
- $\geq$ (greater than or equal to)

For example, $X - 8 < 14$ states that the expression X minus 8 is less than 14.

Goals When Solving Inequalities

The primary objective in solving inequalities is to find all the values of X that satisfy the inequality. These values form the solution set, which can be expressed as:

- An interval (e.g., (a, b))
- A set of specific numbers
- All real numbers satisfying the inequality

Step-by-Step Solution of the Inequality $X - 8 < 14$

Let's solve the given inequality carefully:

Step 1: Write the inequality

$$X - 8 < 14$$

Step 2: Isolate X

To find the values of X that satisfy the inequality, we need to isolate X on one side. Since the inequality involves subtracting 8, we add 8 to both sides:

$$X - 8 + 8 < 14 + 8$$

This simplifies to:

$$X < 22$$

Step 3: Understand the solution set

The solution set of the inequality is all real numbers less than 22:

$$X < 22$$

Expressed in interval notation, this is:

$$(-\infty, 22)$$

Interpreting the Solution Set

The inequality $X < 22$ includes all real numbers less than 22 but does not include 22 itself. The solution set does not contain any numbers greater than or equal to 22.

Now, let's analyze the options provided:

- A) 17
- B) 19
- C) 21
- D) 23

We need to determine which of these options is not in the solution set.

Evaluating Each Option Against the Solution Set

Let's examine each number:

Option A: 17

- Is 17 less than 22? Yes.
- Therefore, 17 is in the solution set.

Option B: 19

- Is 19 less than 22? Yes.
- Therefore, 19 is in the solution set.

Option C: 21

- Is 21 less than 22? Yes.
- Therefore, 21 is in the solution set.

Option D: 23

- Is 23 less than 22? No.
- Therefore, 23 is not in the solution set.

Conclusion: Which Number Is NOT in the Solution Set?

Based on the above analysis, the only number from the options that does not satisfy the inequality $X < 22$ is 23.

Correct answer: D) 23

Additional Insights and Related Concepts

Understanding inequalities and their solutions is crucial in algebra and broader mathematics. Here are some key points and related topics:

1. Types of Inequalities

- Linear inequalities: Like the one we solved, involving variables to the first power.
- Quadratic inequalities: Involving squared variables, e.g., $X^2 - 4 > 0$.
- Compound inequalities: Combining multiple inequalities, e.g., $5 < X + 3 < 10$.

2. Graphical Representation of Inequalities

Inequalities can be visualized on a number line or coordinate plane. For $X < 22$:

- The number line is shaded to the left of 22.
- The point 22 is typically open (not included) if the inequality is strict ($<$).

3. Solving Other Inequalities

- Remember to reverse the inequality sign when multiplying or dividing both sides by a negative number.
- Always perform the same operation on both sides to maintain equality or inequality.

4. Real-World Applications

Inequalities are used in:

- Budgeting and financial planning to set spending limits.
- Engineering to specify safety margins.
- Business to determine acceptable ranges in production or sales.

Summary

To summarize:

- The inequality $X - 8 < 14$ simplifies to $X < 22$.
- The solution set includes all real numbers less than 22.

- Among the options given, 17, 19, and 21 are in the solution set.
- The number 23, which is greater than 22, is not in the solution set.

Final note: Understanding how to solve inequalities and interpret their solution sets is a vital skill in mathematics. It helps in analyzing and solving real-world problems where certain conditions must be met.

SEO Keywords and Phrases for Optimization

- Solving inequalities
- Solution set of inequalities
- Which numbers satisfy $X < 22$
- Inequality $X - 8 < 14$ explained
- How to determine numbers in the solution set
- Math inequality practice questions
- Algebra inequalities examples
- Understanding solution sets in algebra
- Inequalities with multiple choice options
- Basic algebra tutorial for students

By mastering the process of solving inequalities like $X - 8 < 14$, students gain a strong foundation in algebraic reasoning, which is essential for higher-level mathematics and numerous practical applications.

Frequently Asked Questions

Which number is not part of the solution set for the inequality $x - 8 < 14$?

The solution set for $x - 8 < 14$ is $x < 22$. Therefore, any number greater than or equal to 22 is not in the solution set. Among the options, 23 is not in the solution set.

How do you determine which numbers are outside the solution set of $x - 8 < 14$?

First, solve the inequality: $x - 8 < 14$, which simplifies to $x < 22$. Any number greater than or equal to 22 is outside the solution set, so options like 23 are not in the solution set.

Why is 17 included in the solution set of $x - 8 < 14$?

Because 17 satisfies the inequality: $17 - 8 = 9$, and since $9 < 14$, 17 is in the solution set.

Which options are outside the solution set of the inequality $x - 8 < 14$?

Options with numbers 22 or greater are outside the solution set. Since 23 is the only option above 22, it is not in the solution set.

Can you verify if 19 is in the solution set for $x - 8 < 14$?

Yes, because $19 - 8 = 11$, and since $11 < 14$, 19 is in the solution set.

Additional Resources

Which Number Is NOT In The Solution Set Of $x - 8 < 14$? is a fundamental question in algebra that tests our understanding of inequalities, their solution sets, and how to interpret them accurately. This type of problem is common in algebra courses, standardized tests, and practical mathematical applications where inequalities define ranges or conditions for variables. By analyzing this problem carefully, learners can improve their skills in solving inequalities and developing a clearer intuition for how solutions are represented graphically and numerically.

Understanding the Inequality: $x - 8 < 14$

Before we jump into identifying which number isn't in the solution set, let's first understand what the inequality $x - 8 < 14$ represents.

Breaking Down the Expression

The inequality $x - 8 < 14$ involves an unknown variable x . Our goal is to find all values of x that satisfy this inequality.

- The expression $x - 8$ is a simple linear expression.
- The inequality states that $x - 8$ is less than 14.

Step-by-Step Solution

To find the values of x that satisfy this inequality, we follow a straightforward algebraic process:

1. Add 8 to both sides of the inequality to isolate x :

$$x - 8 + 8 < 14 + 8$$

2. Simplify both sides:

$$x < 22$$

This means the solution set consists of all real numbers less than 22.

Visualizing the Solution Set

Understanding the inequality $X < 22$ is crucial. The solution set includes:

- All real numbers less than 22.
- It does not include 22 itself because the inequality is strict ($<$), not less than or equal to ($\leq$).

Graphically, this is represented as:

- A number line with an open circle at 22.
- All points to the left of 22 are included in the solution set.

Evaluating the Given Options

Now, let's analyze the options provided:

- A) 17
- B) 19
- C) 21
- D) 23

Since the solution set is all $X < 22$, any number less than 22 belongs to the solution set, whereas numbers greater than or equal to 22 do not.

Check Each Option:

1. 17: Is 17 less than 22? Yes $\rightarrow$ In the solution set.
2. 19: Is 19 less than 22? Yes $\rightarrow$ In the solution set.
3. 21: Is 21 less than 22? Yes $\rightarrow$ In the solution set.
4. 23: Is 23 less than 22? No $\rightarrow$ Not in the solution set.

Therefore, the number that is NOT in the solution set of $X - 8 < 14$ is 23.

Deep Dive: Why 23 Is Not in the Solution Set

Understanding why 23 is excluded helps reinforce the concept of inequalities:

- The solution set is strictly less than 22.
- Since $23 > 22$, it does not satisfy the inequality $X < 22$.
- This highlights the importance of the inequality's strictness; if it had been $X \leq 22$, then 22 would be included, but 23 still would not.

Additional Insights and Practice

To deepen your understanding, consider the following points:

1. Thinking about the solution set as an interval

- The solution set can be expressed as $(-\infty, 22)$.
- The open interval indicates that 22 is not included.

2. Testing boundary values

- At $X = 21$: $21 - 8 = 13 < 14 \rightarrow$ satisfies inequality.
- At $X = 22$: $22 - 8 = 14 = 14 \rightarrow$ does not satisfy, because the inequality is strict ($<$).

3. Recognizing inequality types

- Strict inequalities ($<$, $>$): solution sets are open intervals.
- Inclusive inequalities ($\leq$, $\geq$): solution sets include boundary points, represented as closed intervals.

Practical Applications

Understanding such inequalities is vital in real-world scenarios:

- Business: Setting profit or cost limits.
- Engineering: Ensuring measurements stay within safety thresholds.
- Statistics: Defining ranges for data analysis.

In all cases, knowing how to interpret and solve inequalities helps make data-driven decisions accurately.

Summary

- The inequality $X - 8 < 14$ simplifies to $X < 22$.
- The solution set includes all real numbers less than 22.
- Among the options, 17, 19, and 21 are less than 22, so they are part of the solution.
- 23 is greater than 22, so it does not satisfy the inequality.
- The correct answer to the question "Which number is NOT in the solution set?" is D) 23.

Final Thoughts

Mastering inequalities involves not only solving for the variable but also understanding the nature of the solution set they define. Recognizing the difference between strict ($<$) and inclusive ($\leq$) inequalities is essential for accurate interpretation. The example of $X - 8 < 14$ illustrates these concepts clearly, providing a foundation for tackling more complex inequalities in mathematics and beyond.

Remember: Always analyze the boundary conditions and test values within and outside the solution

set to develop a strong intuition for inequalities.

8 Which Number Is Not In The Solution Set Of $x^8 \leq 14$ A 17 B 19 C 21 D 23

8 Which Number Is Not In The Solution Set Of $x^8 \leq 14$ A 17 B 19 C 21 D 23

Related Articles

- [Inspection Of The Abdomen Should Begin With The Patient Supine And The Examiner: _____.](#)
- [The Conversion Privilege Under A Group Life Plan Allows An Employee To Convert To A\(n\)](#)
- [A Condition Caused By An Excessive Amount Of Csf Causing Ventricular Enlargement Is:](#)

[Back to Home](#)