Inequalities Example

An inequality compares quantities using <, >, ≤, or ≥. Its answer is usually a set or interval of numbers rather than a single value. You can add or subtract the same amount on both sides; multiplying or dividing by a negative reverses the comparison because it reverses order on the number line. Inequality methods evolved with algebra over centuries and have no single inventor. This example highlights the sign reversal and checks both a value in the solution and the excluded boundary.

Worked example

Solve −2x + 5 > 11.

FORMULA / RULE USED

Key rule: if a < b and c < 0, then ca > cb. Dividing by a negative reverses the inequality sign.

Step-by-step solution

STEP 1 · Subtract 5 from both sides

Subtracting the same number preserves the inequality direction.

−2x + 5 − 5 > 11 − 5, so −2x > 6

STEP 2 · Divide by −2 and reverse the sign

Since −2 is negative, change > to < when dividing.

(−2x)/(−2) < 6/(−2), so x < −3

STEP 3 · Write the solution interval

The strict inequality excludes −3 and includes all real numbers below it.

x □ (−∞, −3)

Answer

ANSWER

The solution is x < −3, or x □ (−∞, −3).

Check

At x = −4, the inequality is true. At x = −3, both sides are equal, so the endpoint is excluded.

x = −4: 13 > 11; x = −3: 11 = 11 (excluded)