

Grade 7 Math – Art of Problem Solving**4.6 Solving Inequalities Using Multiplication or Division**

Work in class. Show reasoning, examples, or diagrams that support your conclusions.

REASON ABOUT SOLUTIONS

1. Same solution set? Which inequalities have the same solution set as $-2u > 6$? Explain the operation or comparison in each choice.

A. $u < -3$

B. $2u < -6$

C. $u > -3$

D. $\frac{u}{-3} > 1$

2. A coefficient changes. Compare the solution sets of $2x \leq 8$ and $4x \leq 8$. How does doubling the positive coefficient affect the boundary? Does every solution of the second satisfy the first?

3. Shelf design. Each game box is $1\frac{1}{4}$ inches wide. A shelf has 19 inches of space. Find the greatest number of boxes that fit. Explain why rounding to the nearest whole number can fail.

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DEEPEN THE REASONING

4. A sign we do not know. Suppose a is nonzero. Solve $ax < 12$ in two cases: $a > 0$ and $a < 0$. Why can there not be one unconditional comparison direction?

5. Reciprocal reasoning. Solve $-\frac{2}{5}x \geq 3$ by dividing and by multiplying by a reciprocal. Explain why both methods reverse the symbol.

6. Two requirements. Describe all values satisfying both $-3x \leq 12$ and $2x < 10$. Check both endpoints and graph the shared part.
