



3-7 Solving Inequalities by Multiplying or Dividing (Pages 151–155)

Solving inequalities that involve multiplication or division is very similar to solving equations that involve multiplication or division. However, there is one very important difference involved with multiplying or dividing by negative integers.

Multiplication and Division Properties of Inequalities	When you multiply or divide each side of a true inequality by a <i>positive</i> integer, the result remains true. For all integers a , b , and c , where $c > 0$, if $a > b$, then $a \cdot c > b \cdot c$ and $\frac{a}{c} > \frac{b}{c}$.
Multiplication and Division Properties of Inequalities	When you multiply or divide each side of a true inequality by a <i>negative</i> integer, you must <i>reverse</i> the order symbol. For all integers a , b , and c , where $c < 0$, if $a > b$, then $a \cdot c < b \cdot c$ and $\frac{a}{c} < \frac{b}{c}$.

EXAMPLES

A Solve $\frac{n}{7} < -7$.

$$\frac{n}{7} < -7$$

$$\frac{n}{7} \cdot 7 < -7 \cdot 7 \quad \text{Multiply each side by 7.}$$

$$n < -49 \quad \text{Check your solution by replacing } n \text{ with } -56, \text{ a number less than } -49.$$

B Solve $-5m \geq 45$.

$$-5m \geq 45$$

$$\frac{-5m}{-5} \leq \frac{45}{-5} \quad \text{Divide each side by } -5 \text{ and reverse the order symbol.}$$

$$m \leq -9 \quad \text{Check your solution by replacing } m \text{ with } -9 \text{ and a number less than } -9.$$

PRACTICE

Solve each inequality and check your solution.

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|------------------------|---------------------------|-----------------------|----------------------|
| 1. $-3x \geq -24$ | 2. $6s \geq 30$ | 3. $\frac{x}{5} < 39$ | 4. $-162 < 18r$ |
| 5. $92 \geq -4p$ | 6. $-7y \geq 119$ | 7. $\frac{x}{3} > 16$ | 8. $\frac{b}{8} < 9$ |
| 9. $-6n \geq -72$ | 10. $15j \leq 135$ | 11. $18d < 126$ | 12. $8x \geq -72$ |
| 13. $4x \geq 36$ | 14. $\frac{y}{12} \leq 2$ | 15. $\frac{c}{8} > 2$ | 16. $-114 \leq -19r$ |
| 17. $\frac{m}{12} > 5$ | 18. $7 < \frac{n}{3}$ | 19. $-80 \leq -20s$ | 20. $38 \geq 19t$ |



21. Standardized Test Practice Dana will leave home at 9 A.M. and will drive to Titusville, which is 220 miles away. What is the least speed he must average to be sure he arrives in Titusville no later than 1 P.M.?

- A** 60 mph **B** 55 mph **C** 50 mph **D** 45 mph

Answers: 1. $x \leq 8$ 2. $s \geq 5$ 3. $x < 195$ 4. $r > -9$ 5. $p \geq -23$ 6. $y \leq -17$ 7. $x > 48$ 8. $b < 72$ 9. $n \leq 12$ 10. $f \leq 11$ 11. $d < 7$ 12. $x \geq -9$ 13. $x \geq 9$ 14. $y \leq 24$ 15. $c > 16$ 16. $r \leq 6$ 17. $m > 60$ 18. $n < 21$ 19. $s \leq 4$ 20. $t \leq 2$ 21. **B**