

C3L4 Notes

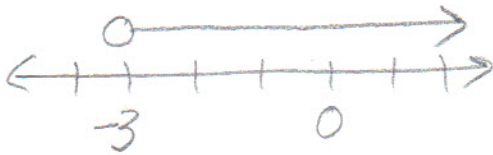
Solving Multi-Step Inequalities

An inequality is an open sentence that contains the symbols

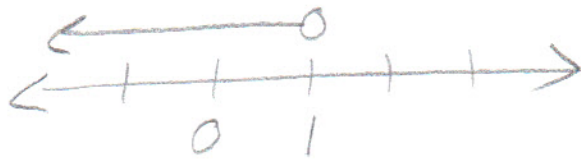
$<$, $>$, \leq , \geq . For example: $3x > 7$

Graph the solutions to the following inequalities on a number line.

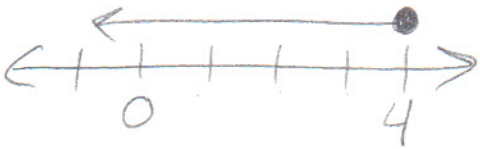
1. $x > -3$



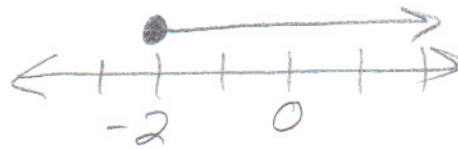
2. $x < 1$



3. $x \leq 4$



4. $x \geq -2$



State the inequality that represents the given graph.

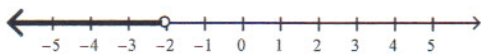
5. $x \leq 3$



6. $x > -1$



7. $x < -2$



8. $x \geq 0$



Solve the following inequalities, then graph the solutions on a number line.

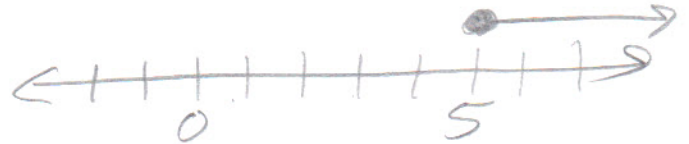
9. $3x - 9 > 18$

$$\begin{array}{r} +9 \quad +9 \\ \hline 3x > 27 \\ x > 9 \end{array}$$



10. $7 \leq 2x - 3$

$$\begin{array}{r} +3 \quad +3 \\ \hline 10 \leq 2x \\ 5 \leq x \\ x \geq 5 \end{array}$$

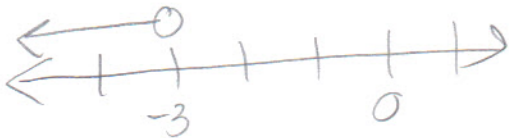


11. $-5x - 8 > 7$

$$\begin{array}{r} +8 \quad +8 \\ \hline -5x > 15 \end{array}$$

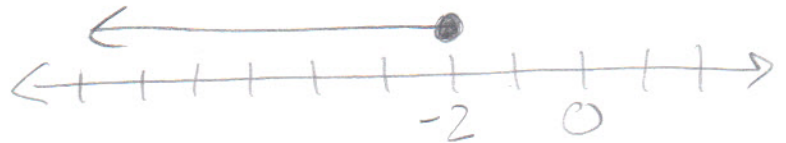
$x < -3$

WHEN YOU DIVIDE BY A NEGATIVE, FLIP THE INEQUALITY SIGN.



12. $\frac{x}{2} + 5 \leq 4$

$$\begin{array}{r} x + 10 \leq 8 \\ -10 \quad -10 \\ \hline x \leq -2 \end{array}$$



Solve each inequality, if possible. If the inequality has no solution, write no solution. If the solutions are all real numbers, write all real numbers.

13. $3(k - 5) + 9k \geq -3$

$$3k - 15 + 9k \geq -3$$

$$\begin{array}{r} 12k - 15 \geq -3 \\ +15 \quad +15 \end{array}$$

$$12k \geq 12$$

$$k \geq 1$$

14. $30 > -(5z + 15) + 10z$

$$30 > -5z - 15 + 10z$$

$$30 > 5z - 15$$

$$\begin{array}{r} +15 \quad \quad +15 \\ \hline \end{array}$$

$$45 > 5z$$

$$9 > z$$

$$z < 9$$

15. $4x + 3 < 3x + 6$

$$\begin{array}{r} -3x \quad \quad -3x \\ \hline \end{array}$$

$$\begin{array}{r} x + 3 < 6 \\ -3 \quad -3 \end{array}$$

$$x < 3$$

16. $3m - 4 \leq 6m + 11$

$$\begin{array}{r} -6m \quad \quad -6m \\ \hline \end{array}$$

$$\begin{array}{r} -3m - 4 \leq 11 \\ +4 \quad +4 \end{array}$$

$$-3m \leq 15$$

$$m \geq -5$$

$$17. -3(w - 3) \geq 9 - 3w$$

$$-3w + 9 \geq 9 - 3w$$

$$\begin{array}{r} 9 - 3w \geq 9 - 3w \\ +3w \qquad +3w \end{array}$$

$$9 \geq 9$$

TRUE

ALL REAL NUMBERS

$$18. -2(6 + z) \leq -15 - 2z$$

$$\begin{array}{r} -12 - 2z \leq -15 - 2z \\ +2z \qquad +2z \end{array}$$

$$-12 \leq -15$$

NOT TRUE

NO SOLUTION

$$19. 17 - (4k - 2) \geq 2(k + 3)$$

$$17 - 4k + 2 \geq 2k + 6$$

$$\begin{array}{r} -4k + 19 \geq 2k + 6 \\ -2k \qquad -2k \end{array}$$

$$\begin{array}{r} -6k + 19 \geq 6 \\ -19 \quad -19 \end{array}$$

$$\begin{array}{r} -6k \geq -13 \\ k \leq \frac{13}{6} \end{array}$$

$$20. \frac{5}{4}x - 2 < x + \frac{3}{4} - \frac{1}{4}x$$

$$5x - 8 < 4x + 3 - 1x$$

$$\begin{array}{r} 5x - 8 < 3x + 3 \\ -3x \qquad -3x \end{array}$$

$$\begin{array}{r} 2x - 8 < 3 \\ +8 \quad +8 \end{array}$$

$$\begin{array}{r} 2x < 11 \\ x < \frac{11}{2} \end{array}$$