Solving In-equations (Inequalities)

To solve an inequation you follow the same rules as when solving equations except when dividing both sides by a negative number. Consider the inequation $5 < 8$. Dividing both sides by -1 gives $-5 < -8$, which is **not** true. The inequality sign must change direction giving $-5 > -8$.

Examples

Solve the following.

a $3x + 2 < 14$

b $18 \leq 12 + 3x$

c $5x - 8 \leq 2x + 13$

d $2x + 13 > 5x + 4$

e $5 - 2x \geq 7$

a Start by writing down the inequation: $3x + 2 < 14$

   Subtract 2 from both sides: $3x < 12$

   Divide both sides by 3: $x < 4$

b Start by writing down the equation: $18 \leq 12 + 3x$

   Subtract 12 from both sides: $6 \leq 3x$

   Divide both sides by 3: $2 \leq x$

   This is more easily understood when written as: $x \geq 2$

   Think: If 2 is less than or equal to x then x is greater than or equal to 2.

c Start by writing down the inequation: $5x - 8 \leq 2x + 13$

   Subtract $2x$ from both sides: $3x - 8 \leq 13$

   Add 8 to both sides: $3x \leq 21$

   Divide both sides by 3: $x \leq 7$