

Objective 4 – Linear Equations and Inequalities

SOLVING LINEAR EQUATIONS AND INEQUALITIES

To solve a problem involving a linear equation or inequality, simplify the expression and solve in terms of a variable. Then check that the answer is reasonable.



Example 1: Calvin and Maria share books.

Represent the number of Calvin's books by c and the number of Maria's books by m . Maria has 8 more books than Calvin. The total number of books, T , is less than or equal to 20. Show this inequality.

Is 4 a reasonable number for Calvin's books? **Yes**

Is 6 a reasonable number for Calvin's books? **Yes**

Is 8 a reasonable number for Calvin's books? **No**

$$c + m = T \text{ and } T \leq 20$$

$$c + (c + 8) \leq 20$$

$$2c + 8 \leq 20$$

$$2c + 8 - 8 \leq 20 - 8$$

$$\frac{2c}{2} \leq \frac{12}{2}$$

$$c \leq 6$$

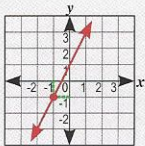
Example 2: Solve the linear equation $f(x) = 2x + 1$ for $x = -1$

Graphing Method

At $x = -1$

$$f(-1) = -1$$

Point
 $(-1, -1)$



Algebraic Method

$$f(x) = 2x + 1$$

$$f(-1) = 2(-1) + 1$$

$$f(-1) = -2 + 1$$

$$f(-1) = -1$$

replace x with -1

multiply 2 by -1

add common terms

Example 3: Find reasonable solutions for the following inequality.

$$6 - 3y < 9x$$

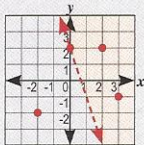
$$6 - 3y - 6 < 9x - 6$$

$$\frac{-3y}{-3} < \frac{9x - 6}{-3}$$

$$y > -3x + 2$$

Step 1: subtract 6 from both sides

Step 2: divide all terms by -3
(reverse inequality sign when multiplying or dividing by negative number)



Points $(2, 2)$ and $(3, -1)$ are reasonable solutions, but Points $(0, 2)$ and $(-2, -2)$ are not.