Appendix I:
Solving Inequalities

TERMINOLOGY — APPENDIX I

For the following term, provide 1) a definition in your own words, 2) the formal definition (as provided by your text or instructor), and 3) an example of the term using a drawing or problem. A sample filled-out form is available in the Introduction.

Solution of an Inequality

Your definition	
Formal definition	
Example	

READING AND SELF-DISCOVERY QUESTIONS — APPENDIX I

1. Solving an inequality requires use of the Order of Operations. You use the same process for solving inequalities that you use for solving equations, with one important exception.

   a) What must you do when you multiply or divide an inequality by a negative number?

   You must change the direction of the inequality symbol.

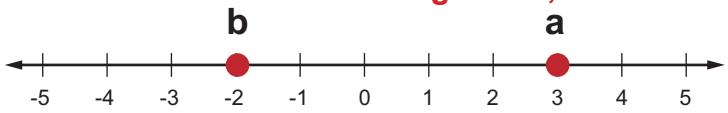
   b) Why must you perform the action in Question a)?

   If a<b, then –a > –b . This is a property of inequalities.

2. When you solve an inequality, it is customary (but not required) for the variable to be on which side of the inequality? **The variable should be on the left side of the inequality.**

3. If **a > b**, will **b < a** always be true? Explain your answer.

   Yes. Look at the number line. If *a* is to the right of *b*, then *b* is to the left of *a*.



4. If **a > b**, will **ac > bc** always be true? Explain your answer.

   This will not be true if c ≤ 0. For example, 2 < 3, but –2 × 2 > –2 × 3 since –4 > –6.

DEMONSTRATE YOUR UNDERSTANDING — APPENDIX I

1. Given $5x + 3 < 5 + 3x$, which of the following numbers is (are) the solutions(s)? (Circle all solutions.)

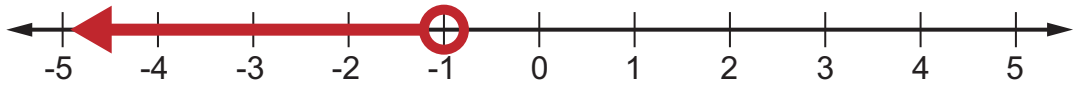
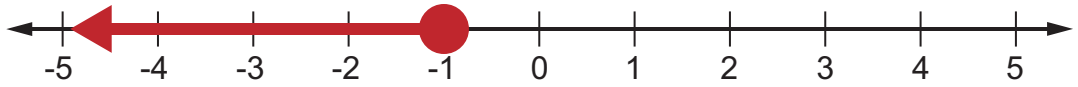
a) 0 b) 2 c) 1 d) –1

The solution is x < 1, so there are two numbers from the solution set here, 0 and –1.

IDENTIFY AND CORRECT THE ERRORS — APPENDIX I

Identify the error(s) you find in each of the following worked solutions. Describe the error made and solve the problem correctly in the appropriate spaces provided.

Problem	Describe Error	Correct Process
1. Solve: $6x - 3 \geq 4x + 3$ **Worked Solution** *(What is wrong here?)* $6x - 3 \geq 4x + 3$ $-6x \quad -6x$ $-3 \geq -2x + 3$ $+-3 \quad +-3$ $-6 \geq -2x$ $\frac{-6}{-2} \geq \frac{-2x}{-2}$ $3 \geq x$	**Student did not change the direction of the inequality.**	$-6 \geq -2x$ $3 \leq x$ $x \geq 3$

Problem
2. Graph the given inequality on a number line: $x \leq -1$
Worked Solution *(What is wrong here?)*

Describe Error
Student did not correctly represent the endpoint at -1.
Correct Process


Problem	Describe Error	Correct Process
3. Solve: $4 - 3x > -2x + 8$	**Student changed the direction of the inequality when subtracting.**	$4 > x + 8$ $-8 = \quad -8$ $-x > 4$ $x < -4$
Worked Solution *(What is wrong here?)*		
$4 - 3x > -2x + 8$ $+3x \quad +3x$ $4 \quad > x + 8$ $-8 \quad\quad -8$ $-4 \quad < x$ **$-4 < x$**		