**2.5 Linear Inequalities and Interval Notation**

**linear inequality** – any inequality that can be written in one of the following forms:

, , , ,

*Examples: , , , ,*

**To solve an inequality** means to find .......................................... satisfying the inequality.

The set of such values is called .............................................. .

**Solution sets** can be graphed on a number line and recorded in **interval notation**, as follows:

|  |  |  |  |
| --- | --- | --- | --- |
| **inequality** | **graph** | **set-builder notation** | **interval notation** |
|  | 3 |  |  |
|  | 1 |  |  |
|  | 5 |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |

*Recall:* Solve inequalities the same way as equations, except when **multiplying or** **dividing by a negative** number, **reverse** the inequality sign.

*Example 1:* Solve, graph, and state your answer in interval notation.

a) b)

**Simultaneous Inequalities:**

To state that ***x*** is between two numbers, say between 2 and 3, we write .

This really means that  **and** .

To solve simultaneous inequalities, apply the needed operations to **all three parts** of the inequality.

*Example 2:* Solve.

a) b)

*Example 3:* Write appropriate inequality and solve.

a) Double a number increased by 1 is between 2 and 8.

b) If 5 is subtracted from a number, then the result is at least 7.

*Example 4:* After a serious automobile accident, most insurance companies will replace the damaged car with a new one if repair costs exceed 80% of the “blue-book” value of the car. John’s car recently sustained $9200 worth of damage but was not replaced. What can we say about the blue-book value of his car?

*Example 5:*

Toni can be paid in one of two ways:

*Plan A:* A salary of $400 per month plus a commission of 8% of gross sales;

*Plan B:* A salary of $610 per month plus a commission of 5% of gross sales.

For what amount of gross sales should Toni select plan A?