**COMPOUND INEQUALITIES** consists of two inequalities connected by or .

Inequalities containing is true only if both inequalities are true.

**Solution**: The solution of the compound inequality containing is a solution of **both** inequalities.

**Graph**: The **INTERSECTION** of the graphs of two inequalities. It can be found by graphing each inequality and then determining where the graphs overlap.

**Example**: Graph the solution set of and .

|  |  |
| --- | --- |
|  |  |
| **0**  **1**  **2**  **3**  **4**  **-1**  **-2**  **-3**  **-4**  **5**  **6**  **-5**  **-6** | **0**  **1**  **2**  **3**  **4**  **-1**  **-2**  **-3**  **-4**  **5**  **6**  **-5**  **-6** |
|  | |
| **0**  **1**  **2**  **3**  **4**  **-1**  **-2**  **-3**  **-4**  **5**  **6**  **-5**  **-6** | |

**Sample Problem 1:** Write an inequality that represents the set of numbers and graph the inequality.

1. All real numbers that are greater than zero and less than or equal to .

|  |  |
| --- | --- |
|  |  |
| **0**  **1**  **2**  **3**  **4**  **-1**  **-2**  **5**  **6**  **7**  **8**  **9**  **10** | **0**  **1**  **2**  **3**  **4**  **-1**  **-2**  **5**  **6**  **7**  **8**  **9**  **10** |
|  | |
| **0**  **1**  **2**  **3**  **4**  **-1**  **-2**  **5**  **6**  **7**  **8**  **9**  **10** | |

1. All real numbers that are less than and greater than .

|  |  |
| --- | --- |
|  |  |
| **0**  **1**  **2**  **-1**  **-2**  **-3**  **-4**  **-5**  **-6**  **-7**  **-8**  **-9**  **-10** | **0**  **1**  **2**  **-1**  **-2**  **-3**  **-4**  **-5**  **-6**  **-7**  **-8**  **-9**  **-10** |
|  | |
| **0**  **1**  **2**  **-1**  **-2**  **-3**  **-4**  **-5**  **-6**  **-7**  **-8**  **-9**  **-10** | |

Inequalities containing is true only if one or both of the inequalities are true.

**Solution**: The solution of the compound inequality containing is a solution of **either** inequality, not necessarily both.

**Graph**: The **UNION** of the graphs of two inequalities. It can be found by graphing each inequality.

**Example**: Graph the solution set of or .

|  |  |
| --- | --- |
|  |  |
| **0**  **1**  **2**  **3**  **4**  **-1**  **-2**  **-3**  **-4**  **5**  **6**  **-5**  **-6** | **0**  **1**  **2**  **3**  **4**  **-1**  **-2**  **-3**  **-4**  **5**  **6**  **-5**  **-6** |
|  | |
| **0**  **1**  **2**  **3**  **4**  **-1**  **-2**  **-3**  **-4**  **5**  **6**  **-5**  **-6** | |

**Sample Problem 2:** Solve each inequality and graph the solution set.

1. or

|  |  |
| --- | --- |
|  |  |
| **0**  **1**  **2**  **-1**  **-2**  **-3**  **-4**  **-5**  **-6**  **-7**  **-8**  **-9**  **-10** | **0**  **1**  **2**  **-1**  **-2**  **-3**  **-4**  **-5**  **-6**  **-7**  **-8**  **-9**  **-10** |
|  | |
| **0**  **1**  **2**  **-1**  **-2**  **-3**  **-4**  **-5**  **-6**  **-7**  **-8**  **-9**  **-10** | |

1. or

|  |  |
| --- | --- |
|  |  |
| **0**  **1**  **2**  **3**  **4**  **-1**  **-2**  **5**  **6**  **7**  **8**  **9**  **10** | **0**  **1**  **2**  **3**  **4**  **-1**  **-2**  **5**  **6**  **7**  **8**  **9**  **10** |
|  | |
| **0**  **1**  **2**  **3**  **4**  **-1**  **-2**  **5**  **6**  **7**  **8**  **9**  **10** | |

**Sample Problem 3:** On an interstate highway, the minimum and maximum speed limit is 40 mph and 70 mph, respectively. Write and graph the compound inequality that describes the speed at which a vehicle should maintain.

|  |  |
| --- | --- |
|  |  |
| **0**  **10**  **20**  **30**  **40**  **-10**  **-20**  **50**  **60**  **70**  **8**  **90**  **100** | **0**  **10**  **20**  **30**  **40**  **-10**  **-20**  **50**  **60**  **70**  **8**  **90**  **100** |
|  | |
| **0**  **10**  **20**  **30**  **40**  **-10**  **-20**  **50**  **60**  **70**  **80**  **90**  **100** | |