Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ PD: \_\_\_\_\_\_

**Notes: Solving Inequalities**

**FOR THIS LESSON, YOU SHOULD ALREADY KNOW:**

* **The following properties: closure, commutative, associative, inverse (addition and multiplication), identity (addition and multiplication), and distributive.**
* **How to solve multistep equations and equations with variables on both sides and justify the steps using field properties and the properties of equality.**

**Properties of Inequality:**

* **Addition/Subtraction Property of Inequality:** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* **Multiplication/Division Property of Inequality**
	+ **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**
	+ **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Steps for Solving Inequalities:**

1. **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**
2. **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**
3. **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**
4. **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**
5. **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Examples: Solve each inequality and graph the solution.**

|  |  |
| --- | --- |
| **Problem** | **Justifications** |
| 1. $5a+6\leq 36$
 |  |
| 1. $\frac{x}{-3}<-10$
 |  |
| 1. $5m-4<2m+11$
 |  |
| 1. $2r-18\leq 5r+3$
 |  |
| 1. $-2x+6\geq 3x-4$
 |  |
| 1. $26p-20>14p+64$
 |  |
| 1. $3\left(x+4\right)-5\left(x-1\right)<5$
 |  |
| 1. $-4\left(3x-1\right)\leq 52$
 |  |
| 1. $3q+6\leq -5\left(q+2\right)$
 |  |
| 1. $9+x<7-2\left(x-3\right)$
 |  |

**Applications**

1. The goal of a toy drive is to donate more than 1000 toys. The toy drive already has collected 300 toys. How many more toys does the toy drive need to meet its goal? Write and solve an inequality to find the number of toys needed.
2. To go to the next level in a certain video game, you must score at least 50 points. You currently have 40 points. You fall into a trap and lose 5 points. What inequality shows the points you must earn to go to the next level?
3. A family decides to rent a boat for the day while on vacation. The boat’s rental rate is $500 for the first two hours and $50 for each additional half hour. Suppose the family can spend $700 for the boat. What inequality represents the number of hours for which they can rent the boat?
4. You wonder if you can save money by using your cell phone for all long distance calls. Long distance calls cost $.05 per minute on your cell phone. The basic plan for your cell phone is $29.99 each month. The cost of regular phone service with unlimited long distance is $39.99. Define a variable and write an inequality that will help you find the number of long-distance call minutes you may make and still save money.