

Date:

Title:

(A) **Lesson Objectives:**

- Introduce Compound Linear Inequalities through several practical applications.
- Provide algebraic solutions to simple questions involving the solution to compound linear inequalities.
- Illustrate the solutions to compound linear inequalities through diagrams involving number lines.

(B) **Investigations for Classwork** → Solve and verify the following linear systems:

Mr Santowski is investing \$10,000 into an education fund for his son Ian. The investment earns 10% pa simple interest. (Formulas involved will be  $I = Prt$  &  $A = P + Prt$ ).

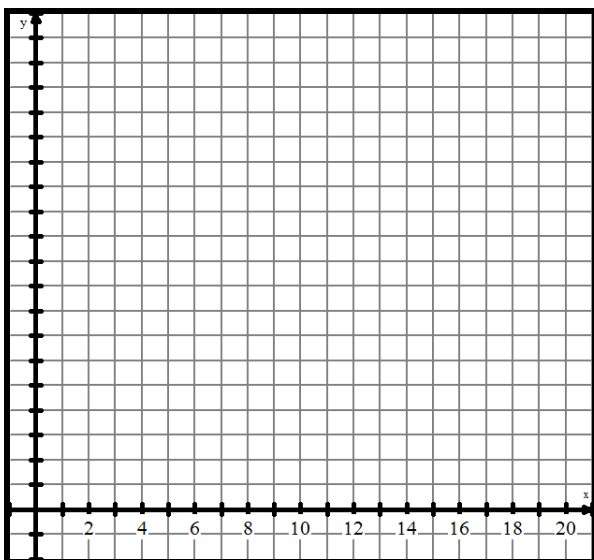
So write an equation showing the relationship between the amount of the investment and the length of time invested.

Provide a data table, showing the relationship between the amount of the investment and the length of time of the investment.

Years	0	1	2	3	4	5	6	7
Amount								

Years	8	9	10	12	14	17	20
Amount							

Provide a graph, showing the relationship between the amount of the investment and the length of time of the investment.



Now deal with the following scenario → I need the investment to earn AT LEAST \$17,000, but at MOST \$25,000.

- If I keep the investment for 5 years, will I accomplish my goal?
- If I keep the investment for 10 years, will I accomplish my goal?
- If I keep the investment for 30 years, will I accomplish my goal?
- How many solutions are there to my scenario?
- What is the number of years that I should keep my money in this investment to meet my requirement?

Now let's write a new type of equation to model this situation → we will call this a **compound linear inequality** .....

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Investigation #2

Mr Santowski is renting a car for the Christmas holidays. The company offers me a rate of \$25 per day and rate of \$0.15 for every km driven.

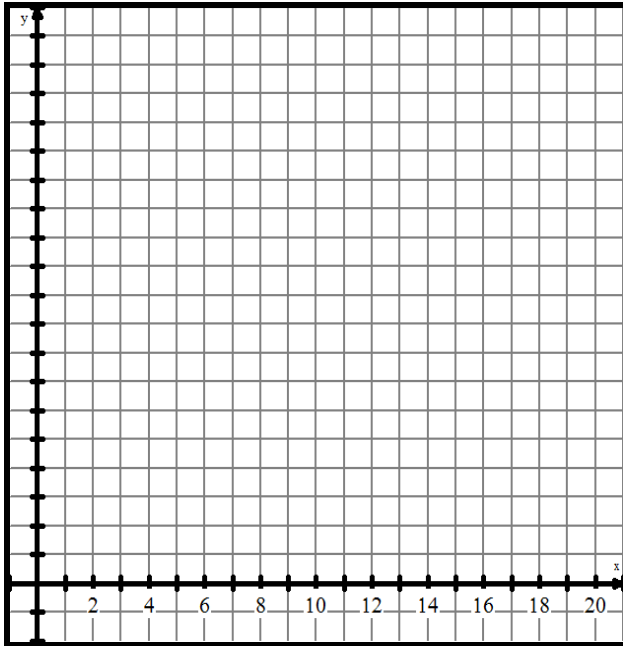
So write an equation showing the relationship between the cost of a daily rental and the distance travelled.

Provide a data table, showing the relationship between the cost of a daily rental and the distance travelled.

Distance	0	10	20	30	40	50	60	70
Cost								

Distance	80	90	100	120	140	170	200
Cost							

Provide a graph, showing the relationship between the cost of a daily rental and the distance travelled.



Now deal with the following scenario → I need the rental costs to be EITHER AT MOST \$17.50 or AT LEAST \$45.00.

- (a) If I drive for 40 km, will I accomplish my goal?
- (b) If I drive for 150 km, will I accomplish my goal?
- (c) If I drive for 300 km, will I accomplish my goal?
- (d) How many solutions are there to my scenario?
- (e) What are the distances I should drive in order to meet my requirement?

Now let's write a new type of equation to model this situation → we will call this a **compound linear inequality** .....

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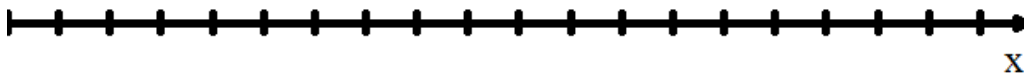
(C) Algebraic Examples – In Class

1. Solving an inequality means →

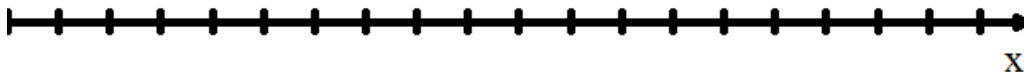
2. Solve  $4 > x \geq 9$  and EXPLAIN what the original question means and EXPLAIN what the solution means.

3. Solve  $x > 5$  OR  $x < -3$  and EXPLAIN what the original question means and EXPLAIN what the solution means.

4. Solve  $-2 \geq x > 7$  and ILLUSTRATE YOUR SOLUTION on a number line. EXPLAIN HOW your number line shows “the solution”.



5. Solve EITHER  $x + 3 \leq 0$  OR  $x - 5 > 0$  and ILLUSTRATE YOUR SOLUTION on a number line. EXPLAIN HOW your number line shows “the solution”.



6. Solve and graph your solution → BOTH  $2x \geq 9$   
AND  $2x - 22 < 0$ .

8. Solve and graph your solution → BOTH  $-2x < 5$   
AND  $2x - 2 > -24$ .

7. Solve and graph your solution → EITHER  $x > 9$  OR  
 $x < -4$

9. Solve and graph your solution → EITHER  $2x > 9$   
OR  $2x - 22 < 0$