

Date:

Title:

(A) **Lesson Objectives:**

- a. Introduce Linear Inequalities through several practical applications.
- b. Provide algebraic solutions to simple questions involving the solution to linear inequalities.
- c. Illustrate the solutions to 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 $I = Prt$ & $A = P + Prt$).

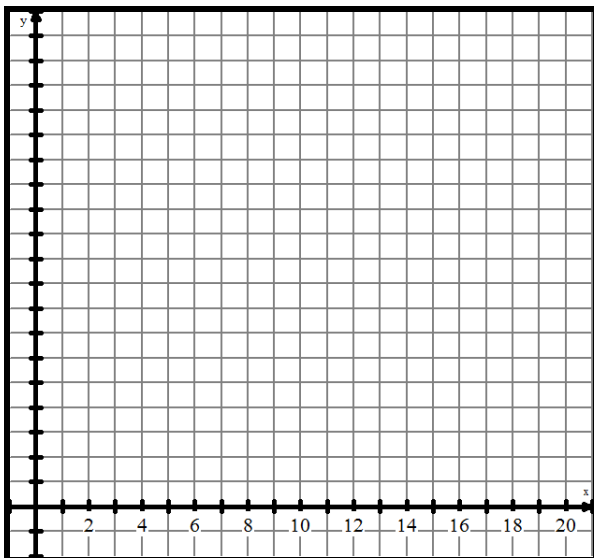
So write an equation showing the relationship between the amount of the investment and the length of time invested.

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.

- (a) If I keep the investment for 5 years, will I accomplish my goal?
- (b) If I keep the investment for 8 years, will I accomplish my goal?
- (c) If I keep the investment for 10 years, will I accomplish my goal?
- (d) How many solutions are there to my scenario?
- (e) What is the least 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 **linear inequality**

Date:

Title:

Investigation #2

Stephen charges \$25 per linear foot to install a wood fence. It costs him \$18.00 per linear foot plus \$5000 to purchase materials and hire installers each month.

So write an equation for Stephen's REVENUES

And write an equation for Stephen's EXPENSES

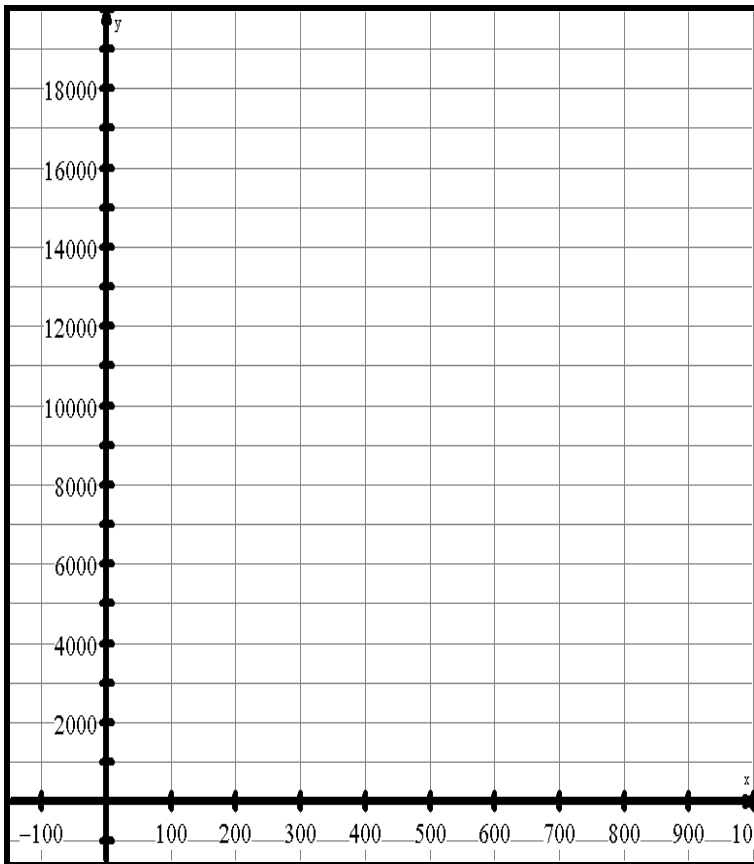
Provide a data table, showing Stephen's revenues.

Distance				
\$				

Provide a data table, showing Stephen's expenses.

Distance				
\$				

Provide a graph, showing the relationship revenues and expenses.



Now deal with the following scenarios:

(a) Write an inequality to reflect the statement "Stephen wants to make at least \$13,000 in revenues this week"

(b) Write an inequality to reflect the statement "Stephen wants to have at most \$10,000 in expenses this week"

(c) What does the linear inequality $25x > 18x + 5000$ mean in context?

(d) What does the linear inequality $25x \leq 18x + 5000$ mean in context?

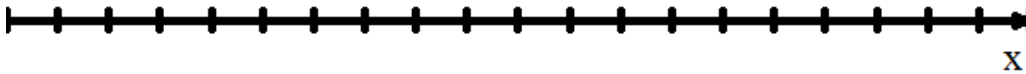
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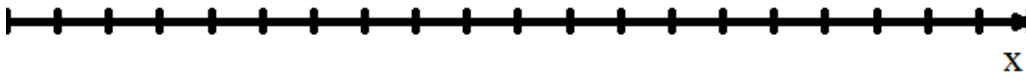
(C) Algebraic Examples – In Class

1. Solving an inequality means →
2. EXPLAIN what the statement “solve $x > 5$ ” means.

3. Solve $x - 4 > 0$ and ILLUSTRATE YOUR SOLUTION on a number line. EXPLAIN HOW your number line shows “the solution”.



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



5. Solve and graph your solution → $2x \leq 9$. For further investigation, graph EACH linear function on your TI-84 and then INTERPRET your solution.

7. Solve and graph your solution → $-2x < 5$. For further investigation, graph EACH linear function on your TI-84 and then INTERPRET your solution.

6. Solve and graph your solution → $\frac{x}{8} < \frac{1}{5}$. For further investigation, graph EACH linear function on your TI-84 and then INTERPRET your solution.

8. Solve and graph your solution → $\frac{2x-3}{4} \leq 2$. For further investigation, graph EACH linear function on your TI-84 and then INTERPRET your solution.

Date:

Title:

9. Solve and graph your solution → $5x + 7 < 3(x + 1)$

11. Solve and graph your solution →

$$\frac{x}{5} - 2 > \frac{2}{3}(x + 3).$$

10. Solve and graph your solution →

$$2(3x + 2) \geq 8(x - 3).$$

12. Solve and graph your solution →

$$\frac{(x-2)}{4} - \frac{2}{7} < \frac{(3-x)}{7} - \frac{1}{2}.$$

(D) Homework/Resources

- HW: from Textbook →

- Video from JMT → <http://www.youtube.com/watch?v=0X-bMeIN53I>

- Help from OnlineMathLearning with inequalities:

- o <http://www.onlinemathlearning.com/linear-inequality-4.html>
- o <http://www.onlinemathlearning.com/linear-inequality.html>

- <http://www.videojug.com/film/algebra-solving-linear-inequalities-sample-video>

- Reading from PurpleMath → <http://www.purplemath.com/modules/ineqlin.htm>