

Investigation 5

Linear Inequalities

You have studied many relationships that can be modeled by linear equations. The points that satisfy such relationships fall on a straight line. Points that do not satisfy a linear relationship (do not fall on a line) satisfy a *linear inequality*.

Graphing helps make sense of how solutions to inequalities are related to what you know about solutions to linear equations. The situations in this investigation can be modeled by linear inequalities.

5.1 Limiting Driving Miles

Vince reads that cars are a major source of air pollution. He decides to look at his family's driving habits. They have two vehicles, a car and an SUV. His parents estimate that the family drives about 1,200 miles each month. They decide to try to limit their driving to no more than 1,000 miles each month.



Getting Ready for Problem 5.1

- Find ten possible (*car miles*, *SUV miles*) pairs that give a total of no more than 1,000 miles.

- | | |
|------------------|-------------------|
| 1. (,) | 6. (,) |
| 2. (,) | 7. (,) |
| 3. (,) | 8. (,) |
| 4. (,) | 9. (,) |
| 5. (,) | 10. (,) |

- One month the family drove the car 500 miles and the SUV 500 miles. Was the total for this month "no more than" 1,000 miles?

Yes/No because _____
 (circle one.)

Problem 5.1 Graphing "No More Than" Situations

- On the grid at the right, plot the ten points you found in the Getting Ready.

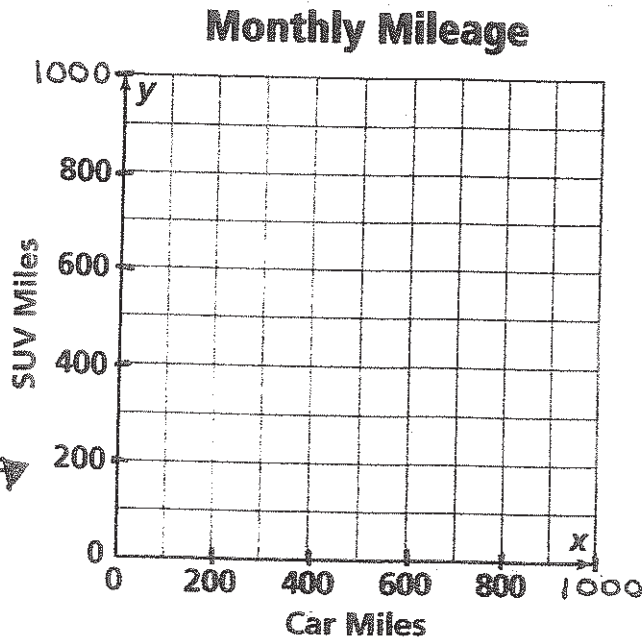
Look at the pattern of plotted points.

- Are there other possible (*car miles*, *SUV miles*) pairs that give a total of no more than 1,000 miles?

If yes, name three and plot them. →

- (,)
- (,)
- (,)

* Remember:
 (car miles, SUV miles)



③ We refer to a part of a graph or plane as a *region*. Describe where the points are located that represent a total of no more than 1,000 miles.

The points are located _____

④ This graph is different from the graph of the equation in the Before Class Work because _____

⑤ In what region are the points that do not meet this condition located? Give some examples of such points.

Examples: These points are located _____

1. (,)
2. (,)
3. (,)

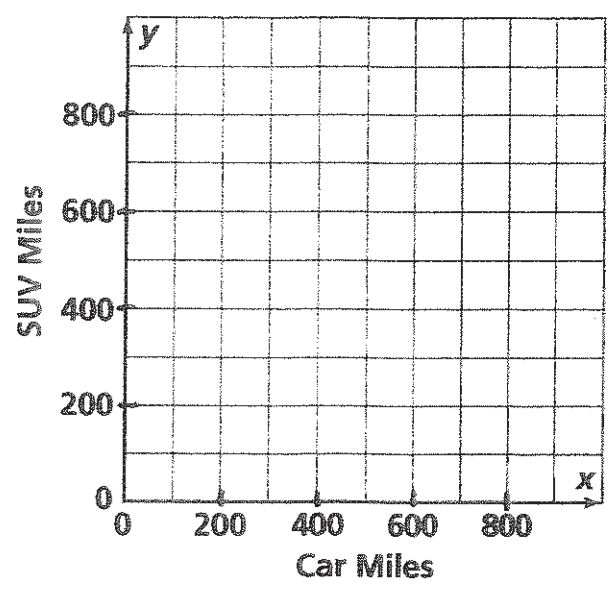
Suppose Vince's family wants to limit their driving to at most 800 miles per month.

⑥ Draw a graph of (*car miles*, *SUV miles*) pairs that meet this condition.

Plot 10 points on your graph.

- | | |
|------------------|-------------------|
| 1. (,) | 6. (,) |
| 2. (,) | 7. (,) |
| 3. (,) | 8. (,) |
| 4. (,) | 9. (,) |
| 5. (,) | 10. (,) |

Monthly Mileage



⑦ Describe the region of the graph that includes all points that represent a total of no more than 800 miles.

The points are located _____

⑧ Do you think you should write equations or inequalities to model the situations in Question 2 and Question 6?

For each situation, I should write an _____ because
(equation or inequality)

⑨ Write inequalities to model the situations in Questions 2 and 6.

Question 2: _____

Question 6: _____

⑩ I know these inequalities are correct because _____

