# Unit 6 Overview – Linear Inequalities

## Learning Outcomes

Model and solve problems that involve systems of linear inequalities in two variables.

> 1.1 Model a problem, using a system of linear inequalities in two variables.
>
> 1.2 Graph the boundary line between two half planes for each inequality in a system of linear inequalities, and justify the choice of solid or broken lines.
>
> 1.3 Determine and explain the solution region that satisfies a linear inequality, using a test point when given a boundary line.
>
> 1.4 Determine, graphically, the solution region for a system of linear inequalities, and verify the solution.
>
> 1.5 Explain, using examples, the significance of the shaded region in the graphical solution of a system of linear inequalities.
>
> 1.6 Solve an optimization problem, using linear programming.

## By the end of the unit, you should be able to solve this type of question…

A publisher makes romance and adventure novels. Romance novels sell for $10 and adventure novels for $8. The publishers noticed that each month they always sell between 500 and 800 romance novels and that the number of adventure novels sold is never more than double the number of romance novels sold.

What are the maximum and minimum profits for a month? Show all work.

*Define the relevant variables, write an inequality for each constraint in the question, draw the feasible region, and create an objective function that should optimize the profits.*
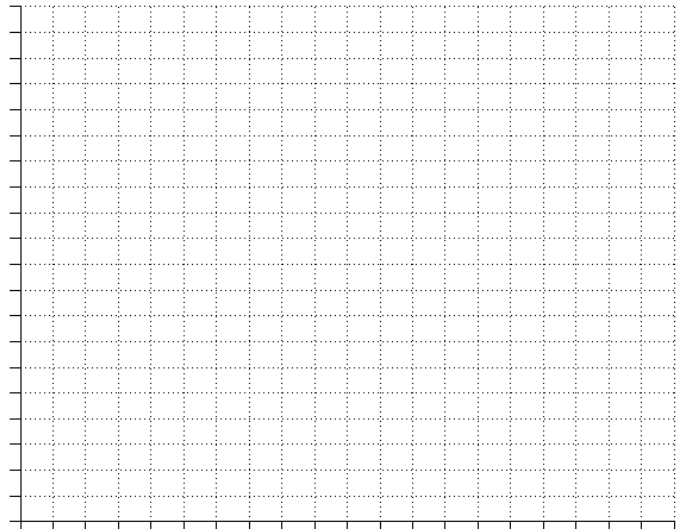
**Unit 6 Lessons**
**6.1 Linear Equation Review**
- Cartesian Coordinate System
- Graphing by finding intercepts

**6.2 Slope Review**
- Slope
- y=mx+b
- Graphing by slope, y-intercept

**6.3 Rearranging Equations**
- Vocabulary (general form, slope form, etc.)
- Rearranging equations
- Word Problems: Defining Variables

**6.4 Solving Systems**
- Solving by graphing or algebraically
- Is (x,y) a solution?

**6.5 Using the Graphing Calculator**
- Input equations
- Use table menu to show work
- Find intersections

MANDATORY QUIZ ON LESSONS 1-5

**6.6 Graphing Inequalities**
- Solid or Dotted
- Graphing a System of Inequalities
- Regular or Reverse Shading
- Finding the Intersection

**6.7 Set Notation**
- Domain and Range
- Different types of numbers
- Graphing Integers and Reals

**6.8 Optimization Part 1**
- Labeling the corners of the solution

**6.9 Optimization Part 2**
- Writing an objective function

**6.10 Optimization Part 3**
- Testing each corner of the solution space

MANDATORY QUIZ ON LESSONS 6-10
**Review Worksheet**
**Review Practice Test Questions**
**Unit Test**

Total = approximately 14 classes