**Activity 1.1.2B Peacekeeping Problem: Area Constraint**

In the previous activity we defined the following variables for the peacekeeping problem.

* Let *x* represent the number of Hummer units to be transported.
* Let *y* represent the number of Apache helicopters to be transported.

We also wrote the area-constraint inequality $1200x+1800y\leq 25200$ based on the information provided in the problem statement: Each Hummer unit uses an area of 1,200 square feet and each helicopter uses an area of 1,800 square feet. The ship has a total of 25,200 square feet of area to use for transport.

1. Let’s explore how various combinations of number of Hummer units and number of Apache helicopters satisfy or fail to satisfy the area-constraint inequality. Fill in the table below. Select two points of your choice for the last two rows of the table.

|  |  |  |  |
| --- | --- | --- | --- |
| *x* | *y* | $$1200x+1800y\leq 25200$$ | Satisfy the Constraint? |
| 4 | 8 | 1200 (4) + 1800(8) ≤ 25200 | Yes |
| 10 | 20 | 1200 (10) + 1800(20) ≤ 25200 | No |
| 1 | 2 |  |  |
| 6 | 12 |  |  |
| 3 | 15 |  |  |
| 10 | 8 |  |  |
|  |  |  |  |
|  |  |  |  |

1. Plot the points in your table on the coordinate plane below. Color green the ordered pairs that satisfy the area-constraint inequality, and color red the ordered pairs that do not satisfy the area-constraint inequality. *Note*: Only the first quadrant of the coordinate plane is provided since we only want to focus on ordered pairs with non-negative values.
2. Graph the equation $1200x+1800y=25200$ on the coordinate plane below. This line is called a *boundary line*.
3. Make a conjecture about the location – with respect to the boundary line – of points that satisfy the area-constraint inequality.

**Graph of Area-Constraint Inequality**



**Group Activity**

Your teacher will provide each group a transparency. Create a graph of the area-constraint inequality $1200x+1800y\leq 25200$ on the transparency. Plot the boundary line and all the ordered pairs that your group explored in Question 1. Color green the ordered pairs that satisfy the weight-constraint inequality, and color red the ordered pairs that do not satisfy the weight-constraint inequality.