

Algebra III - Semester 1 Review

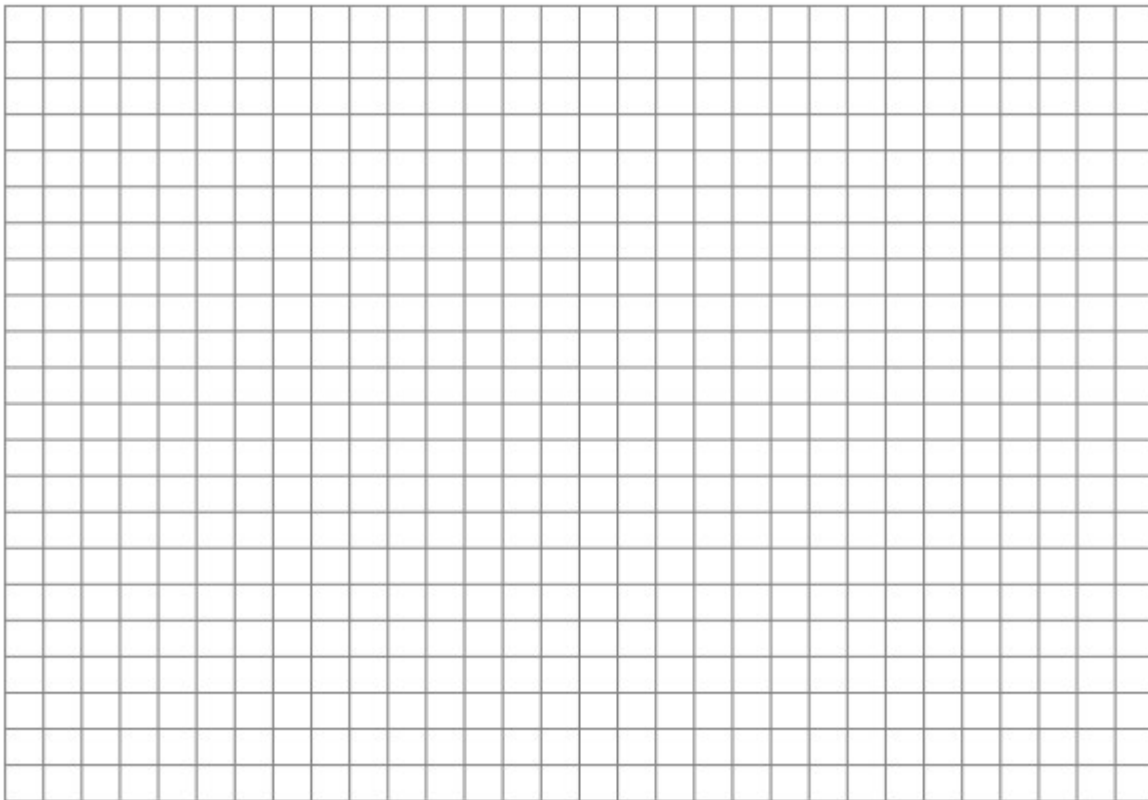
Name: _____

Date: _____ Hour: _____

Directions: Solve each linear programming problem. Assume $x \geq 0$ and $y \geq 0$.

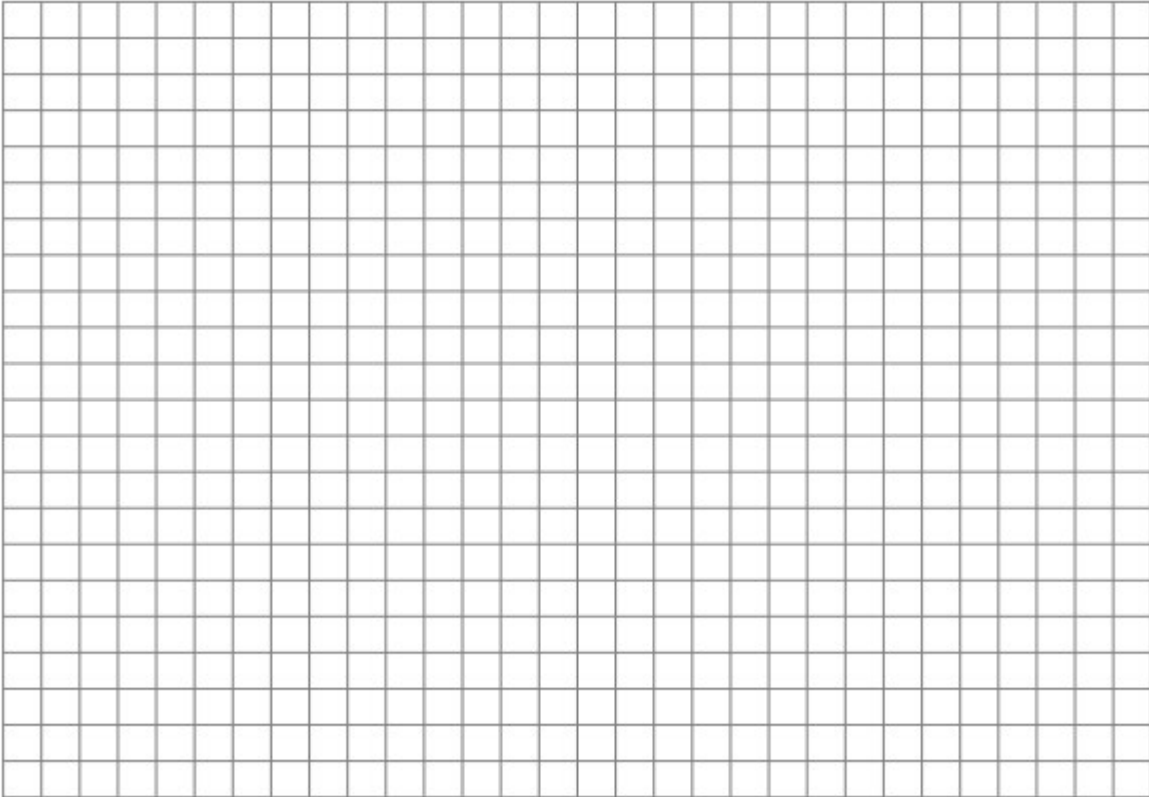
1. Maximize $P = 2x + 2y$ with the constraints

$$\begin{cases} x + 2y \leq 14 \\ 5x + 2y \leq 30 \end{cases}$$

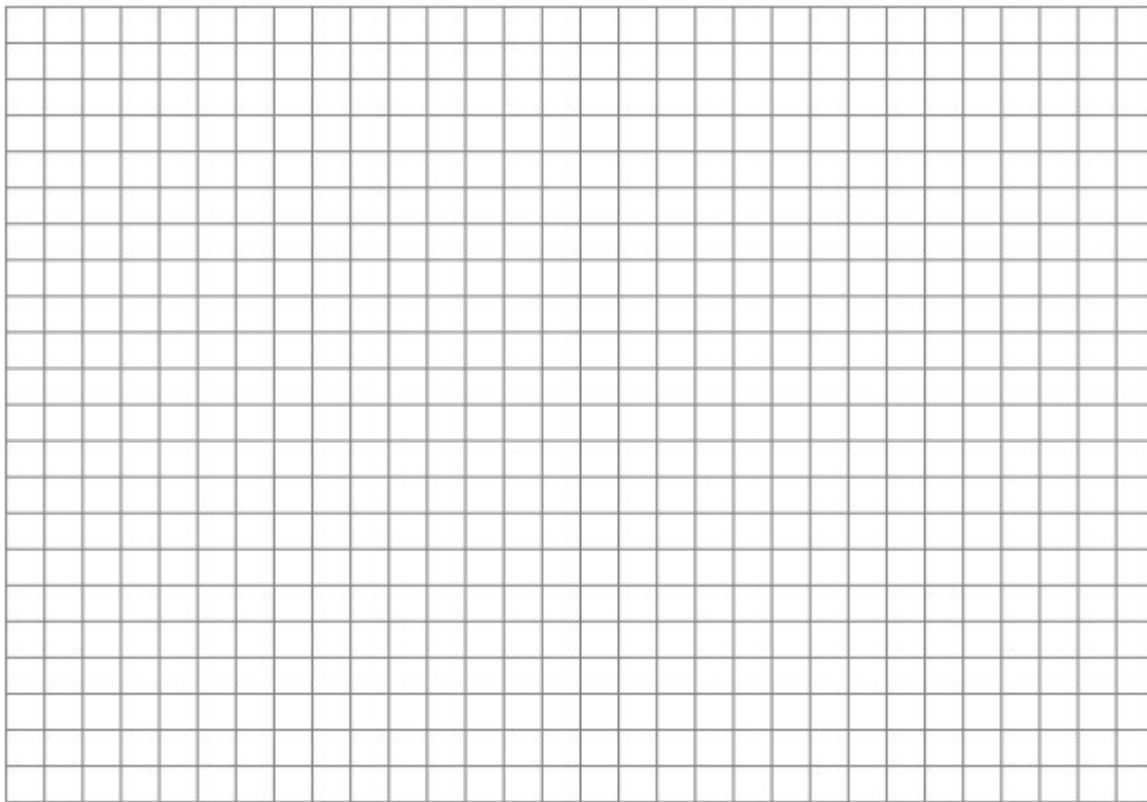


2. Minimize $P = 6x + 3y$ with the constraints

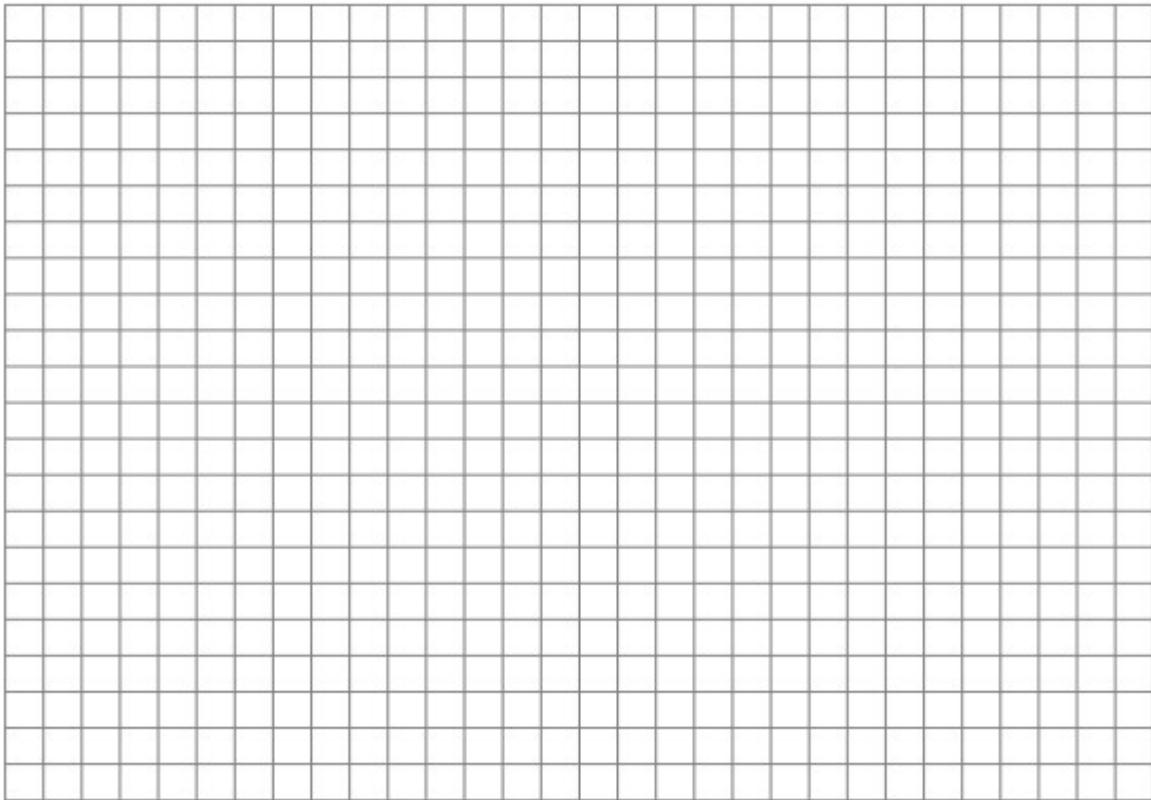
$$\begin{cases} 5x + 2y \geq 20 \\ x + y \geq 7 \\ x + 2y \geq 10 \\ x \leq 15, y \leq 15 \end{cases}$$



3. Lisa has an online jewelry shop where she sells earrings and necklaces. She sells earrings for \$30 and necklaces for \$40. It takes 30 minutes to make a pair of earrings and 1 hour to make a necklace, and, since Lisa is a math tutor, she only has 10 hours a week to make jewelry. In addition, she only has enough materials to make 15 total jewelry items per week. She makes a profit of \$15 on each pair of earrings and \$20 on each necklace. **How many pairs of earrings and necklaces should Lisa make each week in order to maximize her profit, assuming she sells all her jewelry?**



4. A farmer has 10 acres to plant in wheat and rye. He has to plant at least 7 acres. However, he has only \$1200 to spend and each acre of wheat costs \$200 to plant and each acre of rye costs \$100 to plant. Moreover, the farmer has to get the planting done in 12 hours and it takes an hour to plant an acre of wheat and 2 hours to plant an acre of rye. If the profit is \$500 per acre of wheat and \$300 per acre of rye how many acres of each should be planted to maximize profits?



5. a. Write a matrix H to represent the data in the table below.
b. Find element h_{23} . What does this element represent?

Technology in Public Schools (millions)

Type of School	Videodisc Players	Modems	Networks	CD-ROMs
Elementary	25.9	35.1	26.4	37.9
Junior High	9.2	11.0	9.0	11.0
Senior High	10.7	14.5	12.9	14.0

SOURCE: Quality Education Data

6. a. Using the data table above, create another matrix where the rows represent types of technology and columns represent type of school.

- b. What are the dimensions of the new matrix?
c. Find the element h_{23} . What does this element represent?