Problem 1: She's Got the "Write" Stuff

Jamie has just finished writing a research paper. She has hired a typist who will type the paper on the computer for her.

- The typist charges $3.50 per page if no charts or graphs are used and $8.00 per page if a chart or graph appears on the page.
- Jamie knows there will be at most 40 pages having no charts or graphs.
- There will be no more than 16 pages with charts or graphs.
- The paper will be 50 pages or less.

What is the greatest possible cost to have the paper typed? How many pages with graphs and how many without graphs would cause this greatest cost?

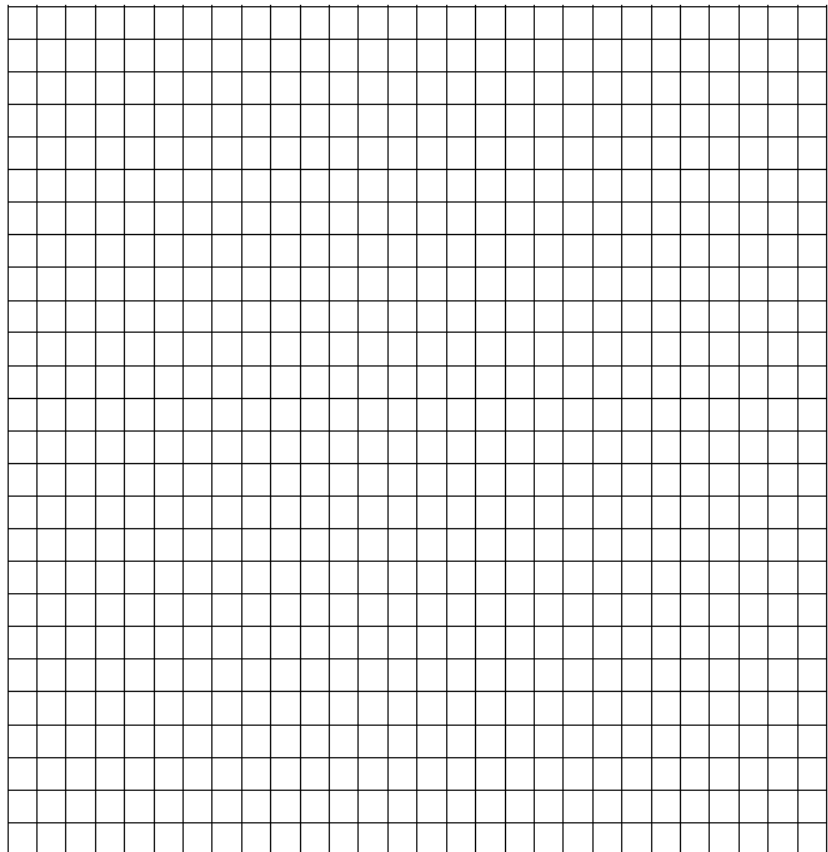Variables (*in words*): *x* =   *y* =

Constraints:

Objective Function:

Vertices: of Feasible Region:

Ordered Pair of Optimal Solution:

Minimum Cost:

Problem 2: Batter Up

BingBATaBoom.Inc manufactures two different quality wood baseball bats, the *Battlefield* and the *Dingbat*.

- There are only 80 hours available for trimming and turning. The Battlefield takes 8 hours to trim and turn and the Dingbat takes 5 hours to trim and turn.
- There are only 50 hours available for finishing. The Battlefield takes 2 hours to finish, whereas the Dingbat takes 5 hours to finish.
- The Dingbat makes a profit of $17.
- The Battlefield makes a profit of $29.

How many of each type of bat should be produced to have the maximum profit? What is this maximum profit?
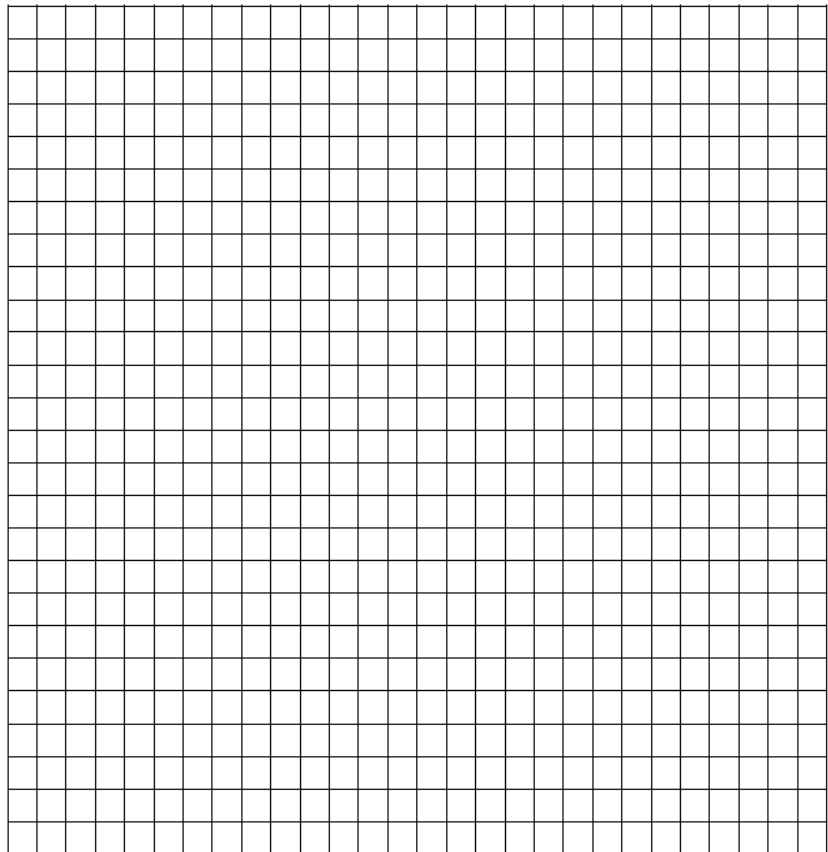
Variables (*in words*): $x =$ $y =$

Constraints:

Objective Function:

Vertices: of Feasible Region:

Ordered Pair of Optimal Solution:

Minimum Cost:

Problem 3: Get the CARrect Answer

The Gala Events Center has a rectangular parking lot and they charge a fee for parking in the lot.

- A car requires 6 square meters of space and a bus requires 30 square meters of space. There are 600 square meters of available space in the lot.
- The attendant can handle no more than 60 vehicles.
- The parking fees are $2.50 for cars and $7.50 for buses.

How many of each type of vehicle should the attendant accept to maximize income? What is the maximum income?
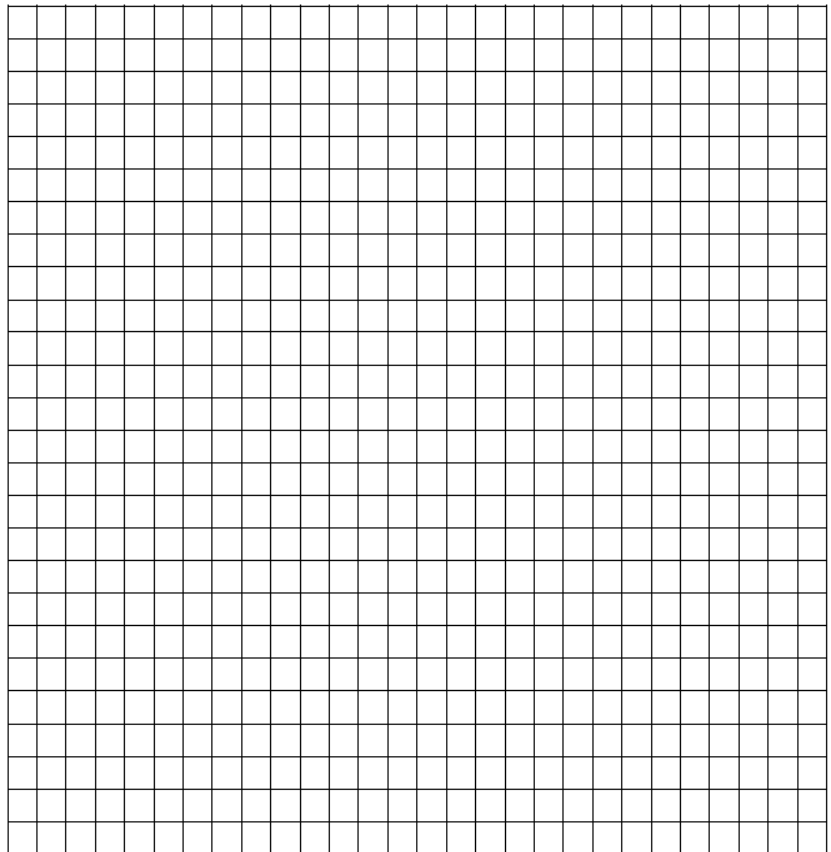
Variables (*in words*): *x* =   ***y* =**

Constraints:

Objective Function:

Vertices: of Feasible Region:

Ordered Pair of Optimal Solution:

Minimum Cost:

Problem 4: Close to "Nuttin"

At *"Nuttin' Like a Lighting Bolt Manufacturing"* there are two machines used to produce nuts and bolts.

- The cost to run Machine 1 for one hour is $2.00.
- The cost to run Machine 2 for an hour is $2.40.
- During an hour, Machine 1 produces 240 bolts and Machine 2 produces 160 bolts. The company must produce at least 2080 bolts to meet demand.
- During an hour, Machine 2 produces 100 nuts and Machine 2 produces 160 nuts. The company must produce a minimum of 1520 nuts to meet demand.
- The machines can have a combined running time of no more than 30 hours,

How long should each machine run to produce an enough to fill their current order at the minimum operating cost?

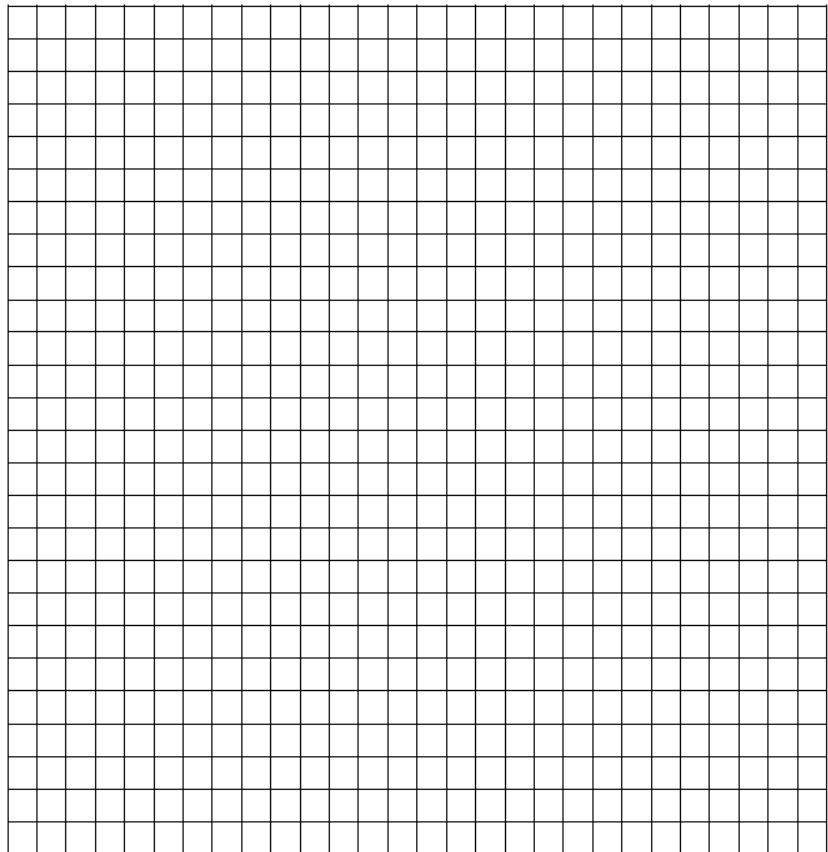Variables (*in words*): $x =$ $y =$

Constraints:

Objective Function:

Vertices: of Feasible Region:

Ordered Pair of Optimal Solution:

Minimum Cost:

Problem 5: Situation for a "Fungi"

A biologist is developing two new strains of bacteria.

- Each sample of Type I bacteria produces 4 new viable bacteria and each sample of Type II produces 3 new viable bacteria. Altogether, at least 240 new viable bacteria must be produced.
- At least 30, but no more than 60, of the original samples must be Type I.
- No more than 70 of the samples can be type II.
- A sample of Type I cost $7 and a sample of Type II costs $3.

How many samples of each should be used to minimize the cost? What is the minimum cost?

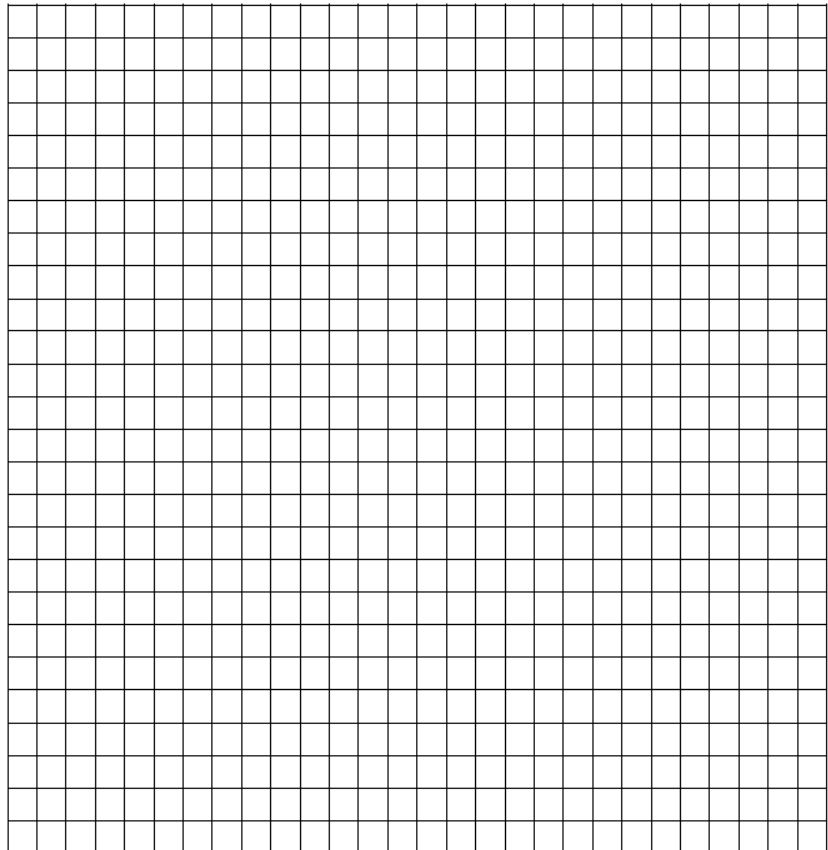Variables (*in words*): $x =$ $y =$

Constraints:

Objective Function:

Vertices: of Feasible Region:

Ordered Pair of Optimal Solution:

Minimum Cost:

Problem 6 (Released Test Question)

A company produces packs of pencils and pens.

- The company produces at least 100 packs of pens each day, but no more than 240.
- The company produces at least 70 packs of pencils each day, but no more than 170.
- A total of less than 300 packs of pens and pencils are produced each day.
- Each pack of pens makes a profit of $1.25.
- Each pack of pencils makes a profit of $0.75.

What is the maximum profit the company can make each day?

A $338.75   B $344.25   C $352.50   D $427.50

Variables (*in words*): *x* =   ***y* =**

Constraints:

Objective Function:

Vertices: of Feasible Region:

Ordered Pair of Optimal Solution:

Minimum Cost:

Problem 7 (Released Test Question

Paul sells chocolate chip cookies and peanut butter cookies.

- Baking a batch of chocolate chip cookies takes 1.75 cups of flour and 2 eggs.
- Baking a batch of peanut butter cookies takes 1.25 cups of flour and 1 egg.
- Paul has 10 cups of flour and 12 eggs.
- He makes $4 profit per batch of chocolate chip cookies.
- He makes $2 profit per batch of peanut butter cookies.

How many batches of peanut butter cookies should Paul make to maximize his profit?

A   1   B   2   C   5   D   8

Variables (*in words*): **x =**   **y =**

Constraints:

Objective Function:

Vertices: of Feasible Region:

Ordered Pair of Optimal Solution:

Minimum Cost: