- **A calculator company produces a scientific calculator and a graphing calculator. Long-term projections indicate an expected demand of at least 100 scientific and 80 graphing calculators each day. Because of limitations on production capacity, no more than 200 scientific and 170graphing calculators can be made daily. To satisfy a shipping contract, a total of at least 200 calculators much be shipped each day.**
- **If each scientific calculator sold results in a \$2 loss, but each graphing calculator produces a \$5 profit, how many of each type should be made daily to maximize net profits?**

  The question asks for the optimal number of calculators, so my variables will stand for that:
  x: number of scientific calculators produced
  y: number of graphing calculators produced

  Since they can't produce negative numbers of calculators, I have the two constraints, $x \geq 0$ and $y \geq 0$. But in this case, I can ignore these constraints, because I already have that $x \geq 100$ and $y \geq 80$. The exercise also gives maximums: $x \leq 200$ and $y \leq 170$. The minimum shipping requirement gives me $x + y \geq 200$; in other words, $y \geq -x + 200$. The profit relation will be my optimization equation: $P = -2x + 5y$. So the entire system is:

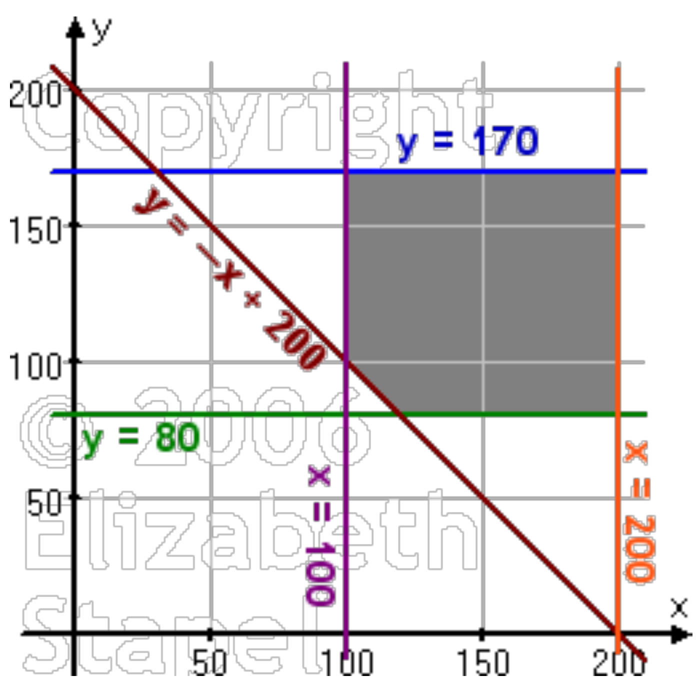
- $P = -2x + 5y$, subject to:

  $100 \leq x \leq 200$

  $80 \leq y \leq 170$

  $y \geq -x + 200$

  The feasibility region graphs as:

- 

When you test the corner points at (100, 170), (200, 170), (200, 80), (120, 80), and (100, 100), you should obtain the maximum value of $P = 650$ at $(x, y) = (100, 170)$. That is, the solution is "100 scientific calculators and 170 graphing calculators".