

2024 Fall Math 140 Week-In-Review

Week 5: Sections 3.1 - 3.3

Sections 3.1 - 3.3: The Method of Corners

Some Key Words and Terms: Variables, Objective Function, Constraints, Graphing a Linear Inequality, True/False Shading, Solution Set, Bounded/Unbounded, Corner Points, Solution to a Linear Programming Problem, Leftovers

Variables:

Objective Function:

Constraints:

Graphing a Linear Inequality:

True/False Shading:

Solution Set:

Bounded/Unbounded:

Corner Points:

Solution to a Linear Programming Problem:

Leftovers:

Examples:

1. Setup the following linear programming problem. Do not solve.

A company makes and sells two types of mini-fridges designed especially for dorm rooms: Space-Savers and Deep-Chills. In order to make the mini-fridges, the company requires coolant, metal, and plastic. Each Space-Saver requires 2 units of coolant, 3 units of metal, and 3 units of plastic. Each Deep-Chill requires 4 units of coolant, 5 units of metal, and 4 units of plastic. After receiving shipments of materials this week, the company has 270 units of coolant, 355 units of metal, and 314 units of plastic. If the company sells each Space-Saver for \$50 and each Deep-Chill for \$85, how many of each mini-fridge should the company make and sell in order to maximize their revenue for this week?

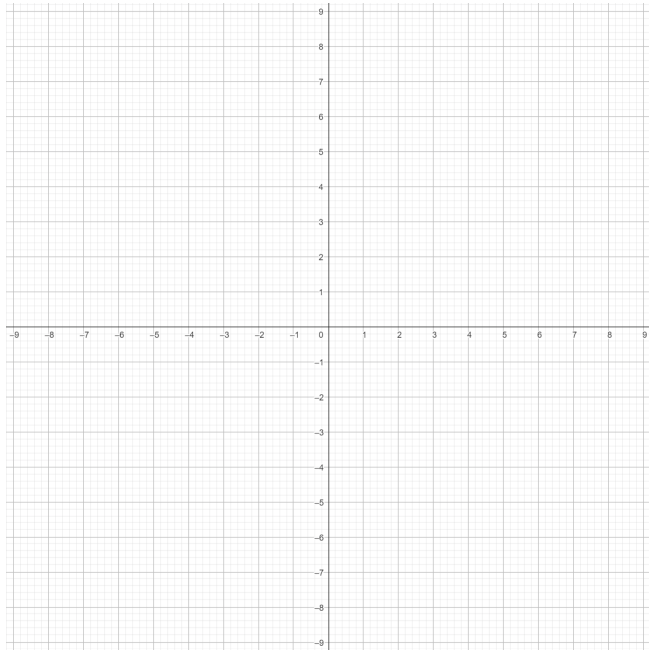
Variables:

Objective:

Constraints:

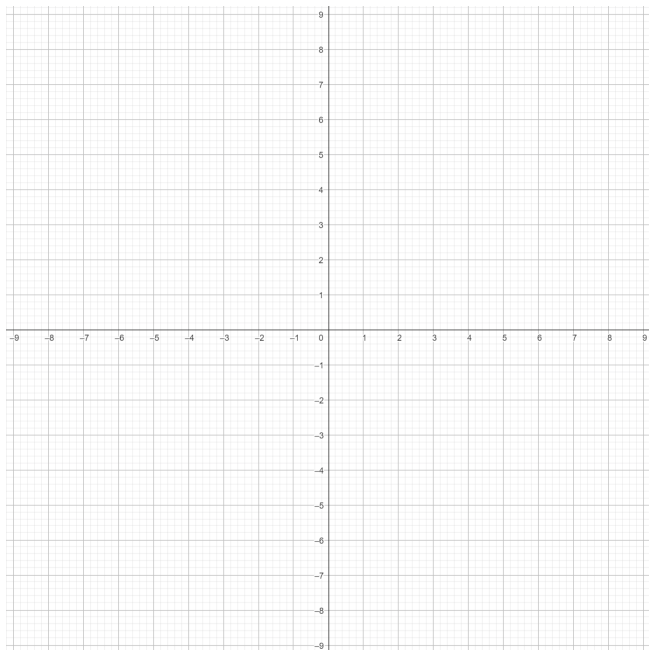
2. Graph the following inequality and use True Shading to determine the solution set.

$$6x + 2y > -12$$



3. Graph the following inequality and use False Shading to determine the solution set.

$$5x - 3y \leq 0$$



4. Use the Method of Corners to determine the solution, if it exists, for the following linear programming problem.

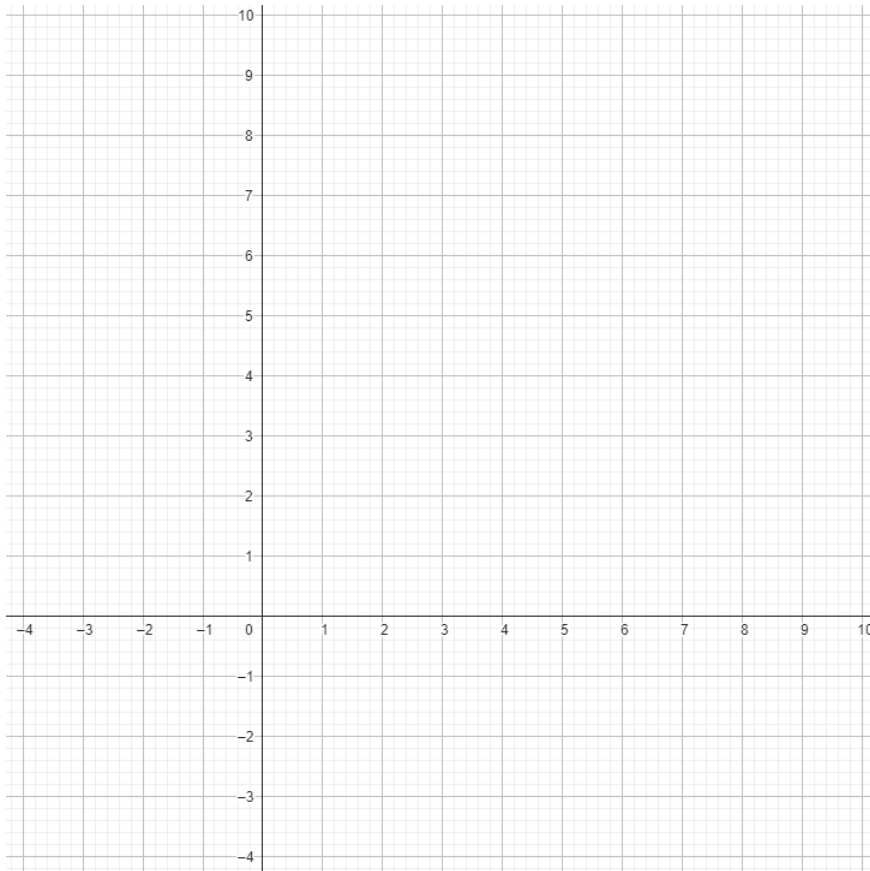
Minimize: $C = 5x + 6y$

Subject to: $2x + 2y \leq 14$

$-3x + 2y \geq 9$

$3x + 7y \geq 21$

$x \geq 0, y \geq 0$



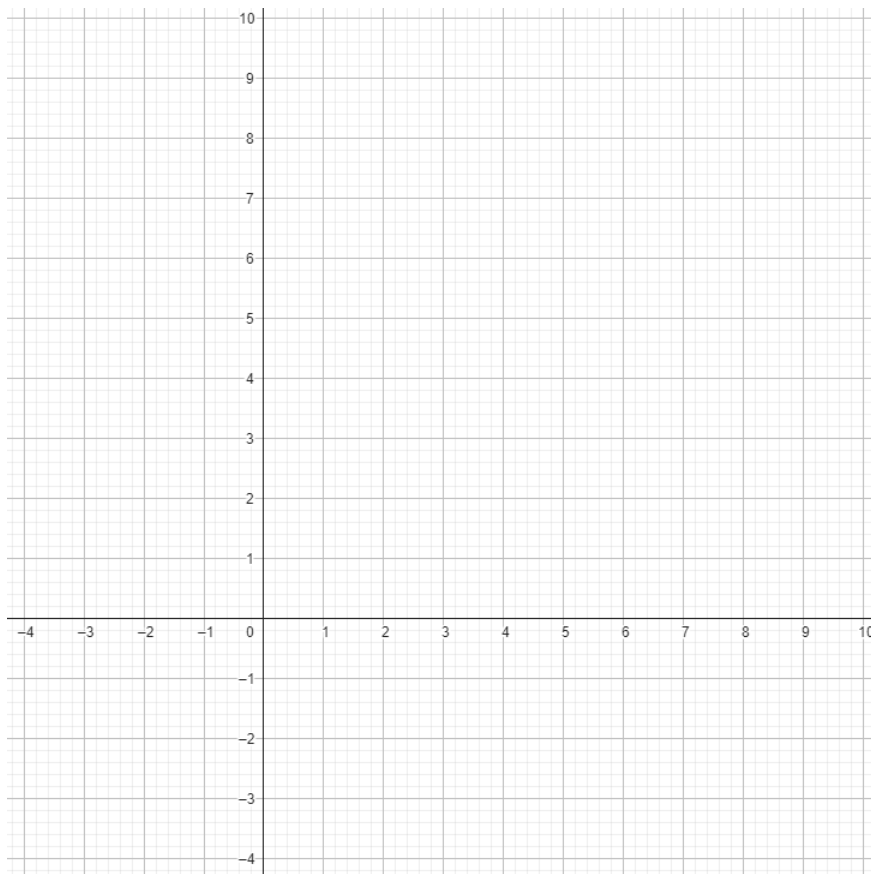
5. Use the Method of Corners to determine the solution, if it exists, for the following linear programming problem.

Maximize: $Z = \frac{2}{3}x + \frac{5}{4}y$

Subject to: $4x + 5y \geq 20$

$x - 2y \leq 5$

$0 \leq x \leq 7$



6. For the situation given in Example 1, the corner points of the feasible region are $(0, 0)$, $(0, 68)$, $(40, 48)$, $(60, 36)$, and $(108, 0)$. Determine the solution and any leftovers. Be sure to express your answers in the context of the situation.