"I can solve a system of equations (including non-linear) involving two or three variables."

$$\begin{cases} 3a + 2b = 4 \\ 5a - 2b = 8 \end{cases}$$ (3/2, −1/4)

$$\begin{cases} 6x - 2y = 3 \\ y = 3x + 1 \end{cases}$$ no solution

$$\begin{cases} 2c - 3d = 3 \\ -4c + 6d = -6 \end{cases}$$ infinitely many solutions

$$\begin{cases} y = x^2 + 4x - 7 \\ 2x - y = -1 \end{cases}$$ (−4, −7) and (2, 5)

$$\begin{cases} y = t + 4 \\ y = 3 - t^2 \end{cases}$$ no solution

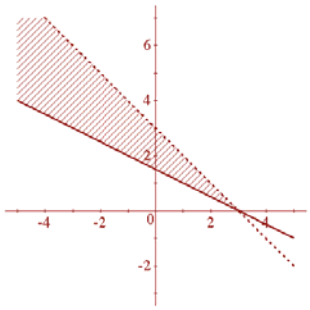
$$\begin{cases} x + 3z = 9 + 2y \\ x = 3y + 4 \\ 2x - 5y + 5z = 17 \end{cases}$$ (1, −1, 2)

$$\begin{cases} m - 3n + p = 1 \\ 2m - n - 2p = 2 \\ m + 2n - 3p = -1 \end{cases}$$ no solution

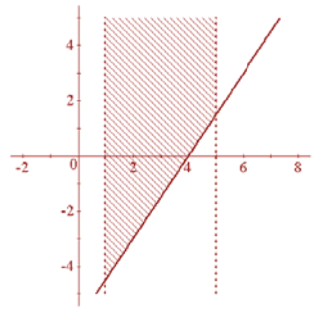
$$\begin{cases} a + b - 3c = -1 \\ b - c = 0 \\ -a + 2b = 1 \end{cases}$$ infinitely many solutions

"I can graph the solution to a system of inequalities involving two variables."

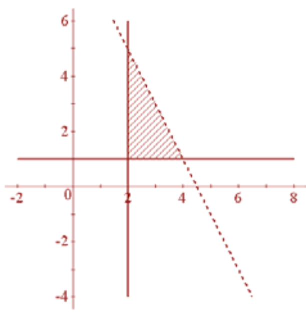
$$\begin{cases} x + y < 3 \\ x + 2y \geq 3 \end{cases}$$



$$\begin{cases} 1 < x < 5 \\ 3x - 2y \leq 12 \end{cases}$$



$$\begin{cases} x \geq 2, \quad y \geq 1 \\ y < 9 - 2x \end{cases}$$



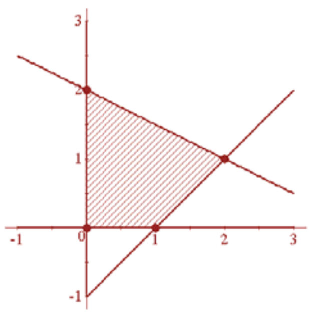
"I can define/graph the feasible region of a linear programming problem given its constraints."
"I can use the vertices of a feasible region to optimize the objective function of a linear programming problem."

Find the maximum and minimum objective function values given each set of constraints.

objective function:
$f(x, y) = 3x + 2y$

constraints:

$$\begin{cases} x \geq 0, \quad y \geq 0 \\ x + 2y \leq 4 \\ x - y \leq 1 \end{cases}$$

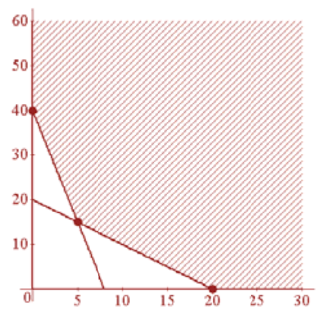


min: $f(0, 0) = 0$
max: $f(2, 1) = 8$

objective function:
$g(x, y) = 2x + 5y$

constraints:

$$\begin{cases} x \geq 0, \quad y \geq 0 \\ y \geq 40 - 5x \\ y \geq 20 - x \end{cases}$$



min: $g(20, 0) = 40$
max: none

"I can write the objective function for an application involving linear programming."
"I can write the constraints for an application involving linear programming."

A manufacturer produces two models of snowboards. The amounts of time in hours required and available for assembling, painting, and packaging the two models are given in the table below. The profit for each model is also given.

	Model A	Model B	Available
Time in Hours for Assembling	2.5	3	4000
Time in Hours for Painting	2	1	2500
Time in Hours for Packaging	0.75	1.25	1500
Profit per Unit Produced	$50	$52	

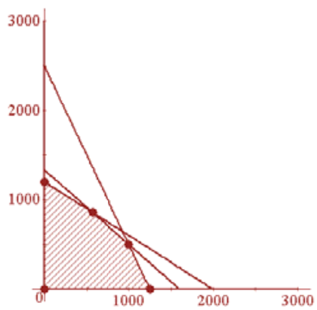
a) Write an objective function for the profit. Define the variables used.

$P(A, B) = 50A + 52B$, where A is the number of Model A snowboards and B is the number of Model B snowboards produced.

b) Write the constraints for the variables used in the objective function.

$$\begin{cases} 2.5A + 3B \leq 4000 \\ 2A + B \leq 2500 \\ 0.75A + 1.25B \leq 1500 \end{cases}$$

c) How many units of each model should be produced to maximize profit? What is the maximum profit?



1000 Model A snowboards and 500 Model B snowboards maximizes the profit at $76,000.