Last name _____

First name _____

LARSON—OPER 731—CLASSROOM WORKSHEET 02
Linear Programming—Integer Programming

1. Consider the *primal* LP:

   Maximize $3x_1 + 2x_2$, subject to the constraints:

$$x_1 + 2x_2 \leq 4$$

$$x_1 - x_2 \leq 1$$

$$x_1 \geq 0$$

$$x_2 \geq 0$$

$$x_1, x_2 \in \mathbb{R}$$

   The maximim is 8 and occurs at the corner point (2,1).

2. We found the *dual* LP is:

   Minimize $4y_1 + y_2$, subject to the constraints:

$$y_1 + y_2 \geq 3$$

$$2y_1 - y_2 \geq 2$$

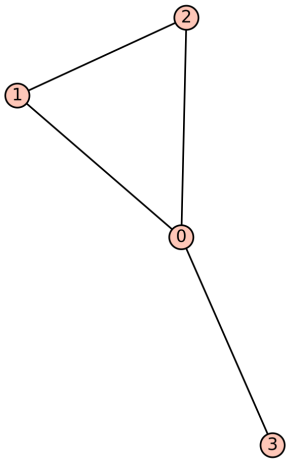
$$y_1 \geq 0$$

$$y_2 \geq 0$$

$$y_1, y_2 \in \mathbb{R}$$

   Solve.

3. What are the complementary slackness conditions?



4. What is a *vertex packing*?

5. Find a maximum vertex packing in the *paw* graph.

6. Write an Integer Program (IP) whose optimum is the size (cardinality) of a maximum vertex packing.

7. Find an optimum (guess and test).

8. Solve the corresponding LP.