

Line 'EM Up!

NAME _____

Dear Friend,

Bart has done it again! He has signed us up for the Line 'Em Up Tournament. Line 'Em Up is a game similar to Bingo. Each player is given a game board and a handful of very small chips. The caller calls out a set of two numbers, and you are suppose to place your chip in the correct location on the game board. The first person to get six chips in a straight line wins.

The rules sound easy enough, but how can I determine where to place my bingo chip on the game board? They only give us a set of two numbers. What do these two numbers mean?

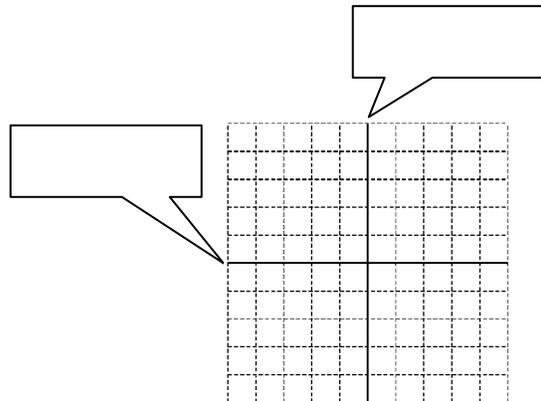
I'm in desperate need of your help! The tournament is next week.

*Your friend,
Lisa*

One of the *Line 'Em Up* game boards is shown to the right.

The dark horizontal line is called the *x-axis*.
The dark vertical line is called the *y-axis*.

Label the **x-axis** and the **y-axis** on the game board in the spaces provided.



The axes separate the board into four sections known as *quadrants*. Quadrant I is the upper right section, Quadrant II is the upper left section, Quadrant III is the lower left section, and Quadrant IV is the lower right section.

Place **I**, **II**, **III**, and **IV** in the appropriate sections of the game board to label the quadrants.

Each position (or point) on the game board can be identified by two numbers, an *x*-coordinate and a *y*-coordinate. These two values are placed inside parentheses and separated by a common; when written in this way, the coordinates are referred to as an *ordered pair*. The *x*-coordinate is written first, then the *y*-coordinate.

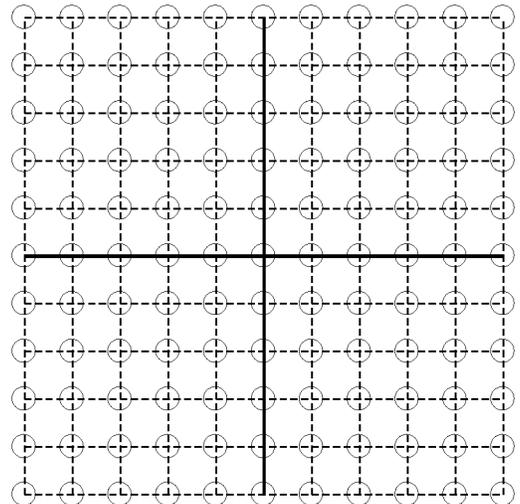
For Questions 1-9, each member of your team will need a graphing calculator loaded with the POINTS program. If you do not have a calculator with this program, see your teacher.

Using the Program

- Step 1:** Press **PRGM**. Use the up and down cursor keys to highlight the position next to the program POINTS. Press **ENTER**. Then, press **ENTER** again.
- Step 2:** X COORDINATE appears on the screen. Enter any integer from -5 to 5. Press **ENTER**.
- Step 3:** Y COORDINATE appears on the screen. Enter any integer from -5 to 5. Press **ENTER**.
- Step 4:** The coordinates of your point appear on the screen. Press **ENTER**. The location of the point is shown on a grid. Press **ENTER** again.
- Step 5:** You are asked whether or not you want to plot more points. Enter **1** for yes, **0** for no. (If you enter “0”, the program ends.)
- Step 6:** If you entered “1” in Step 5, you are then asked if you want to clear the grid of all previous points. Enter **1** for yes, **0** for no. The program will start again.

- 1.** Follow Steps 2 through 6 above to find the coordinates of two points that lie in Quadrant I. Indicate the point’s locations on the grid to the right by darkening the corresponding circles. Label each point with its coordinates. Write the coordinates of these two points in the appropriate column in the table below.

Then, locate two points in Quadrant II, two points in Quadrant III, two points in Quadrant IV, two points on the x -axis, and two points on the y -axis, and darken the corresponding circles.



| Two Points in Quadrant I | Two Points in Quadrant II | Two Points in Quadrant III | Two Points in Quadrant IV | Two Points on the x -axis | Two Points on the y -axis |
|--------------------------|---------------------------|----------------------------|---------------------------|-----------------------------|-----------------------------|
| | | | | | |
| | | | | | |

2. Compare your answers for Question 1 with the answers of your teammates. Then, discuss the answers to the questions below.

a. What do you notice about the coordinates of all the points in Quadrant I?

b. What do you notice about the coordinates of all the points in Quadrant II?

c. What do you notice about the coordinates of all the points in Quadrant III?

d. What do you notice about the coordinates of all the points in Quadrant IV?

e. What do you notice about the coordinates of all the points on the x -axis?

f. What do you notice about the coordinates of all the points on the y -axis?

3. Without using your calculator determine whether the following points are located in Quadrant I, in Quadrant II, in Quadrant III, in Quadrant IV, on the x -axis, or on the y -axis.

a. $(-3, 2)$ _____ b. $(2, 2)$ _____ c. $(0, -2)$ _____

d. $(-5, 0)$ _____ e. $(-3, -1)$ _____ f. $(4, -2)$ _____

g. $(-5, -2)$ _____ h. $(1, -3)$ _____ i. $(3, 0)$ _____

4. What are the coordinates of the point where the x -axis and y -axis intersect (cross)? (_____ , _____)
Check your answer using the program.

This point is called the *origin*. The word *origin* means “the beginning.” With your teammates, discuss why this point might be called the origin. Write your opinion in the space provided.

5. What are the differences between...

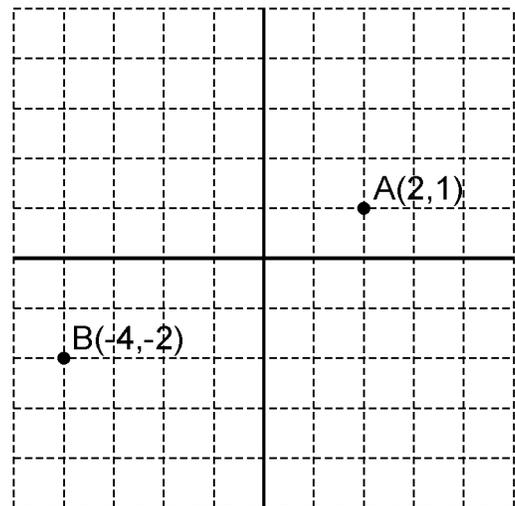
- a. ...the location of the point $(0, 4)$ and the location of the point $(4, 0)$?

- b. ...the location of the points $(3, 1)$ and $(1, 3)$? Be specific in your explanation.

6. On the coordinate plane to the right, point A has coordinates $(2, 1)$.

- a. Because $(0, 0)$ is the *origin* (the beginning point), explain the connection between the coordinates of point A and the movements required to arrive at point A.

- b. Point B is also shown on the coordinate plane. It has coordinates $(-4, -2)$. Explain the connection between the coordinates of point B and the movements required to arrive at point B.



7. Based on your observations, complete the conjectures below.

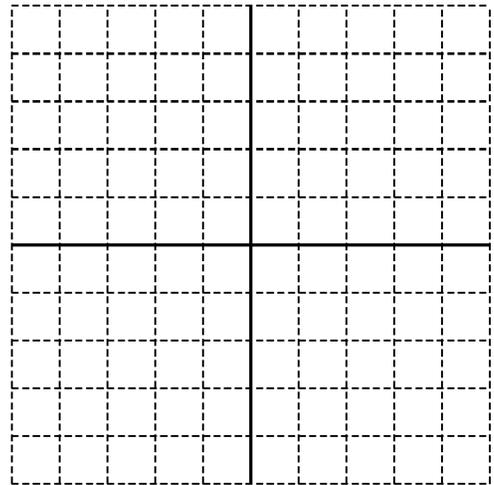
To graph a point with coordinates (x, y) in a coordinate plane, you start at _____.

The x -coordinate tells you _____

The y -coordinate tells you _____

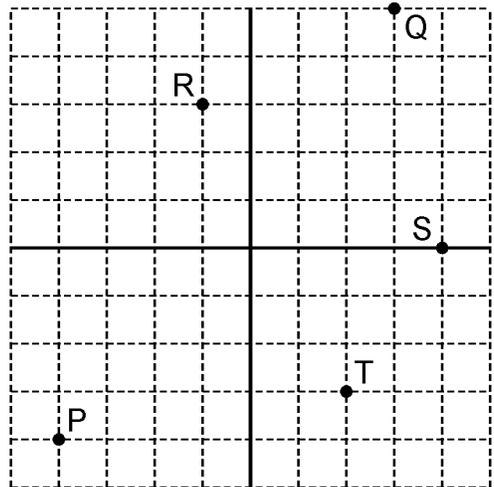
8. Using your conjectures from Question 7 and the coordinate plane to the right, graph each of the following points. Label each point with the letter located in front of its ordered pair. Check your answer using the POINTS program. (Be sure to keep all of the points on the graph; that is, enter “0” when asked, “Plot More Points?” Only enter “1” after all points have been plotted.)

- A(-1, 3) B(-4, -1)
- C(2, 5) D(4, 0)
- E(2, -2) F(0, -3)



9. Write the coordinate of each point. Check your answer using the POINTS program.

- a. P(_____ , _____)
- b. Q(_____ , _____)
- c. R(_____ , _____)
- d. S(_____ , _____)
- e. T(_____ , _____)



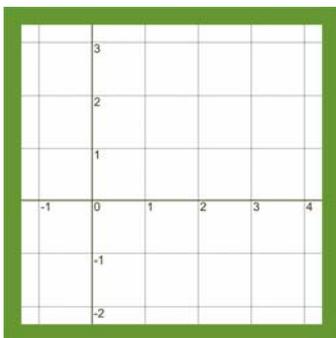
10. Below are three Line 'Em Up game boards. The first belongs to Lisa, the second to Bart, and the third to Milhous. The caller called out the following pairs of numbers; when the last point was called (p), someone yelled, "LINE UP!"

- a. (1, 3)
- b. (-2, 2)
- c. (0, -3)
- d. (3, 1)
- e. (-3, -3)
- f. (-5, 2)
- g. (1, 0)
- h. (-1, -2)
- i. (-4, 1)
- j. (2, 0)
- k. (1, 4)
- l. (-3, 0)
- m. (2, 3)
- n. (1, 2)
- o. (3, -1)
- p. (-2, -1)

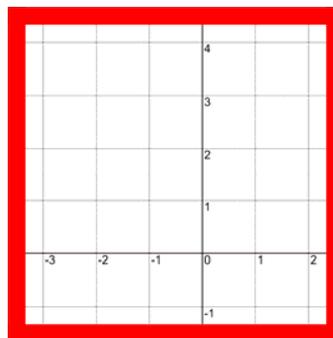
Plot the points (where possible) on each game board to determine the winner. Remember, the object of the game is to be the first person to line up six chips (points) in a straight line. Draw a straight line through the winning points.

Who won the game? _____

Lisa



Bart



Milhous

