It's best to have a different student volunteer operate the computer for each rule.

1. Open **Points Line Up Present.gsp.**
2. Drag point *P* so that students can see how the coordinates change. Explain that students will take turns dragging the points to make the coordinates satisfy certain rules.

Encourage students to help each other in figuring out how to move the points and formulate rules.

3. Have the first student volunteer press button *a* to show the first rule, read the rule out loud, and then drag point *P* around until it satisfies the rule.
4. Have the student drag each of the remaining points around until all the points satisfy the rule.

Q1 Ask the class, "How would you describe the pattern these points make?"

Q2 Ask students to record on their paper both the rule and a diagram showing how the points are arranged.

5. Have a second student volunteer come to the computer, press button *b*, and drag the points for the second rule. Have students record on their paper each rule and a diagram of the resulting pattern. Continue for as many of the remaining rules as seems appropriate.
6. Go to page 2 of the sketch, and explain that on this page the points will arrange themselves and that the job of the class is to make up a rule that fits.
7. After students have written rules for all the arrangements on page 2, press the *a* button again to return the points to their initial arrangement.
8. Ask, "What rule did you write down for this arrangement?" After students have responded, ask "Does anyone know how to write this rule as an equation?" Make sure students understand why the answer is $y = x$.
9. Press each of the remaining buttons in turn, and have students give the equation for each pattern.
10. Tell students to go back to their answers for page 1 and write an equation for each of those arrangements.

Finish with a class discussion encouraging students to describe their insights. The discussion might consider questions such as these:

"How many points are there that would satisfy one of these rules?"

"If you could plot all the points that satisfy a rule, what would the result look like?"

"Why is it that the points line up so neatly?"

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