TOPIC 1.1: POINTS AND LINES

PERFORMANCE OBJECTIVES

Students will be able to:

- solve systems of equations algebraically
- solve systems of equations graphically
- use the midpoint formula to solve problems
- use the distance formula to solve problems

MATERIALS

Overhead projector, prepared transparencies

STRATEGIES

- Start the lesson with the following Do Now:

  Compare and contrast the following two systems of equations:

  (a) Solve graphically

  $6x + 2y = 14$ and $6x + 4y = 8$

  (b) Solve graphically

  $6x + 4y = 10$ and $y = -\frac{3}{2}x + 1$

- These problems provide a good opportunity for having students to get into groups in case some have forgotten these concepts. Each group should write their results on an overhead transparency and explain their results to the class. Students should identify the intersection point produced by the two equations, if any, and the algebraic significance of this point. Challenge the class to identify the reason why the solution to the system checks in both equations. Have the students identify the coordinates of three other points that are located on each of the lines and review the following basic concept: "If a point is on the line, it is a solution to the equation, and if an ordered pair is a solution to the equation, it lies on the line. Introduce the terms "consistent system of equations" as in example (a) with a solution of $(3\frac{1}{3}, -3)$ and "inconsistent system of equations" as in example (b).

- Introduce the idea of dependent systems of equations by posing the next example: Solve the following system of equations graphically: $2x + 3y = 4$, and $4x + 6y = 8$. Elicit that these two lines are exactly the same line and that every point on this line is a solution to the system.

- Summarize the methods of solving a system of equations both algebraically and graphically. Have a prepared solution of the first system, done algebraically by either the substitution method or the addition - subtraction method, or both, on an overhead transparency indicating the step-by-step explanation of these two algebraic methods. Point out that the solution is the same regardless of the method used.

- In order to review the midpoint and distance formula, pose the following problem to the class:

  Consider the following points on a graph: A (1, 7), B (3, 5), C (4, -1), D (2, 1).
  Prove that ABCD is a parallelogram using both the:

  (a) midpoint formula and
  (b) distance formula.

  If time is running short, divide the class into groups and have each group use one of the indicated techniques of proving a quadrilateral is a parallelogram. Have students explain their work to the class on the overhead projector in the front of the class.

- To summarize the lesson, have students write in their notebooks or journals the definitions of and how to effectively use the midpoint and the distance formula.

Lesson plan by Rebecca Perkins