

LESSON PLAN TEMPLATE

LESSON PLAN TOPIC: Pythagorean Theorem and the Formula for Finding the Distance Between Two Points in a Cartesian Plane

TITLE: Exploring the Distance Formula for the Cartesian Plane

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GRADE LEVEL: Algebra I

TOPIC CONTENT: Review of Pythagorean theorem.

Derivation of distance formula from Pythagorean theorem.

Applying distance formula to solve real-world problems.

TEXAS STANDARDS (TEKS): 8.9(A), A3(B), A1(D), A3(A), A6(A)

NCTM STANDARDS: Problem Solving, Communication, Connections, Representation, Reasoning and Proof

OBJECTIVES: Review of Pythagorean Theorem, Derivation of Distance Formula, Application of Distance Formula.

ASSESSMENT: (formative and summative): The assessment of the lesson is two-fold. The first (informal) comes from the observation of the interaction of the students as they discuss their approaches to solving the problems. The second (formal) comes from the actual problems that they create, and their solution of those problems.

MATERIALS: Paper, Grid paper, pencil

EXPLORATORY QUESTION: With Pythagorean Theorem, you are given two sides of a triangle and you are asked to find the third side. What would happen if instead, they gave you two points on a grid, and asked you to find the distance from one to the other?

PROCEDURE: Starting with a triangle with a third side missing, apply the Pythagorean Theorem and find the missing side, then go back and point out the coordinates of the vertices of the triangle and redo the problem, but now use only the information from the vertices to solve for the third side. Show the students that what you have found is the distance between the two points.

DISCUSSION: The students now need to go through the process by themselves so that they can see the connection of the Pythagorean theorem to what they are being asked to do in the distance formula.

REFLECTION: Some students will get confused and will even try to tie this in with the slope formula due to the fact that the same notation and some of the same operations are used. Careful explanation and demonstration of the differences should clear up any confusion.

PROBLEMS FOR PRACTICE: For the practice problems, start with one or two problems that are on the axes, then start adding complexity, so that the students get experience and confidence with solving simple problems with the formula first. Below are some examples of problems that can be used.

1.) Find the distance between point $A(6,0)$ and point $B(0,4)$. (Vary the points increasing complexity each time.)

2.) The ATM machine that Juan needs to withdraw money from is located five blocks North of his house, and the cinema where Cynthia is meeting him is located seven blocks West of his house. What is the shortest distance between the ATM machine and the Cinema?

3.) The school that Mark goes to is located three blocks East and four blocks South of his house, and the McDonalds where he works is located five blocks West and three blocks North of house. What is the shortest distance that Mark must travel from school to work after he gets out of school?

CLOSURE: To close the lesson, and insure that the students have understood the objective, have them create one or two problems of their own, and then have them exchange with their partners and solve them. These problems can then be collected and used as a grade for both the author and the solver.