

TITLE: Distance Formula

Cube Fellow: Rachelle R. Bouchat

Teacher Mentor: Pam Callahan

Goal: The goal of this lesson is to guide the students through the derivation of the distance formula via the Pythagorean Theorem.

Grade and Course: 9th, 10th, 11th, or 12th grade algebra classes

KY Standards: MA-HS-2.1.3 (Measurement: Measuring Physical Attributes)
MA-HS-3.1.1 (Geometry: Shapes and Relationships)
MA-HS-3.1.2 (Geometry: Shapes and Relationships)
MA-HS-3.4.1 (Geometry: Foundational Statements)

Objectives: The objective is to have each student derive the distance formula using the Pythagorean Theorem for right triangles.

Resources/materials needed: Worksheets

Description of Plan: Students will work in small groups of 3-5 students. The Algebra Cubed fellow and the teacher mentor will work with the groups to help guide them through the worksheet.

Lesson Source: This is a classic proof that was broken down into steps by the Algebra Cubed fellow.

Instructional Mode: Group activity

Date Given: 09/21/06

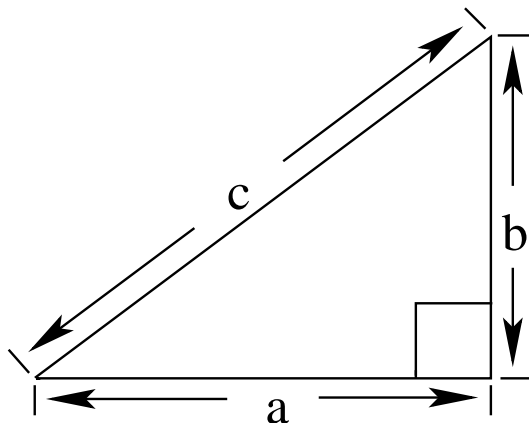
Estimated Time: 50 minutes

Date Submitted to Algebra³: 11/15/06

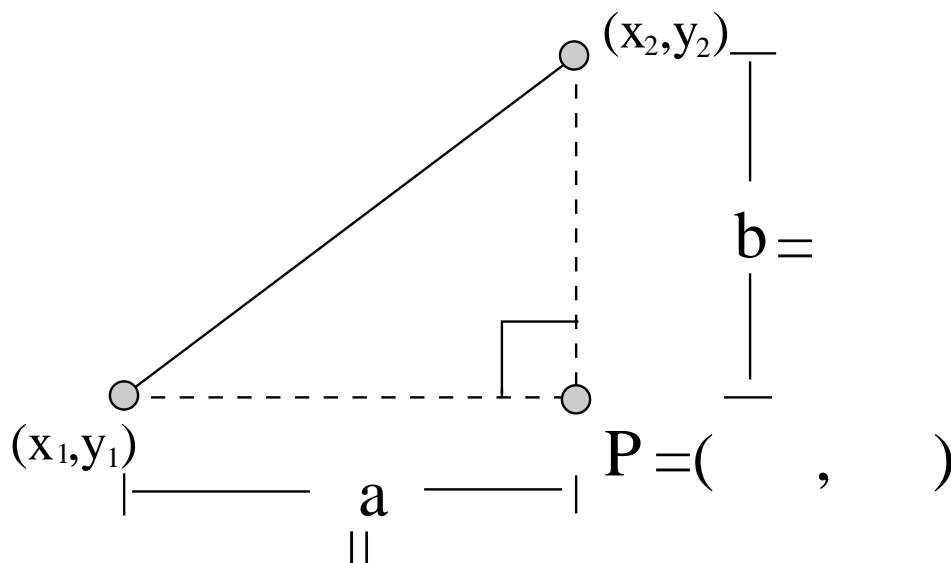
Distance Formula Worksheet

The goal of this worksheet is to be able to derive the formula for the distance between two points.

1. What is the Pythagorean Theorem? (*Hint: It involves the sides of the right triangle below.*)



2. We want to find a formula for the distance between the two points (x_1, y_1) and (x_2, y_2) . First we draw a picture of the line segment from (x_1, y_1) to (x_2, y_2) . Then we construct a right triangle using this line segment as the hypotenuse (see the diagram below).



- (a) Our goal is to find the length of the line segment from (x_1, y_1) to (x_2, y_2) . Label this distance d in the above diagram.
- (b) What are the coordinates of point P ? Fill in these coordinates in the above diagram.

- (c) What is the distance a ? Put this value on the diagram. (*Hint: It will involve x_1 and x_2*)
- (d) What is the distance b ? Put this value on the diagram. (*Hint: It will involve y_1 and y_2*)
3. Set up the Pythagorean Theorem with the information you put in the diagram in step 2.
4. Solve the equation you found in step 3 for d .
5. What does the equation you found in step 4 represent?