

# **Applying the Pythagorean Theorem to find Distances Between Cities**

## **Lesson Plan**

**Cube Fellow:** Julie Gibbs

**Teacher Mentor:** Tara Barnett

**Goal:** This lesson will teach the students how to use the Pythagorean theorem as well as introduce them to an important application of it.

**Grade and Course:** 10<sup>th</sup> grade Geometry

**KY Standards:** MA-HS-2.1.3

**Objectives:** The student will be able to:

- Understand that the Pythagorean Theorem can only be used with right triangles
- Use the formula for the Pythagorean Theorem to solve for the lengths of legs and hypotenuses of triangles
- Identify a Pythagorean Triple
- Understand that an application of the Pythagorean Theorem is breaking things up into components, in this case breaking a distance up into north/south and east/west components

**Resources/materials needed:** Calculator, attached worksheet of US map, and question worksheet

**Description of Plan:** Introduce the Pythagorean Theorem and the definition of a Pythagorean Triple and work some examples of both in a brief lecture. Often in engineering directions are broken up into components. For instance, displacement, velocity, and acceleration are all split into x, y, and z directions. A big part of this lesson is getting this point across so that the students understand why the Pythagorean Theorem is such an important concept. Instead of the students considering x and y directions, they work with east/west and north/south directions. The worksheet shows the distances between many different cities as well as how far east/west and north/south they are from each other. The students are asked to solve for the missing distance. Allow students to work on the worksheet in class.

**Lesson Source:** Original

**Instructional Mode:** Lecture and application using worksheet

**Date Given:** 12-5-2006

**Estimated Time:** 1 class period (45 minutes)

**Date Submitted to Algebra<sup>3</sup>:** 1-9-2007

Form 8-18-06

Name \_\_\_\_\_

### The Pythagorean Theorem and Maps

Round all answers to one decimal place.

1.) How far south of Columbus is Raleigh?

a = \_\_\_\_\_

2.) How far east of Frankfort is Atlanta?

b = \_\_\_\_\_

3.) What is the distance between Jefferson City and Montgomery?

c = \_\_\_\_\_

4.) St. Paul is d miles west of Springfield. Find d.

d = \_\_\_\_\_

5.) How far east of Santa Fe is Austin?

e = \_\_\_\_\_

6.) Denver is f miles north of Phoenix. Find f.

f = \_\_\_\_\_

7.) Find the distance between Pierre and Cheyenne.

g = \_\_\_\_\_

8.) How many miles south of Helena is Boise?

h = \_\_\_\_\_

9.) How far apart are Las Vegas and Sacramento?

i = \_\_\_\_\_

10.) Which of the triangles on the map forms a Pythagorean triple?

