Lab Framework

Text: CHORD

Unit number and title: #14 – Solving Problems with Powers and Roots

Short Description:

Developed by: John Grubbs

Contact Information: grubbsj@lynden.wednet.edu

Date: June 28, 2011

Lab Title

The funny symbol around the number.

Understanding square roots

LAB PLAN

TEACHER: Teacher Prep/ Lesson Plan

- **Lab Objective – Upon completion of this lab, students will be able to:**
  1. Understand the meaning of square roots.
  2. Explain square roots.

- **Statement of pre-requisite skills needed** (i.e., vocabulary, measurement techniques, formulas, etc.)
  1. Multiplication, division
  2. Estimating Answers
  3. Scientific notation
  4. 3-4-5 triangle

- **Vocabulary**
  1. Exponents
  2. Base
  3. Power
  4. Roots

- **Materials List**
  1. Rulers
  2. Graph paper
  3. Plotted or dotted graph paper
  4. Scissors
  5. Colored Pencils
  6. Glue sticks

- **State Standards addressed**
  1. **Math:** A.1.2.C – Interpret and use integer exponents and square and cube roots, and apply lows and properties of exponents to simplify and valuate exponential expressions.
  2. A.1.1.A – Select and justify functions and equations to model and solve problems.
  3. **Reading:** 1.1.1.2.2
  4. **Writing:** 1.1.1.2

- **Leadership Skills**

- Public speaking, team work

- **Workplace Skills**
  1. Resources
  2. Information
  3. Writing
  4. Reading
  5. Arithmetic

- **Set-up information**
  1. This lab would be a supporting lab of a lesson about square roots.
  2. Students would need to gather their supplies at the beginning.
  3. Refresh the class about the 3-4-5 triangle.
  4. Begin lab when everyone is ready.

- **Lab organization**(-Grouping/leadership opportunities/cooperative learning expectations; -**Timeline required)**
  1. Students will work in on their own problems but may sit in small groups
  2. This lab will be completed during 1 – 85 minute period.

- **Teacher Assessment of student learning** (scoring guide, rubric)
  – Students will need to complete the worksheet.

- **Summary of learning** (to be finished after student completes lab)
  -Discuss when the square roots are used and students for their feedback on uses.

- **Optional activities**
  1. Students could use small blocks instead of the plotted graph paper

- **Career Applications**
  - Sheet metal fabrication
  - Interior Design
  - Welding
  - Construction

LAB TITLE: <u>The funny symbol around the number.</u>

STUDENT INSTRUCTIONS:

- **Statement of problem addressed by lab**
  -What does the square root for numbers really mean and do?

- **Grouping instructions and roles**
  -You may work in pairs or on your own but you must complete your own worksheet.

- **Procedures** – steps to follow/instructions
  1. You will have 85 minutes to complete this lab
  2. On the plotted graph paper draw the following sized squares twice: (you should have two sets.
     a. 1 x 1
     b. 2 x 2
     c. 3 x 3
     d. 4 x 4
     e. 5 x 5
  3. Cut out the squares
  4. Cut each square into 1 x 1 squares
  5. Now complete the worksheet.

- **Outcome instructions**
  - You should have the pieces correctly cut and formed back into their big squares
  - You should know how to show the square root for each square with the cut out tiles.
  - The worksheet needs to be completed.

- **Assessment instructions** (peer-teacher)
  - After completing the worksheet and the entire class is done, we will go over each square and their square root.

Lab Data Collection

Student: _____ **Date:** _____

Unit: #14 – Solving problems with Powers and Roots

Lab Title: The funny symbol around the number.

Criteria: Write the problem/objective in statement form

Square roots can be shown with using squares on either on graph paper or with cutout squares.

Data Collection: Complete the questions below.

1. Paste the √1 below with the correct number of squares.

2. Paste the number of squares below in a square for the √4. Then shade the number of squares in that square with a colored pencil for the answer to, what is the √4.

3. Paste the number of squares below in a square for the √9. Then shade the number of squares in that square with a colored pencil for the answer to, what is the √9.

4. Paste the number of squares below in a square for the √16. Then shade the number of squares in that square with a colored pencil for the answer to, what is the √16.

5. Paste the number of squares below in a square for the √25. Then shade the number of squares in that square with a colored pencil for the answer to, what is the √25.

6. Now with the second set of cut squares, build a right triangle with the 3-4-5 theory and paste it in the space below. (You may converse with you partners to try to solve this problem.)

- ***Extra credit-*** If you would like to explain your solution to number 6, write your name on a piece of paper and we will draw out one name from a hat and the person chosen needs explain the solution to number 6 to the class.

Summary Statement:

Explain how square roots can be used to solve a problem in your other classes or in the working world.