

Root 2 and Beyond

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1 Goals

The goals of this activity are:

1. To give students practice with important problem solving skills, especially experimenting by trying simple examples.
2. To introduce students to the idea of using mathematical conventions as solutions to ambiguity (such as BEDMAS, but in our context—iterated exponents).
3. To give students a taste of what mathematical research looks like.
4. To give students practice with working with roots.

2 Materials

For this activity you will need:

1. Handouts

3 Instructions

This activity will take approximately 40 minutes in total. This first part takes about 10 minutes.

1. Form groups of 3 to 4 students. Tell groups to spend a few minutes calculating 2^{3^2} . Groups then share their answers with the class.
2. Have a discussion about solutions: there should be two proposed numbers; 64 and 512, from computing $(2^3)^2$ or $2^{(3^2)}$ respectively.
3. Give students handouts. Discuss *conventions* in math, and how order-of-exponents is a convention. (Also discuss other examples, such as BEDMAS or 0^0 .)

The next part of the activity takes about 30 minutes.

1. Ask groups to choose a problem to explore, and give them 25 minutes to create a poster about their chosen problem.
2. When students are done, organize a gallery walk for students to look at each other's work.

4 Tips

1. It's possible that every group says 512 or 64, in which case you should introduce the other possibility.