
Problem of the Week

Number Three

February 6, 2017

This week's problem features a square root. In mathematics, expressions involving the extraction of roots from numbers are often referred to as "radicals." This seems strange, since in everyday language a radical is someone who wants major societal change immediately.

The word "radical" descends from the Latin word *radix*, meaning root. Its use in mathematics therefore makes perfect sense. A political radical is someone who wants to get to the root of society's ills. Or perhaps he is someone who wants to eradicate society's ills by pulling them by their roots. Or something like that.

Once again, this information comes from Steven Schwartzman's marvelous book *The Words of Mathematics: An Etymological Dictionary of Mathematical Terms Used in English*.

The modern radical sign was, it seems, first used by Christoff Rudolff in 1525. He used the older form of the sign, which lacked the bar on top. If the radicand (the thing whose root was being extracted), was very long, it was enclosed in parentheses. The innovation of placing a bar on top to indicate the extent of the square root was introduced by Rene Descartes.

That won't really help much with this week's problem, but it is no less interesting for that. Nonetheless, it is time to get on with the business at hand.

Here is this week's problem:

Find all real values of x that satisfy the equation

$$x\sqrt{x} - 2\sqrt{x} = x.$$

To get credit, your answer must include an explanation for how you know you have found all of the solutions.

When you think you have the problem figured out, follow the instructions below.

*Submissions are due to Jason Rosenhouse by 5:00 on **Friday, February 10**. Solutions, complete with a brief explanation, should be written on the back of an official POTW hand-out. Place your name, e-mail address, and the section numbers and professors of any math courses you are taking, in the **upper right corner** of the front of the page. One weekly winner will receive a five-dollar gift card from Starbucks. Solutions will be posted at the POTW website:*

<http://educ.jmu.edu/~rosenhjd/POTW/Spring17/homepage.html>