## **A Beautiful PROOF**

By Don Albers\*

Mathematicians sometimes praise a particularly pleasing proof by using words such as **beautiful**, **elegant** or **inspired**. The proofs that mathematicians like best often are described by words that might just as well be applied to works of art. Thus, it was doubly pleasing for this reviewer to see *Proof*, a work of dramatic art that revolves around a mathematical proof. *Proof*, by playwright David Auburn, is nothing less than beautiful, elegant, and inspired. The cast, set, and lighting combine to produce an outstanding night of drama. After a highly successful run off-Broadway at the Manhattan Theatre Club, *Proof* moves to Broadway next month. I enjoyed *Proof* so much that I saw it twice in one week!

Auburn's script is well-crafted, fast moving, and marked by sparkling dialogue. Mathematicians will be relieved to know that in *Proof* the mathematical statements are accurate, and that the characterizations of mathematicians seem to be within the usual bounds for the species. In fact, the mathematicians portrayed in *Proof* come off as delightfully human and rather attractive people with whom you would probably enjoy having dinner.

*Proof* centers on Catherine, the younger daughter of Robert, a distinguished mathematician at The University of Chicago. Catherine is brilliantly played by Mary-Louise Parker, and is utterly convincing in the role of the insecure, emotionally drained, but still sassy daughter. Robert, before he was twenty-five, made great contributions to game theory, algebraic geometry, and nonlinear operator theory. Unfortunately, he suffered from manic depression for many years following his path breaking work, and Catherine interrupted her college education and life in order to care for him and keep him from being institutionalized.

Upon Robert's death, his last doctoral student Hal is working his way through the 103 notebooks that Robert filled with what Catherine refers to as "gibberish" written by a graphomaniac. Hal hopes that he may find mathematical gold in the notebooks, but Catherine insists that Hal is wasting his time. He claims that she doesn't know enough math to know what is gibberish and what is not. She forcefully reminds him that she spent years caring for her father, and that she might know more mathematics than Hal thinks.

Hal, while finishing his doctorate under Robert, had been attracted to Catherine, and now they are brought together again by her father's death. After a romantic interlude, Hal announces that she seems to be right about the notebooks, whereupon she gives him the key to the desk drawer containing one more notebook. A short time later, Hal excitedly reports that the last notebook contains an absolutely amazing proof of an outstanding number theory result. He wants to know why she didn't tell him about finding her father's last notebook. Catherine provides an electrifying end to the first act by responding, "I didn't find it. I wrote it."

Could it be that Robert's mathematical genius has been passed to Catherine? How could she have done the proof if the handwriting so clearly resembles that of her father? Could she have learned on her own the latest work in number theory, and then used it to construct a proof of dazzling proportions? Hal, her new lover, has doubts — certainly a big block to continuing their relationship. He suggests that he and some of his mathematical colleagues need to check the proof closely and see what really is there.

The doubts of Hal and her successful and domineering older sister Claire combine to demoralize Catherine. Claire is concerned that Catherine may have inherited her father's madness as well as his mathematical talents, and she wants to move her out of South Chicago to the security of New York. How does it end? You'll have to go see *Proof* to find out.

Some mathematicians have complained that *Proof* does not contain enough "actual" mathematics. To that, I can only respond that few plays try to teach subject matter. Why in the world should *Proof* be different? The mathematical milieu works exceedingly well for *Proof* but you don't need to know any mathematics to enjoy it. There is absolutely no need to ratchet up the quantity or level of mathematics found in *Proof*.

The plausibility of *Proof* is enhanced by Auburn's awareness that very few fields — art, music, and mathematics — are marked by prodigies. Neither art nor music would work very well with the basic story line of *Proof* because it is very difficult to conceal great accomplishment in art or music.

Those of you familiar with the neighborhoods surrounding The University of Chicago will be pleased by the set, which features an authentic brick house straight out of South Chicago. It fills the stage and contributes mightily to the success of *Proof*.

Great script, wonderful cast, and sensational set! What more could you ask for? *Proof* is truly beautiful.

Cast Catherine – Mary-Louise Parker Claire – Johanna Day Hal – Ben Shenkman Robert – Larry Bryggman

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