



# PROOF

by David Auburn

directed by Charles Newell | Mar 7 - Apr 7

Study Guide

# About the Play

Plot Synopsis; Characters



# About the Play: Plot Synopsis

*Proof* opens with Catherine, the twenty-something daughter of an esteemed mathematician at the University of Chicago, who has just laid her father to rest after a prolonged mental illness. Robert, Catherine's father, had once been a gifted, ground-breaking professor. But as he lost his sanity, he lost his ability to communicate coherently with the outside world.

The audience quickly learns that Catherine is brilliant in her own right, but she fears that she might possess the same mental illness that ultimately incapacitated her father. To make matters worse, her older sister wants to take her to New York, where she can be cared for, potentially in an institution. While Catherine and her sister argue, Hal, a devoted graduate student of Robert's, searches through the professor's files in hopes of finding a mathematical discovery that will keep his mentor's reputation intact despite the madness of his final years.

Hal discovers a pad of paper filled with profound, cutting-edge calculations. He incorrectly assumes the work is Robert's, but in truth, Catherine wrote the mathematic proof, however no one believes her. Ultimately, she must prove that the proof belongs to her.

# About the Play: Characters

- **Claire**, 29, is Catherine's older sister. Unlike Catherine, Claire is not a genius, but she has worked hard to achieve her successes and has been supporting her father and sister financially for some time. Claire helped pay for Catherine's college, and she encourages Claire to move in with her in New York because she is worried about her mental health.
- **Catherine**, 25, is the daughter of Robert and sister of Claire. She delayed her college education so she could stay at home with her father while he was ill. After his death, she finds herself caught between where she wants her life to go and where it has been.
- **Robert**, father of Catherine and Claire, is a retired professor of math at the University of Chicago. Robert left his position when mental illness overtook him (at one point, he believed aliens were communicating to him through the Dewy Decimal system). Robert also suffers from Graphomania, meaning he has an obsessive need to write.
- **Hal**, 28, is a former student of Robert's. He has a great deal of respect for Robert as a mathematician and once dreamed he would contribute to mathematics in similar ways, but now feels he is too old to contribute at all. Hal's intentions are unclear as he searches through Robert's old notebooks; although he claims that his search is for the sake of mathematics, Catherine suspects he may have ulterior motives.



# Inside the Play

Mathematics; Mental Illness; Design Process



# Inside the Play: Mathematics

## ■ What is a proof?

(Michael Hutchings, Professor of Mathematics at University of California – Berkeley)

A mathematical proof is an **argument that convinces other people that something is true**. Math isn't a court of law, so a "preponderance of the evidence" or "beyond any reasonable doubt" isn't good enough. In principle, **we try to prove things beyond any doubt at all** — although in real life people make mistakes, and total rigor can be impractical for large projects.

There is a **certain vocabulary and grammar that underlies all mathematical proofs**. The vocabulary includes logical words such as 'or', 'if', etc. These words have very precise meanings in mathematics, which can differ slightly from everyday usage. By "grammar", I mean that there are certain **common-sense principles of logic, or proof techniques, which you can use to start with statements which you know and deduce statements which you didn't know before**.

# The Building Blocks of a Proof

- ▣ Statements: **Sentences that are either true or false but not both.**
- ▣ Logic: **Operations that combine or modify statements (including 'and', 'or', 'not', and 'if. . . then').**
- ▣ Theorems: **statements that have been proven on the basis of previously established statements.**
- ▣ Axioms: **the premise or starting point of reasoning.**



# Inside the Play: Mental Illness

- “[*Proof* is] the story of a young woman, Catherine, who has spent years caring for her father who is a brilliant mathematician, and her father began having various kinds of mental illness problems. She gave up her life to care for him. When the play begins ... she is sitting alone on her 25<sup>th</sup> birthday and wondering, ‘is this going to happen to me? How much of my father's mental illness have I inherited and have I inherited any of his talent as well?’”

– Playwright David Auburn, in an interview with Terence Smith of *PBS NewsHour*.



# What is mental illness?

(From the National Alliance on Mental Illnesses)



- Mental illnesses are medical conditions that disrupt a person's thinking, feeling, mood, ability to relate to others and daily functioning. Just as diabetes is a disorder of the pancreas, mental illnesses are medical conditions that often result in a diminished capacity for coping with the ordinary demands of life.
- Serious mental illnesses include major depression, schizophrenia, bipolar disorder, obsessive compulsive disorder (OCD), panic disorder, post traumatic stress disorder (PTSD) and borderline personality disorder.
- Mental illnesses can affect persons of any age, race, religion, or income. However, mental illnesses are treatable. Most people diagnosed with a serious mental illness can experience relief from their symptoms by actively participating in an individual treatment plan.
- In addition to medication treatment, psychosocial treatment such as cognitive behavioral therapy, interpersonal therapy, peer support groups and other community services can also be components of a treatment plan and that assist with recovery.



# Inside the Play: Design Process

# The story of *Proof*'s design process

(excerpted from "Not Your Grandpa's Back Porch: Charles Newell Directs A Rethought 'Proof' at Court Theatre,"  
NewCity Stage)

- "White planks ... a field of neatly lined-up boards with both a silver shimmer and the scratched-at exterior of birch bark ... From the tall ceiling, metal chains stream down to a serene swing, also starkly white. There are two levels and no other furniture. During performances, no more than three props are ever on stage. Colored lights will create location... [Director Charles] Newell [is] staging David Auburn's Pulitzer Prize-winning "Proof" in Hyde Park, the actual location it's set in, without any realistic elements of the neighborhood."



ROBERT

*...If I just wanted to close my eyes, sit quietly on the porch and listen for the messages, I did that. It was wonderful. (Proof)*

**“Proof” is typically “set on a back porch in Hyde Park with a very literal, naturalistic, realistic feel to it. And I know a lot of those backyard porches because I’ve sat on them.”**

-- Director Charles Newell



*A porch typical of a Hyde Park home*





Set model (left) and actual set (right)

"I started off the design process in which I said, 'Hey guys, given all of this, let's just start with one thing we know. Let's say we know it isn't: it's not set on a literal porch in a backyard in Hyde Park.' And for a long time, we played around with a much more abstract space, a metaphoric space, a kind of psychological space... "We need the space to be both. We need it to be a porch, but also be an environment in which this more psychological, metaphoric stuff can happen." – Director Charles Newell

# Discussion Questions & Supplemental Materials

About the playwright; Questions to think about during & after the show



# About the Playwright

David Auburn was born in Chicago, Illinois on November 30, 1969 and studied political philosophy at the University of Chicago. His writing career began when he joined a comedy troupe as an extracurricular activity and began contributing sketches to the group's repertoire. Auburn graduated in 1991 and was offered a writing fellowship by Amblin Productions, a Los Angeles-based company owned by filmmaker Steven Spielberg. Auburn took the opportunity and moved to Los Angeles to perfect his craft. After the fellowship ended, he moved on to New York, where he attended the Julliard School's playwriting program. He began to write plays in earnest and had several of them produced by small New York theaters throughout the following years.

Along with his short plays and *Proof*, Auburn is best known as the author of *Skyscraper*, a darkly comedic play that ran off-Broadway in 1997. He wrote the screenplay for the movie version of *Proof*, starring Gwyneth Paltrow and Jake Gyllenhaal, in 2005, as well as for the movie *The Lake House*, starring Keanu Reeves and Sandra Bullock, in 2006. Auburn debuted as a movie director with *The Girl in the Park*, starring Sigourney Weaver, Kate Bosworth, and Keri Russell, in 2008. Auburn's latest play, *The Columnist*, premiered at New York's Manhattan Theatre Club in April 2012.



**“Proof of What Happens When You Just Let Go”**  
**by David Auburn (*Los Angeles Times*, June 4, 2002)**

Part of writing a play is letting it go. It's both exhilarating and a bit frightening when you turn your script over to the director and the actors who will try to make it live. It's a risk—you hope you'll get lucky. With *Proof*, I did. But when I let this play go I had no idea how far it would travel.

The play has been done in London, Tokyo, Manila, Stockholm, Tel Aviv and many other cities; the definitive New York production, directed by Daniel Sullivan, opens in Beverly Hills this week at the Wilshire Theatre.

*Proof* started with two ideas. One was about a pair of sisters: What if, after their father's death, they discovered something valuable left behind in his papers? The other, more of a visual image than anything else, was about a young woman: I saw her sitting up alone, late at night, worried she might inherit her father's mental illness.

While trying to see if these ideas fit together, I happened to be reading *A Mathematician's Apology*, the memoir by the great Cambridge mathematician G. H. Hardy. It's probably the most famous attempt to explain the pleasures of doing math to a non-mathematical audience. One passage particularly startled me.

"In a good proof," Hardy wrote, "there is a very high degree of unexpectedness, combined with inevitability and economy. The argument takes so odd and surprising a form: the weapons used seem so childishly simple when compared with the far-reaching consequences; but here is no escape from the conclusions."

That sounded like a definition of a good play, too. Math was alien territory to me—I had barely made it through freshman calculus in college—but I decided to set my story in Hardy's world.

A mathematical proof became the "thing" the sisters find: my protagonist, Catherine, became convinced that she may have inherited her father's talent—he was a legendary mathematician—as well as his illness. With these elements in place, and feeling inspired by the meetings with the mathematicians I'd begun to have, I was able to finish a draft of the play quickly, in about six weeks.

My first play, *Skyscraper*, had been commercially produced off-Broadway in 1997. Its run was short, but long enough for the literary staff at Manhattan Theater Club to catch a performance. They had invited me to submit my next play—a good break for me, since MTC is the best venue for new work in the city. I sent *Proof* to them. A few weeks later, it had a star, Mary Louise Parker, a director, Daniel Sullivan, and an opening date for what I assumed would be a six-week run.

*Proof* has now been running for two years. In that time, I've often been surprised at the responses it has generated. At a New York University conference on the play, a panel of omen mathematicians used it to discuss questions of sexism and bias in their professions. After a performance on Broadway I got a note from an audience member backstage: "My daughter is just like Catherine," it said. "I can't communicate with her. Can you help me?"

In Chicago, a woman confronted me after a book signing. She told me her father had been a mathematician who'd lost his mind and she'd spent her whole life caring for him. "This is the story of my life," she said. "How did you know?"

The answer, of course, is that I didn't, any more than I intended the play to speak directly to the concerns of female academics, or could tell a stranger how to break through to his daughter. When you let a play go, you also take the risk that it will take on associations for people that you didn't intend and can't account for.

That risk is the prerogative of art, however, and of the theater in particular. The theater affects us more directly, and unpredictably, than any of the other arts, because the actors are right there in front of us, creating something new every night. "Unexpected and inevitable." Which makes it all work the risk.

## Discussion Questions

- Think about the “proof” each character needs to complete for him/herself. What do the characters in *Proof* need to prove, either to themselves or to each other?
- Did Catherine inherit her father’s genius? Did she inherit his illness?
- Do you believe Catherine wrote the proof? Why or why not?
- What do you think Catherine means when she refers in the play to “proofs like music?” Why is she comparing math to music?
- Think about the themes of the play. What does each piece of the set in Court Theatre’s production of *Proof* symbolize to you?