

# Catharine Alvarez, PhD

## Mathematics Instructor and Tutor

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**LinkedIn** [linkedin.com/in/catharine-alvarez](https://www.linkedin.com/in/catharine-alvarez)

- Experience developing online Calculus curriculum.
- Experience teaching university level mathematics.
- Professional tutor certified by the National Tutoring Association.
- Director of a home-based private school from 2010 to 2020.

## Education

1990 - 1998

### University of California, Berkeley Ph.D. Applied Mathematics 1998

- Dissertation: *Inverse Nodal Problems with Mixed Boundary Conditions*

1986 - 1990

### Linfield College, McMinnville, Oregon B.S. Mathematics 1990

- Honors Thesis: *The Behavior of Newton's Method when Applied to Complex Transcendental Equations*
- Minor in Physics

## Experience

2019-01 - present

### Distance Education Instructor

*Johns Hopkins Center for Talented Youth*

- Curriculum development for online AP Calculus AB, AP Calculus BC, Calculus C, Honors Pre-Calculus, and Honors Trigonometry courses.
- Customizing Moodle course appearance, materials, homework, quizzes, and exams.
- Writing and editing Calculus problems and solutions in LaTeX.

2020-03 - present

### Freelance Mathematics Tutor

*Talentnook*

Online tutoring in mathematics

2020-01 - 2020-05

### Private Math Tutor

*Linear Algebra*

- Weekly one-on-one tutoring of an Ohlone College student for one semester.
- *Linear Algebra and Its Applications*, 5th edition by Lay
- Intensive practice of homework and review problems

2019-03 - 2020-03

### Private Math Tutor

*Seventh & Eighth Grade Math*

- Weekly one-on-one tutoring for two school years.
- Integrated Common Core curriculum, *Big Ideas Math Advanced 2*
- Used interactive online graphing tools and other supports.

2010-03 - 2020-06

### Director and Instructor

*Rivendell Academy of Fremont, a private, secular home school*

- Designing and coordinating custom educational programs for two students from third grade through high school level.
- One-on-one teaching of mathematics, biology, chemistry, physics, Latin, Spanish, German, literature, writing, history, computer programming, electronics, photography, piano, driver education.
- College counseling for students graduating high school.

2018-08 - 2019-12

### Private Math Tutor

*Calculus AB & Multivariable Calculus*

- Three days per week tutoring an Ohlone Community College student for three semesters.
- *Calculus: Early Transcendental Functions*, 6th ed by Larson and Edwards
- Intensive practice of homework and review problems

2018-06 - 2018-08

### Private Math Tutor

*Fifth Grade Math*

- One-on-one tutoring, twice a week during the summer for a fifth grader.
- Utilized hands-on manipulatives to teach fractions and decimals.
- Assessed skills and targeted specific skill areas for extra practice on Khan Academy.

2015-08 - 2015-12

### Homeschool Math Instructor

### *Linear Algebra*

- Taught a one semester course in Linear Algebra using *Elementary Linear Algebra* by Howard Anton

2014-08 - 2015-05

### **Online Math Coach**

*OnlineG3.com*

- Individually tutored students online using the ALEKS mathematics curriculum.
- Students were working at various levels of high school mathematics, including Algebra 2 and Pre-Calculus.

2014-08 - 2014-12

### **Homeschool Math Instructor**

*Introduction to Statistics*

- Taught a one semester course in Introduction to Statistics using the ALEKS online curriculum.

2006-09 - 2008-06

### **Math Lab Coordinator and Instructor**

*Warwick Elementary School*

- Proposed, initiated, and organized the Math Wizards math enrichment program.
- Created hands-on lesson plans using manipulatives such as geoboards, tangrams, cuisenaire rods, base ten blocks, and pentominoes.
- Taught students in the classroom in second and third grades for three hours a week.

1998-08 - 1999-01

### **Lecturer**

*University of Wisconsin, Madison*

- Taught three sections of College Algebra.
- Graded exams.
- Assisted students one-on-one during office hours.

1997-01 - 1997-06

### **Teaching Assistant**

*University of California, Berkeley*

- Led weekly discussion section for the undergraduate Numerical Methods course.
- Received training in mathematics instruction from the Mathematics department.
- Graded exams.
- Assisted students individually at office hours.

1990-06 - 1996-08

### **Research Assistant**

*Los Alamos National Laboratory*

- Summer internships
- Writing code to compare various finite element methods of computing fluid flow.

## **Publications**

1996

**The Performance of a Fourth-Order Runge-Kutta Scheme with Cell-Edge Spatial Differences**, *Los Alamos National Laboratory: LA-UR-96-4011* (with D. Brown)

1993

**CGTVD: A Two-dimensional TVD Code for Composite Overlapping Grids**, *Los Alamos National Laboratory: LA-UR-93-3197* (with D. Brown and B. Sjögren)

1990

**Effective thermionic work function measurements of zirconium carbide using a computer-processed image of a thermionic projection microscope pattern**, *Journal of Vacuum Science & Technology A: Vacuum, Surfaces, and Films* (with W. Mackie, et al.)

## **Certifications**

2020-04 - 2022-04

### **Certified Professional Tutor**

*National Tutoring Association*

Certification requires

- Documented tutoring experience
- Completion of training webinars with graded written exams
- Background check

2018-05 - 2022-05

### **Certified Child Passenger Safety Technician**

*Safe Kids Worldwide Certification ID T776994*

- As a CPST, I provide one-on-one hands-on education on how to correctly install and use child safety seats for parents and caregivers.
- Certification requires an in-person multiday course with written and practical exams approved by NHTSA.