

pre calculus calculator with steps

pre calculus calculator with steps is an invaluable tool for students and professionals who need to navigate the complexities of precalculus mathematics. These calculators provide step-by-step solutions to a variety of problems, making them ideal for understanding concepts like functions, limits, and trigonometry. This article will delve into what a precalculus calculator is, its benefits, how to use it effectively, and the types of problems it can solve. Additionally, we will explore some popular precalculus calculators available online, the steps involved in using them, and tips for maximizing their potential.

To assist you further, we will also provide a comprehensive FAQ section to address common inquiries related to precalculus calculators and their functionalities.

- Understanding Precalculus Calculators
- Benefits of Using a Precalculus Calculator
- How to Use a Precalculus Calculator with Steps
- Types of Problems Solved by Precalculus Calculators
- Popular Precalculus Calculators
- Tips for Effective Use of Precalculus Calculators
- Conclusion

Understanding Precalculus Calculators

A precalculus calculator is a specialized software or online tool designed to assist users in solving precalculus problems. These calculators are equipped to perform complex calculations involving algebra, trigonometry, and other mathematical concepts that are foundational for calculus. They often provide not only the final answers but also detailed steps that explain how the solution was derived. This feature is particularly beneficial for students who are learning the material and need to understand the process behind the calculations.

The Role of Technology in Mathematics

As technology continues to evolve, the role of calculators has expanded significantly. Precalculus calculators are now more accessible than ever, allowing users to input equations and receive instant feedback. This instant feedback loop can help reinforce learning and provide clarity on difficult topics. The integration of technology in mathematics education has transformed the way students approach problem-solving, making it more interactive and engaging.

Benefits of Using a Precalculus Calculator

Utilizing a precalculus calculator comes with a myriad of benefits that can enhance the learning experience and improve mathematical skills. Here are some of the key advantages:

- **Step-by-Step Solutions:** One of the main features of precalculus calculators is their ability to break down complex problems into manageable steps, making it easier to understand the process involved.
- **Instant Feedback:** Calculators provide immediate answers, allowing users to check their work quickly and learn from any mistakes.
- **Time Efficiency:** By automating calculations, these tools save time, enabling students to focus more on understanding concepts rather than tedious arithmetic.
- **Accessibility:** Many precalculus calculators are available online for free, making them accessible to anyone with an internet connection.
- **Variety of Functions:** These calculators can handle a wide range of problems, from polynomial equations to trigonometric identities, offering versatility in learning.

How to Use a Precalculus Calculator with Steps

Using a precalculus calculator effectively requires understanding its interface and functionalities. Most calculators follow similar procedures for inputting data and retrieving answers. Here's a step-by-step guide on how to use a precalculus calculator:

Step 1: Select the Calculator

Choose a precalculus calculator based on your needs. Some may focus more on algebra, while others might be better for trigonometry or graphing functions. Ensure that the calculator offers step-by-step solutions.

Step 2: Input the Problem

Type in the equation or problem you wish to solve. Pay attention to the syntax, as many calculators require specific formats. For instance, use parentheses to denote the correct order of operations.

Step 3: Review the Options

Before hitting the 'calculate' button, check if there are options for different methods of solving the problem. Some calculators allow you to choose between algebraic solutions and graphical representations.

Step 4: Analyze the Output

Once the calculation is complete, review the output carefully. Most calculators will display the final answer followed by detailed steps explaining how the solution was reached. Take the time to understand each step.

Step 5: Practice Similar Problems

To reinforce your learning, try solving similar problems using the calculator. This practice helps solidify your understanding of the concepts involved.

Types of Problems Solved by Precalculus Calculators

Precalculus calculators can handle a wide array of mathematical problems. Here are some common types:

- **Polynomial Equations:** Solving equations of various degrees, including finding roots and factoring.
- **Trigonometric Functions:** Evaluating and simplifying expressions involving sine, cosine, tangent, and their inverses.
- **Exponential and Logarithmic Functions:** Solving equations involving exponential growth or decay and logarithms.
- **Limits:** Calculating limits of functions as they approach specific values, essential for understanding calculus.
- **Graphing:** Plotting functions to visualize their behavior and intersections.

Popular Precalculus Calculators

Several precalculus calculators are widely used and praised for their features and user-friendly interfaces. Here are some notable options:

- **Desmos:** An online graphing calculator that allows users to visualize equations and inequalities interactively.
- **Wolfram Alpha:** A powerful computational engine that can solve a vast range of mathematical problems, providing detailed steps.
- **Symbolab:** A dedicated math solver that offers step-by-step solutions for algebra, calculus, and more.
- **GeoGebra:** An interactive geometry, algebra, and calculus application that helps visualize

mathematical concepts.

Tips for Effective Use of Precalculus Calculators

To maximize the benefits of using a precalculus calculator, consider the following tips:

- **Understand the Concepts:** Don't rely solely on the calculator. Make sure you understand the underlying concepts to enhance your learning.
- **Use Multiple Resources:** Consult textbooks, online tutorials, and videos in addition to calculators for a well-rounded understanding.
- **Practice Regularly:** Regular practice helps reinforce learning and build confidence in problem-solving skills.
- **Check Different Methods:** Explore various solving methods provided by the calculator to see which ones resonate with your learning style.
- **Seek Help When Needed:** If you encounter difficulties, don't hesitate to ask teachers or peers for clarification.

Conclusion

In conclusion, a precalculus calculator with steps is a powerful tool that can significantly enhance a student's understanding of mathematical concepts. By providing detailed solutions, instant feedback, and support for a variety of problem types, these calculators make learning precalculus more accessible and engaging. As technology continues to advance, the use of such calculators will likely become even more integral to education, helping students build a solid foundation for future studies in calculus and beyond.

Q: What is a precalculus calculator?

A: A precalculus calculator is a digital tool that helps users solve precalculus problems by providing detailed step-by-step solutions for a variety of mathematical concepts, including algebra and trigonometry.

Q: How do I use a precalculus calculator?

A: To use a precalculus calculator, select a suitable one, input your problem correctly, review the output and steps provided, and practice with similar problems for reinforcement.

Q: What types of problems can a precalculus calculator solve?

A: A precalculus calculator can solve polynomial equations, trigonometric functions, exponential and logarithmic equations, limits, and can graph functions for visualization.

Q: Are there free online precalculus calculators?

A: Yes, many precalculus calculators are available online for free, such as Desmos, Wolfram Alpha, and Symbolab, each offering unique features and functionalities.

Q: Can a precalculus calculator help me understand concepts better?

A: Yes, by providing step-by-step solutions, a precalculus calculator can help users understand the process of solving problems, reinforcing learning and aiding comprehension.

Q: Is it essential to use a calculator in precalculus?

A: While not essential, using a calculator can significantly aid in understanding and solving complex problems, especially when learning new concepts or preparing for exams.

Q: What are the benefits of using a precalculus calculator?

A: The benefits include step-by-step solutions, instant feedback, time efficiency, accessibility, and the ability to handle various types of mathematical problems.

Q: How can I ensure I am using a precalculus calculator effectively?

A: To use a precalculus calculator effectively, understand the underlying concepts, practice regularly, explore multiple solving methods, and seek help when needed.

Q: Do precalculus calculators provide explanations for their solutions?

A: Yes, most precalculus calculators provide detailed explanations and steps for their solutions, which can help users understand how to arrive at the answer.

[Pre Calculus Calculator With Steps](#)

Find other PDF articles:

<https://explore.gcts.edu/calculus-suggest-007/Book?docid=hfn96-0641&title=when-was-multivariable-calculus-invented.pdf>

pre calculus calculator with steps: *Easy Precalculus Step-by-Step* Carolyn Wheeler, 2012-06-13 Master high-frequency concepts and skills for precalc proficiency -- fast!

pre calculus calculator with steps: *The Pre-calculus Problem Solver* Max Fogiel, Research and Education Association, 1984

pre calculus calculator with steps: *Pre-Calculus For Dummies* Yang Kuang, Elleyne Kase, 2012-06-26 Offers an introduction to the principles of pre-calculus, covering such topics as functions, law of sines and cosines, identities, sequences, series, and binomials.

pre calculus calculator with steps: *Easy Pre-Calculus Step-by-Step, Second Edition* Carolyn Wheeler, 2018-12-28 Get the knowledge and skills you need to solve pre-calculus problems with confidence! The quickest route to learning a subject is through a solid grounding in the basics. Rather than endless drills, this accessible guide presents an original, step-by-step approach to help you develop a better understanding of pre-calculus topics. You'll find important concepts linked together by clear explanations, invaluable exercises, and helpful worked-out problems. Once you've mastered the topics in this book, you will find yourself well-equipped to begin your calculus studies. This book features: • A new Trigonometry chapter that will round out your pre-calculus studies • Clear explanations that break down concepts into easy-to-understand steps • Stay-in-step pop-ups offering helpful advice and cautions against common errors • Step-it-up skill-building exercises linking practice to the core steps already presented • Worked-out solutions to all exercises that reinforce understanding of concepts

pre calculus calculator with steps: *Pre-Calculus For Dummies* Krystle Rose Forseth, Christopher Burger, Michelle Rose Gilman, Deborah J. Rumsey, 2008-04-07 Offers an introduction to the principles of pre-calculus, covering such topics as functions, law of sines and cosines, identities, sequences, series, and binomials.

pre calculus calculator with steps: *Pre-Calculus For Dummies* Mary Jane Sterling, 2018-10-25 Get ahead in pre-calculus Pre-calculus courses have become increasingly popular with 35 percent of students in the U.S. taking the course in middle or high school. Often, completion of such a course is a prerequisite for calculus and other upper level mathematics courses. Pre-Calculus For Dummies is an invaluable resource for students enrolled in pre-calculus courses. By presenting the essential topics in a clear and concise manner, the book helps students improve their understanding of pre-calculus and become prepared for upper level math courses. Provides fundamental information in an approachable manner Includes fresh example problems Practical explanations mirror today's teaching methods Offers relevant cultural references Whether used as a classroom aid or as a refresher in preparation for an introductory calculus course, this book is one you'll want to have on hand to perform your very best.

pre calculus calculator with steps: *5 Steps to a 5 AP Calculus AB* William Ma, Grace Freedson, 2002-02-04 An exciting new series of study guides that lets each student design a course of study pitched to his or her individual needs and learning style Each year, more than one million U.S. high school students take one or more advanced placement (AP) exams, and, according to official projections, that number will continue to rise in the years ahead. That is because AP exams confer important benefits on those who do well on them. High AP scores are indispensable to gaining admission to most elite colleges. They provide students with a competitive edge when competing for grants and scholarships. And they allow students to bypass required university survey courses, saving on skyrocketing tuition fees. Designed to coincide perfectly with the most current AP exams, Five Steps to a 5 on the Advanced Placement Examinations guides contain several advanced features that set them above all competitors. Each guide is structured around an ingenious Five-Step Plan. The first step is to develop a study plan, the second builds knowledge, the third and fourth

hone test-taking skills and strategies, and the fifth fosters the confidence students need to ace the tests. This flexible study tool is also tailored to three types of students. For the more structured student there is a Month-by-Month approach that follows the school year and a Calendar Countdown approach that begins with the new year. For students who leave studying to the last minute Basic Training covers the basics in just four weeks. Other outstanding features include: Sample tests that closely simulate real exams Review material based on the contents of the most recent tests Icons highlighting important facts, vocabulary, and frequently-asked questions Boxed quotes offering advice from students who have aced the exams and from AP teachers and college professors Websites and links to valuable online test resources, along with author e-mail addresses for students with follow-up questions Authors who are either AP course instructors or exam developers

pre calculus calculator with steps: Barron's Math 360: A Complete Study Guide to Pre-Calculus with Online Practice Barron's Educational Series, Lawrence S. Leff, Christina Pawlowski-Polanish, 2021-09-07 Previously published under the titles Precalculus the easy way, and E-Z precalculus.

pre calculus calculator with steps: Pre-Calculus For Dummies Yang Kuang, Elleyne Kase, 2012-05-21 The fun and easy way to learn pre-calculus Getting ready for calculus but still feel a bit confused? Have no fear. Pre-Calculus For Dummies is an un-intimidating, hands-on guide that walks you through all the essential topics, from absolute value and quadratic equations to logarithms and exponential functions to trig identities and matrix operations. With this guide's help you'll quickly and painlessly get a handle on all of the concepts — not just the number crunching — and understand how to perform all pre-calc tasks, from graphing to tackling proofs. You'll also get a new appreciation for how these concepts are used in the real world, and find out that getting a decent grade in pre-calc isn't as impossible as you thought. Updated with fresh example equations and detailed explanations Tracks to a typical pre-calculus class Serves as an excellent supplement to classroom learning If the fun and easy way to learn pre-calc seems like a contradiction, get ready for a wealth of surprises in Pre-Calculus For Dummies!

pre calculus calculator with steps: TI-89 Graphing Calculator For Dummies C. C. Edwards, 2005-08-26 Do you own a TI-89, TI-89 Titanium, TI-92 Plus, or a Voyage 200 graphing calculator? If you do, or if you need to get one for school or your job, then you need to know how it works and how to make the most of its functions. TI-89 For Dummies is the plain-English nuts-and-bolts guide that gets you up and running on all the things your TI-89 can do, quickly and easily. This hands-on reference guides you step by step through various tasks and even shows you how to add applications to your calculator. Soon you'll have the tools you need to: Solve equations and systems of equations Factor polynomials Evaluate derivatives and integrals Graph functions, parametric equations, polar equations, and sequences Create Stat Plots and analyze statistical data Multiply matrices Solve differential equations and systems of differential equations Transfer files between two or more calculators Save calculator files on your computer Packed with exciting and valuable applications that you can download from the Internet and install through your computer, as well as common errors and messages with explanations and solutions, TI-89 For Dummies is the one-stop reference for all your graphing calculator questions!

pre calculus calculator with steps: Pre-Calculus All-in-One For Dummies Mary Jane Sterling, 2023-10-10 The easy way to understand and retain all the concepts taught in pre-calculus classes Pre-Calculus All-in-One For Dummies is a great resource if you want to do you best in Pre-Calculus. Packed with lessons, examples, and practice problems in the book, plus extra chapter quizzes online, it gives you absolutely everything you need to succeed in pre-calc. Unlike your textbook, this book presents the essential topics clearly and concisely, so you can really understand the stuff you learn in class, score high on your tests (including the AP Pre-Calculus exam!), and get ready to confidently move ahead to upper-level math courses. And if you need a refresher before launching into calculus, look no further—this book has your back. Review what you learned in algebra and geometry, then dig into pre-calculus Master logarithms, exponentials, conic sections, linear equations, and beyond Get easy-to-understand explanations that match the methods you

teacher uses Learn clever shortcuts, test-taking tips, and other hacks to make your life easier
Pre-Calculus All-in-One For Dummies is the must-have resource for students who need to review for exams or just want a little (or a lot of!) extra help understanding what's happening in class.

pre calculus calculator with steps: 5 Steps to a 5: AP Calculus AB 2019 William Ma, 2018-08-06 A PERFECT PLAN FOR THE PERFECT SCORE Score-Raising Features Include: •4 full-length practice exams, 2 in the book + 2 on Cross-Platform •Comprehensive overview of the AP Calculus BC exam format with step-by-step explanations for nearly 800 Calc AP problems •Clear demonstrations for using the TI-89 calculator to solve Calculus AB problems •Cumulative review sections at the end of each chapter provide continuous practice that builds on previously-covered material •An appendix of common formulas and theorems frequently tested on the AP Calculus AB exam •AP-style scoring guidelines for free-response practice questions BONUS Cross-Platform Prep Course for extra practice exams with personalized study plans, interactive tests, powerful analytics and progress charts, flashcards, games, and more! (see inside front and back covers for details) The 5-Step Plan: Step 1: Set up your study plan with three model schedules Step 2: Determine your readiness with an AP-style Diagnostic Exam Step 3: Develop the strategies that will give you the edge on test day Step 4: Review the terms and concepts you need to achieve your highest score Step 5: Build your confidence with full-length practice exams

pre calculus calculator with steps: Pre-Calculus Workbook For Dummies? Michelle Rose Gilman, Christopher Burger, Karina Neal, 2009-06-24 Get the confidence and the math skills you need to get started with calculus! Are you preparing for calculus? This easy-to-follow, hands-on workbook helps you master basic pre-calculus concepts and practice the types of problems you'll encounter in your coursework. You get valuable exercises, problem-solving shortcuts, plenty of workspace, and step-by-step solutions to every problem. You'll also memorize the most frequently used equations, see how to avoid common mistakes, understand tricky trig proofs, and much more. 100s of Problems! Detailed, fully worked-out solutions to problems The inside scoop on quadratic equations, graphing functions, polynomials, and more A wealth of tips and tricks for solving basic calculus problems

pre calculus calculator with steps: 5 Steps to a 5 AP Calculus BC, 2014-2015 Edition William Ma, 2013-07-24 Get ready for your AP exam with this straightforward and easy-to-follow study guide, updated for all the latest exam changes! 5 Steps to a 5: AP Calculus BC features an effective, 5-step plan to guide your preparation program and help you build the skills, knowledge, and test-taking confidence you need to succeed. This fully revised edition covers the latest course syllabus and provides model tests that reflect the latest version of the exam. Inside you will find: 5-Step Plan to a Perfect 5: 1. Set Up Your Study Program 2. Determine Your Test Readiness 3. Develop Strategies for Success 4. Develop the Knowledge You Need to Score High 5. Build Your Test-Taking Confidence 2 complete practice AP Calculus BC exams 3 separate plans to fit your study style Review material updated and geared to the most recent tests Savvy information on how tests are constructed, scored, and used

pre calculus calculator with steps: TI-84 Plus Graphing Calculator For Dummies Jeff McCalla, C. C. Edwards, 2013-06-14 Get up-to-speed on the functionality of your TI-84 Plus calculator Completely revised to cover the latest updates to the TI-84 Plus calculators, this bestselling guide will help you become the most savvy TI-84 Plus user in the classroom! Exploring the standard device, the updated device with USB plug and upgraded memory (the TI-84 Plus Silver Edition), and the upcoming color screen device, this book provides you with clear, understandable coverage of the TI-84's updated operating system. Details the new apps that are available for download to the calculator via the USB cable Walks you through menus and basic arithmetic Addresses graphing and analyzing functions as well as probability and statistics functions Explains how to use the calculator for geometry Reviews communicating with PCs and other calculators TI-84 Plus Graphic Calculator For Dummies, 2nd Edition is the perfect solution for getting comfortable with the new line of TI-84 calculators!

pre calculus calculator with steps: Teaching Secondary and Middle School Mathematics

Daniel J. Brahier, 2020-03-09 Teaching Secondary and Middle School Mathematics combines the latest developments in research, technology, and standards with a vibrant writing style to help teachers prepare for the excitement and challenges of teaching secondary and middle school mathematics. The book explores the mathematics teaching profession by examining the processes of planning, teaching, and assessing student progress through practical examples and recommendations. Beginning with an examination of what it means to teach and learn mathematics, the reader is led through the essential components of teaching, concluding with an examination of how teachers continue with professional development throughout their careers. Hundreds of citations are used to support the ideas presented in the text, and specific websites and other resources are presented for future study by the reader. Classroom scenarios are presented to engage the reader in thinking through specific challenges that are common in mathematics classrooms. The sixth edition has been updated and expanded with particular emphasis on the latest technology, resources, and standards. The reader is introduced to the ways that students think and how to best meet their needs through planning that involves attention to differentiation, as well as how to manage a classroom for success. Features include: The entire text has been reorganized so that assessment takes a more central role in planning and teaching. Unit 3 (of 5) now addresses the use of summative and formative assessments to inform classroom teaching practices. ● A new feature, Links and Resources, has been added to each of the 13 chapters. While the book includes a substantial listing of citations and resources after the chapters, five strongly recommended and practical resources are spotlighted at the end of each chapter as an easy reference to some of the most important materials on the topic. ● Approximately 150 new citations have either replaced or been added to the text to reflect the latest in research, materials, and resources that support the teaching of mathematics. ● A Quick Reference Guide has been added to the front of the book to assist the reader in identifying the most useful chapter features by topic. ● A significant revision to Chapter 13 now includes discussions of common teaching assessments used for field experiences and licensure, as well as a discussion of practical suggestions for success in methods and student teaching experiences. ● Chapter 9 on the practical use of classroom technology has been revised to reflect the latest tools available to classroom teachers, including apps that can be run on handheld, personal devices. An updated Instructor's Manual features a test bank, sample classroom activities, Powerpoint slides, chapter summaries, and learning outcomes for each chapter, and can be accessed by instructors online at www.routledge.com/9780367146511

pre calculus calculator with steps: 5 Steps to a 5: AP Calculus AB 2022 William Ma, 2021-08-04 MATCHES THE LATEST EXAM! Let us supplement your AP classroom experience with this multi-platform study guide. The immensely popular 5 Steps to a 5: AP Calculus AB guide has been updated for the 2021-22 school year and now contains: 3 full-length practice exams (available in the book and online) that reflect the latest exam Access to a robust online platform Comprehensive overview of the AP Calculus AB exam format Step-by-step explanations for nearly 800 AP Calculus AB problems Hundreds of practice exercises with thorough answer explanations An appendix of common formulas and theorems frequently tested on the exam Proven strategies specific to each section of the test A self-guided study plan including flashcards, games, and more online

pre calculus calculator with steps: Pre-Calculus, Vol. IV: Lessons 136 - 180 Quantum Scientific Publishing, 2023-06-11 Quantum Scientific Publishing (QSP) is committed to providing publisher-quality, low-cost Science, Technology, Engineering, and Math (STEM) content to teachers, students, and parents around the world. This book is the fourth of four volumes in Pre-Calculus, containing lessons 136 - 180. Volume I: Lessons 1 - 45 Volume II: Lessons 46 - 90 Volume III: Lessons 91 - 135 Volume IV: Lessons 136 - 180 This title is part of the QSP Science, Technology, Engineering, and Math Textbook Series.

pre calculus calculator with steps: Pre-Calculus Workbook For Dummies Yang Kuang, Michelle Rose Gilman, 2011-03-16 Get the confidence and math skills you need to get started with calculus Are you preparing for calculus? This hands-on workbook helps you master basic

pre-calculus concepts and practice the types of problems you'll encounter in the course. You'll get hundreds of valuable exercises, problem-solving shortcuts, plenty of workspace, and step-by-step solutions to every problem. You'll also memorize the most frequently used equations, see how to avoid common mistakes, understand tricky trig proofs, and much more. Pre-Calculus Workbook For Dummies is the perfect tool for anyone who wants or needs more review before jumping into a calculus class. You'll get guidance and practical exercises designed to help you acquire the skills needed to excel in pre-calculus and conquer the next contender-calculus. Serves as a course guide to help you master pre-calculus concepts Covers the inside scoop on quadratic equations, graphing functions, polynomials, and more Covers the types of problems you'll encounter in your coursework With the help of Pre-Calculus Workbook For Dummies you'll learn how to solve a range of mathematical problems as well as sharpen your skills and improve your performance.

pre calculus calculator with steps: 5 Steps to a 5: AP Calculus AB 2020 William Ma, 2019-08-02 Get ready to ace your AP Calculus Exam with this easy-to-follow, multi-platform study guide The immensely popular test prep guide has been updated and revised with new material and is now accessible in print, online and mobile formats. 5 Steps to a 5: AP Calculus 2020 introduces an easy to follow, effective 5-step study plan to help you build the skills, knowledge, and test-taking confidence you need to reach your full potential. The book includes hundreds of practice exercises with thorough answer explanations and sample responses. You'll learn how to master the multiple-choice questions and achieve a higher score on this demanding exam. Because this guide is accessible in print and digital formats, you can study online, via your mobile device, straight from the book, or any combination of the three. This essential guide reflects the latest course syllabus and includes 4 full-length practice exams (2 in the book and 2 online), plus proven strategies specific to each section of the test. 5 Steps to a 5: AP Calculus AB 2020 features: 4 Practice Exams (2 in the book + 2 online) Access to the entire Cross-Platform Prep Course in Calculus AB 2020 Step-by-step explanations for nearly 800 AP Calculus AB problems An appendix of common formulas and theorems frequently tested on the exam Powerful analytics you can use to assess your test readiness Flashcards, games, and more

Related to pre calculus calculator with steps

pre - 2011 1

html pre - pre HTML <pre> pre

2025 - PRE3prabcd2prdtop

pri pro per pre - pre president —pre
+sid sit " " +ent = =

presentation pre - presentation pre pre presentation pre pre

Pre-A A - pre A pre-A A preA 1

Pre-A, A - ABC

LM-studio - 2060 cuda 1.15.3 flash attention fa
pre1 - pre1 2

Physical Review E - Physical Review E PRE

pre - 2011 1

html pre - pre HTML <pre> pre

LM-studio - 2060 cuda 1.15.3 flash attention fa
pre1 - pre1 2

Back to Home: <https://explore.gcts.edu>