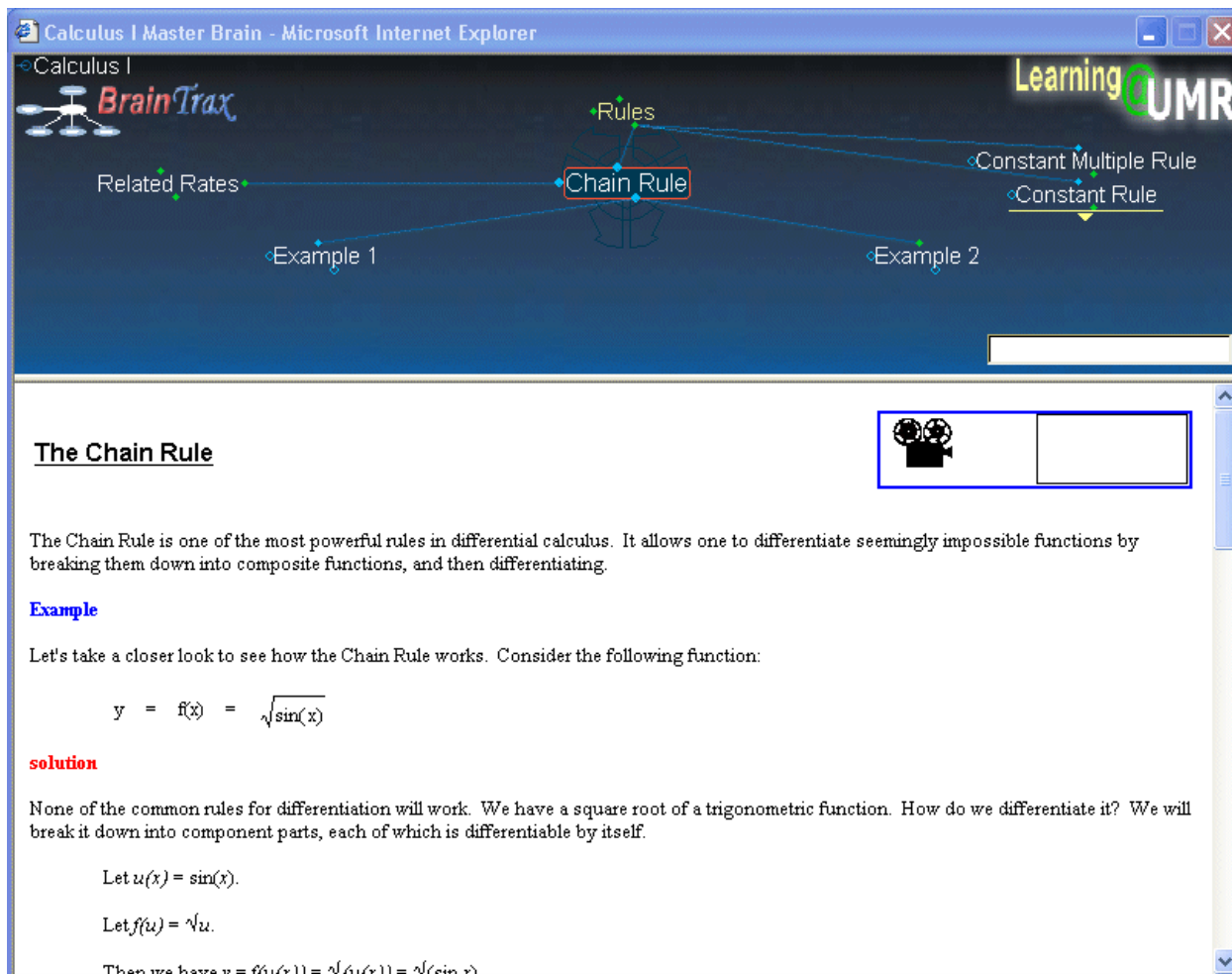


The Calculus Brains are an earlier version of the current Algebra Brain, so they lack some of the features that have made the Algebra Brain so successful. However, both Calculus Brains still contain a wealth of information as well as some additional features not found in the Algebra Brain. If and when BrainTrax has sufficient resources, we may redevelop the Calculus Brain to fully implement some nifty features.



Calculus I Master Brain - Microsoft Internet Explorer

Calculus I

BrainTrax

Learning@UMR

Rules

Chain Rule

Constant Multiple Rule

Constant Rule

Related Rates

Example 1

Example 2

The Chain Rule

The Chain Rule is one of the most powerful rules in differential calculus. It allows one to differentiate seemingly impossible functions by breaking them down into composite functions, and then differentiating.

Example

Let's take a closer look to see how the Chain Rule works. Consider the following function:

$$y = f(x) = \sqrt{\sin(x)}$$

solution

None of the common rules for differentiation will work. We have a square root of a trigonometric function. How do we differentiate it? We will break it down into component parts, each of which is differentiable by itself.

Let $u(x) = \sin(x)$.

Let $f(u) = \sqrt{u}$.

Then we have $y = f(u(x)) = \sqrt{u(x)} = \sqrt{\sin(x)}$

As with all our Brains, the Calculus Brain is composed of two primary features: The Brain navigation window and the content window. The active thought is located in the center of the Brain 'plex. Clicking on any other thought will activate and move it to the center of the Brain 'plex. Then the bottom window will load a different content page associated with the activated thought.

For instance, following the path *Differentiation* ⇒ *Basic Principles* ⇒ *Rules* ⇒ *Chain Rule* will take you to a page about the Chain Rule of Differentiation, an important concept in Calculus I.

The other main feature of the Calculus Brains is the use of Flash video that gives a brief lecture on a given concept. We used actual UMR Calculus professors to do the voiceover and provide the lesson. No formulas were harmed in the making of these Flash videos. In order to view the Flash videos, you must have the Macromedia shockwave plug-in available from Macromedia at

<http://www.macromedia.com/shockwave/download>

Many browsers will prompt you to install this plug-in if it is not already installed. Check with your system administrator if you need assistance in installing this plug-in.

There are over 600 thoughts combined in the Calculus I and II Brains. Not all thoughts contain detailed information, but most do. Also, many examples are given their own thought simply because they are long and involved. Each is written in extreme detail, with plain English explanations and numerous graphs to aid comprehension.

Although we also teach Calculus III here at UMR, demand for a Calculus III Brain has been low, so we have halted production of a third Calculus Brain.

Both the Calculus Brains assume that the user has a working knowledge of algebra and trigonometry. Fortunately for the user, we have both Algebra and Trigonometry Brains to assist the user in refreshing his or her memory on a particular concept. Calculus relies heavily on a thorough understanding of both algebra and trigonometry.

Feel free to explore both Calculus Brains at your leisure. Like the Algebra and Trigonometry Brains, they are available 24 hours a day, 7 days a week.

Questions or comments about the Calculus Brains can be directed via email to braintrax@umr.edu.