As a new BrainTrax user, we want you to be sure you know of all the available features.

This is what the new BrainTrax Algebra Brain looks like:

One of the principle goals of algebra is to examine the relationships between numbers and more abstract quantities such as variables and expressions. The tool that we use to perform these analyses is called the function. A function is simply a dependency between two quantities. For example, a football player kicks a football. How far the football travels depends upon a number of conditions. If the wind is blowing in the player’s face, then it will not travel as far. How hard the ball is kicked also affects how far the ball will travel. Thus, the distance the football travels is said to be a function of wind speed and direction, as well as the amount of force exerted to propel the ball (i.e., the kick).

There are a variety of ways with which we can represent functions. One method is as sets of ordered pairs. An example of a set of ordered pairs might be the outside temperature taken at hourly intervals.

<table>
<thead>
<tr>
<th>time</th>
<th>temp (°F)</th>
<th>ordered pair notation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 pm</td>
<td>42</td>
<td>(1, 42)</td>
</tr>
<tr>
<td>2 pm</td>
<td>43</td>
<td>(2, 43)</td>
</tr>
<tr>
<td>3 pm</td>
<td>47</td>
<td>(3, 47)</td>
</tr>
<tr>
<td>4 pm</td>
<td>44</td>
<td>(4, 44)</td>
</tr>
<tr>
<td>5 pm</td>
<td>40</td>
<td>(5, 40)</td>
</tr>
</tbody>
</table>

Note: At each hour, we can have only one temperature associated with that time. This is known as one-to-one correspondence. In other words, each first coordinate of the ordered pair appears with one and only one second coordinate of the ordered pair. We can plot this on a graph like the one below.

Notice that the browser shown does NOT have a back button displayed. That is because the brain must be used as the navigational tool. Click on the top thoughts to go back to the root of the matrix. Clicking the lower (child) thoughts moves you closer to the leaf nodes of the matrix. There are no more than 5 levels from top to bottom. There are approximately 130 thoughts, and about 120 separate concepts are covered.

The BrainTrax display has three primary regions, the Upper Region, the narrow Middle Region, and the Lower, or content, Region.

**The Upper Region**

The upper region is the Brain itself. It is used for navigation around and through the content contained with the BrainTrax Algebra Brain.

In addition to the brain itself, in this region you will also find a search box (it is the white box in the lower right hand corner of the blue part). Typing in this box will search the thought names for a partial match. Searching will begin as soon as you type. Note that this does NOT search the content of the thought, only the thought name.
**The Middle Region**

The middle portion, or Title Window, may contain a variety of discrete items, each of which has some significance for you, the user. Let's look at each of these in turn.

**Title:** this is a label that identifies the subject matter of the page you are reading. In our example here, it is called “Basic Rules of Algebra”.

**Level Tabs:** Each content page within the algebra brain has 3 levels (where the material permits). These are **Basic**, **Intermediate**, and **Advanced**.
- The **Basic** level is aimed at students with an 8th grade comprehension of mathematics. These pages have a purple border.
- The **Intermediate** level is aimed at students with a 10th grade level of comprehension. These pages have a Green border.
- The **Advanced** tab is aimed at students ready for algebra at a collegiate level, such as is taught at UMR. These pages have a blue border, and are the default level displayed within the brain at this time.

Clicking one of these tabs will display the appropriate level of information for the subject listed in the “Title Window”. In addition to the border color, (purple, green, or blue), the selected tab will be highlighted, or appear brighter when it is active.

**Real World Example Tabs:** Each advanced level page has one or more real world examples to demonstrate the use of the mathematical concept. Intermediate and Basic levels may have this feature in the future. Teachers who wish to assist the BrainTrax team in creating suitable examples should discuss this with the BrainTrax office.

**The Descending Grades Button:** Clicking this button will launch an Interactive Example and Testing System (IETS) session for the displayed content. See provided reference material on the BrainTrax IETS for further detail.

The IETS session will be specific to both a given thought and a content level.

Only authorized students will be allowed to enter the IETS to participate in this activity.
The Lower Region

**Student Guide Buttons:** Each page will have 3 or more buttons that will, when moused over, display important information for the student. At the top of each page will be "Goals", "Terms", and "MathTrax".

- **Goals** – Mousing over this button will reveal the learning goal for this page
- **Terms** – Mousing over this button will reveal a list of terms that are used on this page, and their definitions
- **MathTrax** – Mousing over this button will reveal a math factoid that is traditionally not provided in the classroom.
- **Example** – Mousing over this button will reveal a description of what the student should learn from this example.

Note that content displayed by these buttons may be different for different levels within a single thought.

**Scroll Bars:** Notice that the lower section of the example picture shows scroll bars. Use these to see the remainder of the page displayed.

The following buttons may appear in the colored border on the left side of the lower region.

- **The e Button:** Clicking this button will jump to a related static example within the three level pages. Mousing over the button will tell the user where they will be transferred if they click the button.

- **The i Button:** This button conveys additional information. It is used to tell the student where they may find more basic or advanced material about the specific component next to the button. Clicking the button will transfer the student to that location on another level's page.

- **The Speaker Button:** Clicking this button will activate an audio stream that discusses the material directly opposite the button. For text material, the audio stream will read the text. For images, it will describe what the student is seeing, and what they should notice about the image. This feature is available on basic level pages only.

- **The ? Button:** Clicking this button will spawn a new window with a question/answer activity for the student. Questions are generally conceptual in nature. Two answers are displayed, along with an explanation after the student has selected his/her answer.

- **The x Button:** Clicking this button will spawn a new window with a dialog to solve a problem. The student will be asked at each step what they should do to solve the problem. (est. available Oct 2001)

- **The Movie Button:** Clicking this button will launch a short movie detailing a specific math operation or task. The movie will appear in a new window. Not all pages will have embedded video.

**Contact Information**

You can reach UMR's BrainTrax developers here:

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