

Using Expressionist's Features

GUIDED TOUR


This chapter is a guided tour of *Expressionist*. In it you will learn the basics of how *Expressionist* works.

When this tutorial tells you to type something in, it will be very specific, telling you the exact keystrokes to type, in words. So, if the tutorial says “Type A B”, you should push the A key, and then the B key, but without using the Shift key. If it says “ ”, that means the space bar. If it says “†” or “Ÿ”, it means the Tab or Escape keys on the keyboard.

If it says “BA”, that means to hold down the Shift key while pressing the A key. If it says “ÇA”, that means to hold down Control while pressing the A key. Likewise, “ÅA” means to hold down the Alt key while typing A. Sometimes, it will even say “ÅÇA”, meaning to hold down both of them, or even “ÅÇBA”. Do not use the Shift key to type upper case letters unless you are expressly told to do so.

As you go along, be careful to make sure that your screen looks like the pictures shown here in the manual. Pay attention to the arrow pointer if it is in the picture; it shows where you should be clicking.

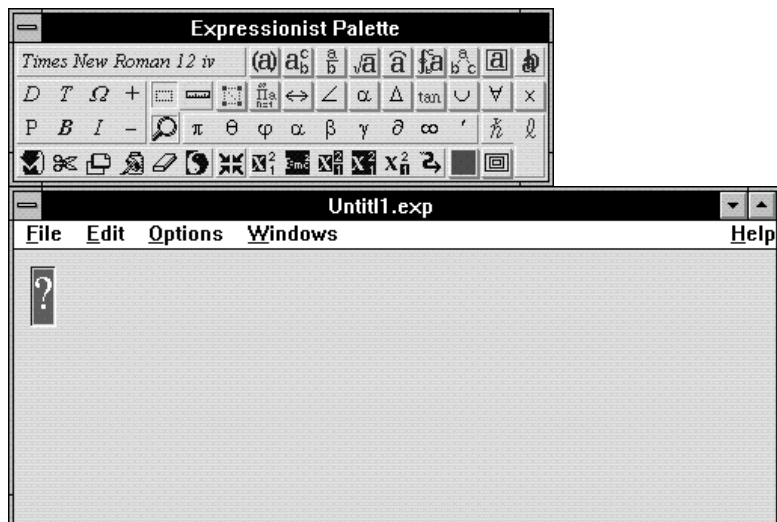
If you make a mistake, you can usually fix it by choosing **Undo** from the **Edit** menu, or by typing °Z (with Windows, ÇZ or Åø), or by clicking on

the  palette button.

Under Windows, press ; to use *Expressionist*'s online help system. For context-sensitive help, press ß; and click on the *Expressionist* item you want to learn about.

If it is not already running, double-click on the *dE* *Expressionist* icon to run the application. When *Expressionist* is first started up, it looks like the following diagram.

(If you already have *Expressionist* open, choose **New** from the **File** menu.)



If you get an error message about preferences, re-read the installation instructions.

The window at the top is the palette window. The window below it, named "Untitled 1" ("Untitled1.exp" under **Windows**), is an *expression window*, in which you create your equation.

The palette of editing tools at the top of the screen is an independent window, and it can be moved around the screen. It always appears in front of other windows while *Expressionist* is active. Click the palette window's close box or un-check **Palette** on the **Windows** menu to make the palette window go away.

With the palette window gone, resize the expression window (Untitled 1) and move it about the screen. Check **Palette** on the **Windows** menu to get the palette window back.

You do not have to type spaces.

Notice that *Expressionist* works much like a word processor. Type $X=Y+Z$. The expression window should have this:

The guide box encloses a "string" of characters. You will eventually create equations with several strings of characters in them.

Selecting

Now, try clicking your mouse anywhere in the string between two characters. You can put the caret (blinking cursor) anywhere you want, just like in a word processor.

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Try dragging to select: click the mouse down on the left side of the x , and hold the mouse down as you drag to the right, just past the y :

To select just a single character click near its middle with a tiny bit of a



The image shows the mathematical expression $x = y + z$ enclosed in a dashed rectangular selection box. A solid black rectangular highlight is positioned over the character 'y'.

dragging motion. Practice selecting individual characters quickly by sweeping the mouse just a bit. With a little practice, you can select a single character with just a click in its middle.



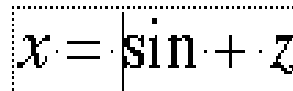
The image shows the mathematical expression $x = y + z$ enclosed in a dashed rectangular selection box. A solid black rectangular highlight is positioned over the character 'y'.

With the y selected, type S I N. The selection, y , is replaced with the s , which is then followed by “in”. The cursor is blinking after the “n”. Press β^- three times, which makes the following selection:



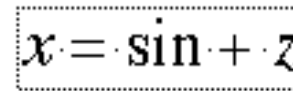
The image shows the mathematical expression $x = \text{sin} + z$ enclosed in a dashed rectangular selection box. A solid black rectangular highlight is positioned over the characters 'sin'.

Press $\bar{\leftarrow}$ to move the cursor to the left of the s :



The image shows the mathematical expression $x = \text{sin} + z$ enclosed in a dashed rectangular selection box. A solid black rectangular highlight is positioned over the characters 'sin'. A vertical cursor line is positioned to the left of the 's'.

Experiment with the arrow keys to see how the cursor moves. Use the Shift key to make a selection with the arrow keys. When you are through experimenting, click the mouse pointer outside the guide box, but inside the expression window. This de-selects the current selection, leaving you with no selection.



The image shows the mathematical expression $x = \text{sin} + z$ enclosed in a dashed rectangular selection box. A solid black rectangular highlight is positioned over the characters 'sin'.



If you begin typing with no selection (as above), the characters you type appear at the end of the expression, as if the cursor were at the end. For example, type $\emptyset C O S$:

$$x = \sin + \cos$$

Another shortcut allows you to quickly select entire words. Double-click the x to select it. Double-click “sin”. Double-click “cos”:

$$x = \sin + \cos$$

Hold down the Shift key and double-click “sin”, which gives you a multiple selection:

$$x = \sin + \cos$$

Press \sim , which gives you multiple blinking cursors, then press $f(\emptyset)$ twice:

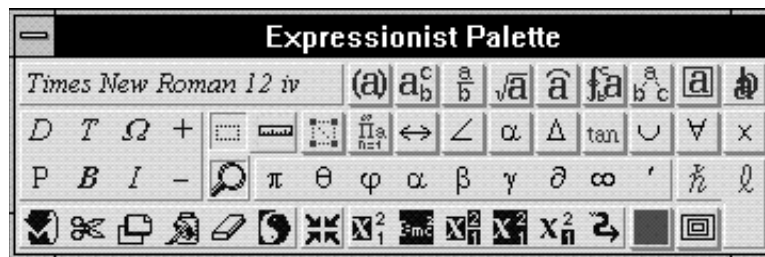
$$x = s + c$$

Drag to select the s and type Y to replace it:

$$x = y + c$$

Characters

Now we will explore the palette.



The “iv” indicates applied styles, which are explained later.

The large button at the top labeled “Times 12 iv” or “Times New Roman 12 iv” is called the FontSizeStyle box (also known as the *FSS* box). It shows the current font, size, and style of selected characters. When you

Font buttons

change the font, size, and style of a selection, this box changes to reflect the new font characteristics. For example, the Helvetica font in 12 points, italicized, with vertical squeeze, would show “*Helvetica 12 iv*” in the FontSizeStyle box.

The *D*, *T*, and Ω buttons below the FontSizeStyle box change the font of whatever character(s) you have selected. Select the whole equation then click on the Ω button to change the selection to Symbol, a Greek font:

Notice the *x* changed to ξ , the Greek letter xi. The Roman letter *y*



The image shows the equation $x = y + c$ rendered in the Symbol font. The characters are black on a white background and are enclosed in a dashed rectangular box. The Greek letter xi (ξ) is used for the variable x , and the Greek letter psi (ψ) is used for the variable y .

changed to the Greek letter psi, ψ and *c* became chi, χ . Take a look at the FontSizeStyle box; it says “Symbol 12 iv”. Symbol font is a very different font used for mathematics. It is similar to a mathematical typeball for a typewriter; when you type regular letters, it gives you Greek letters.

Click on the *D* button, which is the default font command. It changes the selection to the default font settings. In this case, the default is the Times family in twelve points, with all style variations off except for italics and vertical squeeze (hence the “iv” on the FSS box). You can see our selection is back to in the Times font, which we started with in the first place. (All new expressions start in the default font.)

The *T* button changes the selection to the Times font family, but does not



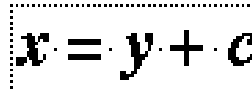
The image shows the equation $x = y + c$ rendered in the Times font. The characters are black on a white background and are enclosed in a dashed rectangular box. The variables are in their standard Roman forms: x , y , and c .

affect size and style variations like the *D* font command.

Style buttons

The buttons two rows below the FontSizeStyle box are for changing the style of selected characters. With the whole string still selected, click on the **B** then click outside the expression to de-select it.

B makes everything bold. Not only that, but notice that the



The image shows the equation $x = y + c$ rendered in a bold Times font. The characters are black on a white background and are enclosed in a dashed rectangular box. The variables x , y , and c are all in boldface.

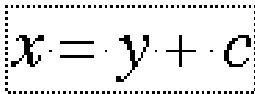
FontSizeStyle box shows “**Times 12 biv**” or “**Times New Roman 12 biv**”. The “**b**” stands for Boldface.

The bold style is intended to be applied to variables which are vector quantities. (When you write them by hand, you might put an arrow over them or use a circumflex or underline, but the “correct” thing to do for typesetting is to use bold. It could be that this custom started because the

arrows above characters were so difficult to typeset. *Expressionist*, of course, lets you do it both ways. See “vector” in the Encyclopedia section if you are curious.)

Next, select the entire expression and click the P button to make the selection plain. The bold and italic styles are removed from the characters. (Actually, P removes *all* style variations from the selection, except for vertical squeeze.)

Next, try the right-most italic *I* button:



The image shows the equation $x = y + c$ enclosed in a dotted rectangular selection box. The characters x , y , and c are in an italicized font, while the equals sign and plus sign are plain.

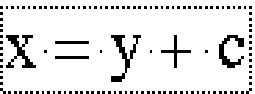
Now your equation is italicized. The FontSizeStyle box has changed and now says “Times 12 *iv*”. The “i” stands for italic and the “v” stands for vertical squeeze.

The italic style is intended to be applied to scalar variables. Many people do not bother to italicize their variables, but we made it the default because italics are necessary for professional-looking documents. (However, on the screen and some printers, italics do not always look good. Thus, you might want to avoid italicizing until the end, making it the last thing you do to your equation. This manual explains later how to make the default font not use italics.) Both TrueType and Adobe Type Manager fonts have good looking italics.

Notice that the = and + were not italicized by *Expressionist*, and neither were sin and cos earlier. Function names, punctuation, digits, and other special symbols in equations are normally plain and should not be italicized or made boldface. *Expressionist* helps you with this by not italicizing these characters and names when you use the *I* button for italicizing. (The *I* button is a font command which applies a specific font description. This particular command applies the italic style only to alphabetic (a-z) characters which are not function names. You may change the *I* button font command to apply different font variations. This is explained in the Encyclopedia section; see “Font Command”.)

With the expression selected, click on the P to make it plain:

Note that the “i” went away in the FSS box.



The image shows the equation $x = y + c$ enclosed in a dotted rectangular selection box. All characters, including the equals sign and plus sign, are now in a plain font.

Sizing buttons

Next, we explore the + and – buttons. These buttons enlarge and shrink the selected character(s). With the whole equation selected, click on the + button (called “Enlarge”):

Notice that the characters in the expression are a bit larger. The

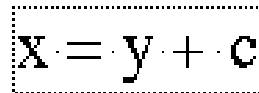

$$X = y + c$$

FontSizeStyle box tells us that this is 14 point, instead of the 12 point we were using before. Although the equation is in 14 points, it appears as 28 points on the screen because *Expressionist*'s Magnify mode doubles the size for easier editing. If you are using the Times New Roman TrueType font or Times ATM font it will look fine, but if you are using a screen font, it may look chunky and ugly on the screen. This is another good reason to use TrueType and/or ATM with *Expressionist*—they provide smooth large font sizes.

The + button does not increase the size merely one point at a time; it enlarges in steps. Usually, you will want to increase the size by two steps at a time. This is easy—just click twice in a row whenever you use it. If you click four times, you will get exactly double the original size.

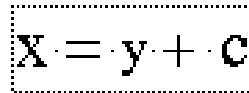
Next, try out the -, called "Shrink." As you might imagine, it makes characters smaller. Select the whole equation and click - until the size returns to 12 points. If you overdo it and go below 12, you can always click on Enlarge again.

Enlarge and Shrink can adjust each character individually without

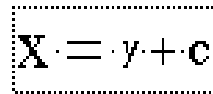

$$X = y + c$$

forcing different characters in the expression or selection to be the same size. For example, select only the y and Shrink it twice to reduce it to 9 points:

Then select y + c. Click on Shrink twice again, to shrink the two of them:

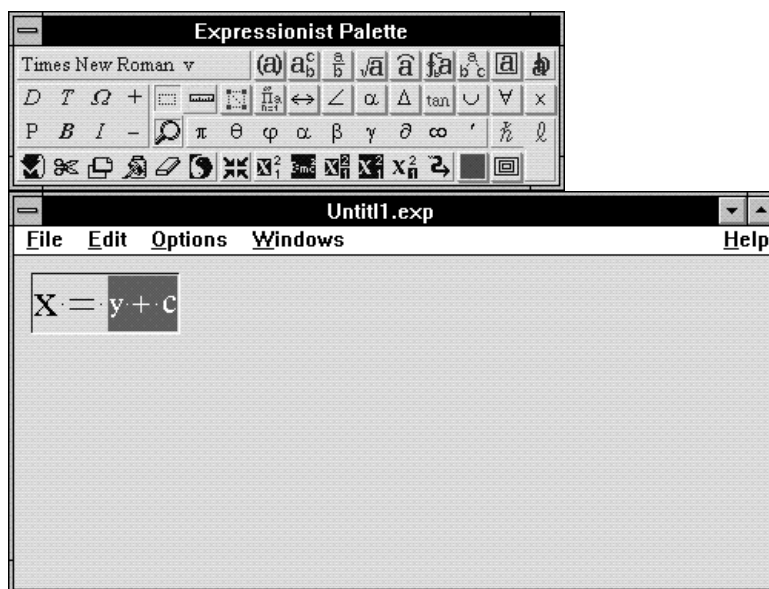

$$X = y + c$$

Notice that *Expressionist* did not just blindly change everything to 6


$$X = y + c$$

points; it shrunk everything down two steps. The y dropped down from 9 to 6 points. To see for yourself that the c has not been converted to 6 points, select it and look at the FontSizeStyle box, which says "Times 9" or "Times New Roman 9".

Select $y + c$ and take another look at the FSS box. Since the selection includes characters of differing font sizes, the FSS box does not show a size.



With the whole expression selected, click the D button to change back to the default 12 points.

The size that you begin with when creating new equations should be the same as the text in your word processor. The text in most books and journals is typeset in 9 to 12 points. (Subscripts, superscripts and other symbols of different size are measured from your starting size.) For lower-resolution printing, you should use 12 points for readability.

Expressionist lets you set the default font, including size and style characteristics, but we will continue to use the default Times or Times New Roman 12 italic for most examples in this manual.

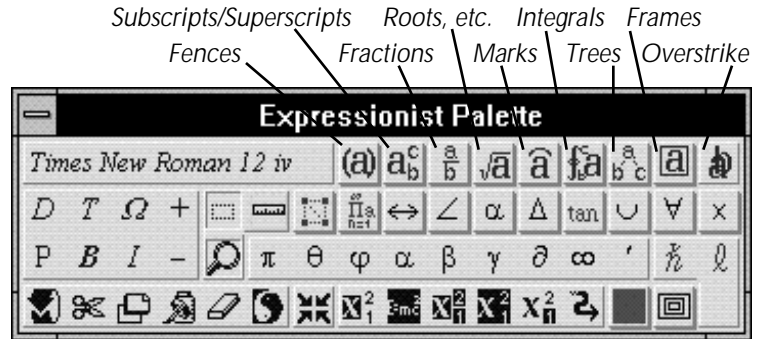
Enlarge and Shrink will become more useful later when you edit more complicated equations with subscripts, limits, etc.

Composite Structures

Up until now we have seen how *Expressionist* works like a regular word processor. But that's not why you got an equation editor—you want to do equations more complicated than $x = y + z$. You can do this with “composites,” templates for more complicated structures. *Expressionist*

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organizes its composites on pop-up palettes with buttons with icons representing the resulting composites.



Pop-up palettes of composites on the main palette

Get back to our simple equation and select $y + c$:

$$x = y + c$$

Fraction

Choose the $\frac{a}{b}$ palette button from the $\frac{a}{b}$ pop-up palette: fraction

$$x = \frac{y + c}{?}$$

Notice that this has caused the selection to become the numerator (top part) of a vertical fraction. The bottom part is a question mark. (because you have not told *Expressionist* what you want on the bottom yet). So, type D + E:

There is another composite you can use to make subscripts and

$$x = \frac{y + c}{d + e}$$

superscripts. To see how to use it, first get rid of the fraction by selecting

the fraction, deleting it with the *f* (or *ø*) key, and re-typing $y + c$. (There is an easier way to do this, but Unmark is covered later in the manual.)

$$x = y + c$$

Superscript

Now, select the letter *c* and choose the a^c button from the a_b^c pop-up palette for the superscript:

$$x = y + c^?$$

The composite is attached to the selection, with a “?” in the superscript location. Type “2” in the superscript:

$$x = y + c^2$$

Notice that the 2 is slightly smaller than the other characters. It is smaller by three Shrink steps, which works out to about 60% of the original size. As you might imagine, you could attach superscripts or subscripts to your superscripts or subscripts and they would be two steps smaller yet.

Subscript

You can make subscripts using a neighboring button. Select the *y* and choose the a_b subscript button from the a_b^c pop-up palette:

$$x = y_b + c^2$$

and you can type in a 2 for that, too:

$$x = y_{2b} + c^2$$

Notice that the superscript has a tiny little guide box in the subscript position, and the subscript also has a tiny box in the superscript position. That is because the subscript and the superscript composites are actually

the same thing, called a “subscript/superscript composite.” A subscript composite has the superscript deleted, and a superscript has an empty subscript box. These empty guide boxes are not as tall as other strings because they do not have any characters in them. (A string is only as tall as its tallest constituent.) You can make a superscript above your subscript by carefully clicking inside that tiny box so you have a blinking caret, and then typing N:


$$x = y_2^n + c^2$$

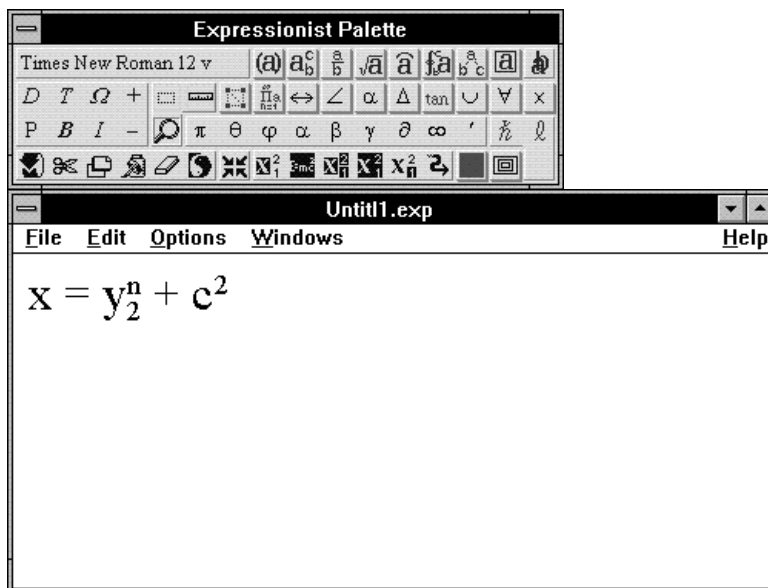
Viewing Modes

Expressionist provides three different viewing modes to help you edit equations. Each affects how the equations are displayed on the screen but do not affect how your equation looks when printed.

Guide mode



The rectangles that you see outlining strings are not really part of your equation. They are just there to help you see what is going on. They only show themselves when Guide mode is on, which is the default. You can turn it off by clicking on the  palette button.



You can turn Guide mode back on by clicking the button again. Notice that the equation looks like it gets a bit smaller when Guide mode is off.

Expressionist makes room for the guide boxes when it draws the equation in Guide mode. It is as if each string is wearing an invisible fluffy down parka—everything gets slightly bigger and disproportionate. Guide mode does not affect equations copied, saved, or printed.

Guide mode makes the designs of your equation more obvious. For example, you have seen how the guide boxes aid you in placing the cursor in an empty superscript. The Overstrike composite, which consists of two components printed on top of each other, is separated in Guide mode so you can edit the two elements easily.

The guides are three-dimensional beveled boxes on a grey background with black characters. (This is if you are using a Windows display driver which displays more than sixteen simultaneous colors; if not, then the guides are dotted-line boxes with black characters on white background).

For aesthetic clarity, the screen shots in this manual show dotted-line Guide boxes with black characters on

your screen may show this...

but this manual shows it as this

If you add different colors to your equations (described later in this manual), Guide mode does not show the colors. You must turn off Guide mode to display the equation in its true colors.

Turning on Guide mode turns off Ruler mode, described below.

Ruler mode



Beside the Guide mode palette button is the Ruler mode button. Clicking this button turns off Guide mode (they are mutually exclusive and thus can not both be on at the same time). With Ruler mode on, rulers appear above the strings in your equations. A ruler lets you change justification (left, right, or center), set tab stops (left, right, center, equal sign, or decimal point), and move the right margin.

Ruler mode is explained in more detail later in this manual.

Magnify mode



The button just below the Guide mode button with the magnifying glass icon toggles Magnify mode on and off. Normally, Magnify mode is on and what you see is twice as big as the actual size. By clicking on the magnifying glass, you can turn Magnify mode off and on again:

Magnify off

Magnify on

It is easier to work with equations in Magnify mode, because the actual font sizes used may be as small as six points, and smaller font sizes are difficult to see and work with.

Just like the other viewing mode buttons, when Magnify mode is on, the button appears to be depressed.

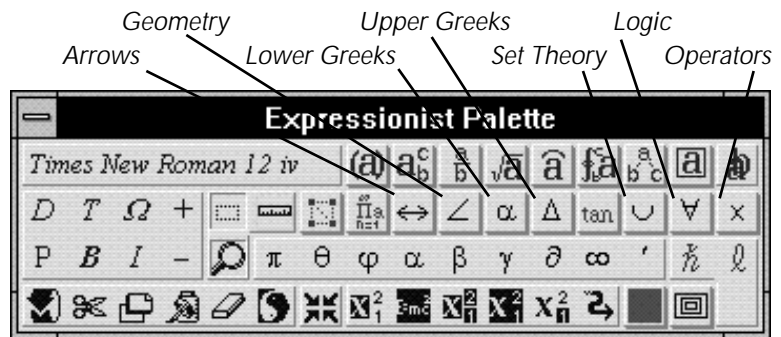
Guide mode does not affect equations copied, saved, or printed.

Special Symbols

Many times equations have Greek letters or mathematical symbols in them. Although you can type them in from the keyboard, it is easier to just click on the desired symbol from the palette.

The main palette has a row of Greek letters and special symbols: π , θ , ϕ , α , β , γ , δ , ∞ , \prime , \hbar , ℓ . There are more lower case Greek letters available on the α pop-up palette and upper case Greek letters available on the Δ (Delta) pop-up palette. Other pop-ups contain palettes of operators, arrows, set operators, and the other symbols.

If your palette does not show these Greek letters and symbols, your system doesn't have the Symbol font installed.



Pop-up palettes of special symbols

Now you have got a much better selection of Greek letters and symbols. The characters on the palette and most of the sub-palettes are from the Symbol font. If you click on one of these symbols, then select the symbol inserted into your expression window, you will see that the FontSizeStyle box tells you it is in the Symbol font.

You can type Greek letters from the keyboard. Hold the Alt key and Control key as you type some alphabetic characters. Notice that the inserted characters are the Symbol font Greek letters corresponding to the keys you press. For example, typing ÅçF (ÅçF) gives you lower case phi, ϕ , and typing ÅçBF (ÅçBF) gives you upper case phi, Φ .

See the Encyclopedia section's entry for Keystroke Definitions for more information, including instructions on how to print a list of currently assigned keystroke definitions.

Cutting and Pasting

This section discusses cutting and pasting in *Expressionist*. This will come in handy if you have equations with the same sub-expressions repeated over and over again. If you use cut and paste in your word processor already, you will probably use it even more in *Expressionist*.

First, create this expression on the expression window:

$$x = \frac{x + y}{d + e}$$

Next, select the fraction by dragging from the top to the bottom,

$$x = \frac{x + y}{d + e}$$

and choose **Cut** from the **Edit** menu to cut the fraction to the clipboard.

$$x =$$

Now, choose **Paste** from the **Edit** menu to paste your fraction back in the expression.

$$x = \frac{x + y}{d + e}$$

As in a word processor, you can continue to use the contents of the clipboard. Type +, then Paste again:

$$x = \frac{x + y}{d + e} + \frac{x + y}{d + e}$$

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You can enclose composites inside other composites by pasting. Select the e in the bottom of the first fraction:

$$x = \frac{x+y}{d+e} + \frac{x+y}{d+e}$$

Do another Paste:

$$x = \frac{x+y}{d + \frac{x+y}{d+e}} + \frac{x+y}{d+e}$$

There is no limit to how deep you can nest composites inside others. Select the e on the very bottom and Paste again:

$$x = \frac{x+y}{d + \frac{x+y}{d + \frac{x+y}{d+e}}} + \frac{x+y}{d+e}$$

Turn off Guide mode and Magnify mode to see what the whole equation looks like:

$$x = \frac{x+y}{d + \frac{x+y}{d + \frac{x+y}{d+e}}} + \frac{x+y}{d+e}$$

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Under Windows, ⌘X,
⌘C, and ⌘V

The **Edit** menu items are just one way to do clipboard commands. You may use the keyboard shortcuts for **Cut**, **Copy**, and **Paste** (⌘X, ⌘C, and ⌘V, respectively) for characters, expressions, and whole equations. The *Expressionist* palette provides another method to access the clipboard. The four buttons starting at the lower left are Undo, Cut, Copy, and Paste.

