

User Documentation, Version 2.2

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MacVectors is a freeware program for the graphical solution of two-dimensional vector problems on a computer screen instead of a piece of paper. Conceptually, you use it the same way that you use a pencil, ruler, and protractor. You can draw, move (redraw at a new location), and measure vectors. You can set or reset the scale for your drawing and, if a printer is available, you can print your drawing. Solutions worked out with MacVectors are truly graphical, because pixel information is recorded for your vectors as you draw them. Lengths and directions are calculated from the pixel information and the precision of your solution is limited by the pixel resolution of your computer screen.

You will find that there are some things that you can do with a pencil and paper diagram that you can't do with MacVectors, but because you are drawing your vector diagrams on a computer screen rather than a piece of paper, you also have some additional possibilities. Additional possibilities are outlined in the menu functions table.

You use MacVectors by selecting items from the pull-down menus. There are three different kinds of menu items:

- (1) Items that represent options that may be turned on or off are shown in the menu functions table with a check mark (✓). When an option is turned on it appears in the pull-down menu with a check mark; when an option is turned off, there is no check mark. Selecting this kind of menu item causes MacVectors to toggle the selected option between the on and off states and then wait for the next menu selection. Most, but not all, of these items are in the Options menu. See the menu functions table for details.
- (2) Items for operations that require drawing or selecting a vector to be acted on are shown in the menu functions table with an asterisk (*). When you select this kind of item, MacVectors indicates the kind of operation selected in the upper right corner of the window and waits for you to move the mouse into the window to provide input. Move the mouse pointer into the window with the mouse button still up. Vectors are drawn by moving the mouse while the button is held down. Already-drawn vectors are selected by moving the mouse near (or directly in front of) the vector to be selected. The currently selected vector is indicated in the upper left corner of the window. When you press the mouse button the selected operation is carried out on the selected vector. If the menu item could reasonably be applied to more than one vector, MacVectors remains in the same function and that function continues to be displayed in the upper right corner until the function is canceled. When the mouse pointer is moved into the title bar, the current function is canceled and MacVectors waits for a new menu selection.
- (3) Items for operations that do not require drawing or selecting a vector are executed immediately upon selection. MacVectors executes the operation and then waits for the next menu selection. Items not requiring you to draw or select a vector are listed in the function table without a special symbol.

MacVectors Menu Function Table

MENU	ITEM	WHAT IT DOES
FILE	Print	Prints your vector diagram on the currently selected printer. The resolution of your printed output is limited by the resolution of the printer, not the resolution of the computer screen.
	New Problem	Clears the screen and memory. This is like taking a new sheet of paper.
	Quit	Quits MacVectors.
VECTORS	Draw*	Allows you to draw new vectors by holding the mouse button down while moving the mouse. Up to nine vectors can be drawn. When the mouse pointer is moved into the window, its current location in pixel coordinates is displayed in the upper left corner. To draw a vector move the mouse pointer from vector tail to vector head while the mouse button is held down. As each vector is drawn, its length and direction are displayed in the upper left corner. New vectors are automatically labeled with single letters in ascending alphabetic order. Moving the pointer into the title bar cancels this function.

MacVectors Menu Function Table ... continued

MENU	ITEM	WHAT IT DOES
VECTORS	Move*	Allows you to rearrange vectors on the sheet by pointing and dragging. The currently selected vector is indicated in the upper left corner of the window. Moving the pointer into the title bar cancels this function. Moving a labelled vector also moves its label.
	Reenter*	Allows you to reenter the selected vector.
	Set Scale*	Allows you to set or change the scale for your drawing by entering the length for the currently selected vector. Changing the scale for this vector changes the scale for all vectors in the current problem.
	Delete*	Deletes the selected vector. Labels of other vectors are not changed.
	Reverse*	Reverses the selected vector and changes the sign of its label.
	Decompose*	Shows the selected vector decomposed into x and y component vectors while the mouse button is held down.
	LABELS	Move Labels*
Edit Labels*		When you have selected this function you can move the mouse pointer in the window to select a vector. Depressing the mouse button opens a dialogue box for changing its label.
Write*		This function is used to annotate your diagram. Point and click where you wish to make a note. Each line is a separate note and you may have as many as 8 lines.
DISPLAY	Zoom Out	Reduces the length of all vectors by a factor of 2. After zoom out the vector ends are set to the nearest pixel locations.
	Zoom In	Increases the length of all vectors by a factor of 2. Because of the limited pixel resolution of the screen, zooming out several times and then zooming back in may not reproduce the diagram exactly.
	Shift*	This function works like Move under the VECTORS menu. Select and move one vector or axis, and the rest of the diagram is then automatically moved by the same amount.
	Length&Angle \surd	Vectors are measured either in terms of length and angle or in terms of components. The current mode is checked in the pull-down menu. Selecting either Length&Angle or Components toggles between measurement modes and changes the check mark in the menu.
	Components \surd	See Length&Angle above.
OPTIONS	Show axes \surd	The origin of coordinates is either the lower left corner of the window or else the intersection of the x and y axes, if they are shown. This menu item is checked if the axes are shown (the default option). Selecting this item when checked erases the axes and shifts the origin of coordinates to the lower left corner. Selecting this item when not checked places a horizontal and vertical axis on the screen and makes their intersection the origin for coordinates. The axes may be moved using either Move or Shift.
	Snap Head \surd	If Snap Head is selected on (the default), MacVectors automatically puts the head of a newly drawn or moved vector at the same pixel as the origin (if axes are showing) or to the nearest head or tail of any vector within snapper range (5% of screen width).
	Snap Tail \surd	When drawing or moving a vector, automatically puts the tail of the new or moved vector at

the same pixel as the origin (if axes are showing) or to the head or tail of any nearby vector. If both Snap Head and Snap Tail are turned on when moving a vector, either the head or tail (but not both) is snapped according to whether the mouse pointer was nearer to the head or tail when the move was initiated. This option is on by default.

Show Measures When this item is checked the measures of all drawn vectors are displayed and will be printed on the diagram if the diagram is printed. Column headings for the measures display are automatically put on the diagram if this item is selected. This option is off by default.