Monitor resolution is a pretty straight forward affair. We are dealing with simple mathematics for the most part, but there are some details that need to be resolved to start. First, you have a monitor of a particular size – 17, 19, or 22 inches for example. This is the diagonal measurement of the actual tube in a CRT monitor or the LCD in a flat screen monitor. To start with, we will ignore the spec sheet and make some determinations of our own.

My 22-inch LCD monitor actually measures 20 inches across the diagonal. This is because the bezel surrounding the screen hides the edges of the physical display device and presents me with a window in which I see the displayed image. This window measures 16 inches horizontally, and 12 inches vertically. This tells me some interesting things about the monitor which I need to know to make some decisions about how to use it.

The *aspect ratio* – the relationship between the horizontal and vertical dimensions – is 4:3. This is typical of a lot of monitors, but there are others with 5:4 aspect ratios. I need to know the aspect ratio of the monitor in order to choose an appropriate *screen resolution* – pixels per inch (ppi) – setting.

To check the aspect ratio of a screen resolution choice, divide the smaller screen resolution number by the larger number. If the result is .75, it is 4:3; if it is .80, it is 5:4. Monitors with a 5:4 aspect ratio would use screen resolutions of 1280x1024 or 1600x1280. Dividing the smaller number by the larger will give you the same .80 aspect ratio number. Using a screen resolution with a different aspect ratio than the physical design of the screen will result in a distorted image. Squares will display as rectangles, for example, and your images will not display properly.

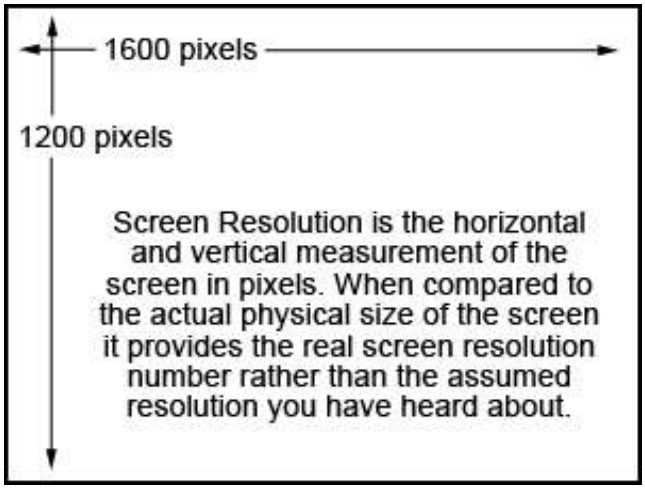
You can access screen resolution settings from your operating system to determine the display settings for your computer. On a PC, go to Start/Control Panel/Display/Settings. On a Mac, go to the Apple menu and choose Control Panels/ Monitors and Sound/ Monitors.

My 19-inch LCD monitor is also 4:3. Typical screen resolution choices are 800x600, 1024x768 and 1600x1200. Generally, the horizontal pixels are first and the vertical pixels second. Different video cards handle resolution choices in different ways, so you may or may not have resolution choices that only match your aspect ratio. Check the math to be sure.

Monitors with other aspect ratios such as 16:10 on some wide screen LCD monitors and laptops will display at 1280x800 or 1680x1050. My 14-inch laptop screen is a typical 16:10 ratio screen, but the choices for display resolution include 800x600 and 1024x768 in addition to the native resolution of 1280x800. The 4:3 ratio choices are there to allow the laptop screen to match projectors for PowerPoint and other projected displays without distorting the image on screen. When set to the 4:3 aspect ratios they center a smaller display rather than stretch the image to fit the screen. At the native 1280x800 resolution my laptop screen resolution works out to 106 ppi.

Current LCD flat screen monitors for desktop computers have a native resolution and they are best left at that setting. Those resolutions are typically higher than those for the older CRT monitors. Choosing lower resolutions for LCD monitors usually results in a reduction in sharpness, and should be done for very good reasons. For graphics use the native resolution is generally the best choice.

I will use my 22-inch monitor as an example of how to determine the actual screen resolution best suited for your CRT monitor. My monitor is set to display at a resolution of 1600x1200 pixels. This makes for some rather easy and convenient math, as the screen measures 16 x 12 inches, resulting in a screen resolution of 100 ppi (1600/16). Measuring the horizontal resolution is sufficient. You can measure the vertical (1200/12=100) to see if the numbers are the same to make sure you will get a non-distorted image. If your numbers are very close, that is good enough.



If we look at the 19-inch monitor set at 1024x768, which measures 14.25 x 10.75 inches, we get about 72 ppi (1024/14.25), ignoring the decimals. These screen resolutions are the recommended settings for the monitors of their respective sizes, but they present us with some interesting numbers. The 72 ppi of the 19-inch monitor will surprise nobody as conventional wisdom accepts the notion that monitors are 72 ppi. But, that is supposed to be for MacIntosh monitors. PC monitors are supposedly 96 ppi. Both of my monitors are on a PC. The 22-inch monitor is displaying at 100 ppi, perhaps close enough to the theoretical 96 ppi of a PC that you might assume I measured something a little wrong. I did not.

Since my 22-inch monitor is a 4:3 ratio monitor, I could choose to display at 1024x768 and be as accurate in representing my images as 1600x1200, but things would show up a bit larger. If I did that, however, the actual screen resolution would change to 64 ppi.

That makes sense as fewer pixels per inch means larger pixels, and therefore a larger display. There are no wrong choices here, just choices.

I could also choose to set my 19-inch monitor at 1600x1200, which would result in a 112 ppi screen resolution. A higher screen resolution means smaller pixels, and therefore a smaller displayed image. Many users choose higher screen resolutions as the effective *pitch* or pixel size is reduced. This results in an increase in sharpness of the displayed image, an advantage in editing images. The smaller the pixel size, the higher the screen resolution, and the closer to the resolution of the finished image. At 100 ppi, my 22-inch monitor is displaying a 300 ppi image viewed at 100% in Photoshop at three times the size of the actual finished image.

The truth of the matter is that we have stumbled into the dirty little secret about screen resolution. It is the function of the size of the screen itself *relative* to the desired display properties of the screen determined by the user. To say that a screen on a particular computer platform or of a particular size is a specific number is simply wrong. It is one of those conventional wisdom things that started when monitors were hard-wired with a specific resolution. Early Apple monitors actually were 72 ppi – that is where the whole thing started. As soon as operating systems and monitors allowed the user to determine how their individual display settings would be, the statement was no longer relevant.

Conventional wisdom, unfortunately, has the power to sustain itself, and to this day the assumed resolution for monitors and the internet is 72 ppi. It is of little concern unless you actually use your monitor/screen resolution to determine image sharpening parameters. Most people do not – too much math.

What do you do with this information? Nothing in particular, except to realize that screen resolution is a relative rather than an absolute figure. Understanding *image resolution* is what is really important, and the actual number of pixels that make up any image are what is important. Image resolution must be related to the output device on which the image will be printed, or displayed in the case of a monitor. When in doubt, for screen displays, such as images for email or the web, either use the conventional 72 ppi as a factor, or determine the size you want your image to be in pixels. In HTML code for web pages, images are described in pixel dimensions with no resolution number. This is simply because the image dimension in pixels determines how the web page will display the image as it has no idea what resolution you have set for your monitor.