

Apple Device Sizes

Apple started with one size of phone in 2007, but they later came out with larger sizes. The iPad came out in 2010 and is significantly larger. Earlier devices had a relatively smaller pixel density, which is the number of pixels per inch (ppi). Newer devices have the label “retina” and they have larger pixel density. When it comes to Apple devices, a retina screen typically means a screen that has 2x the pixel density of the previous generation. For example, if the original generation had a screen size of 360x600, and the new generation has a screen size of 720x1200, the new generation would be called “retina.” Some devices have 3x the pixel density. These are also called “retina.” In the above example, a 3x screen would have 1080x1800 pixels. (Those numbers might sound familiar.)

Note: Android device sizes and pixel densities are different. Some have 1.5x or 2.5x densities, in addition to the typical 2x and 3x.

Your mission is to identify the pixel sizes, physical ruler sizes, aspect ratios, and pixel densities of all the Apple devices currently supported by Xcode 8 and Xcode 9. These include iPads, iPhones, and Apple Watches. You need to fill out every square in the attached sheet. Then you’ll create an HTML table, with styles, to put in your portfolio.

You may be able to find all these numbers online, but don’t have confidence in any numbers unless you find them on a reputable web site. The numbers should all work out mathematically, and that is part of your task — to check all the numbers.

Width and Height in pixels. This should be relatively easy to find. For example, the original iPad was 768x1024. More recent iPads may be different. We usually orient the iPad in portrait mode, so the width is the smaller of the two numbers.

Diagonal inches. This should also be relatively easy to find. For example, some iPhones have diagonal sizes of 3.5 inches, 4 inches, 5 inches, and 5.5 inches. Some iPads have diagonal sizes of 7.9 inches and 9.7 inches. There may be others.

Pixel density. This is the number of pixels per inch on the device. This may be easy to find online. Look for numbers in the 150 pixels per inch to 400 ppi range.

Aspect Ratio. This is the simplified ratio of vertical to horizontal pixels. Typical aspect ratios would use small numbers such as 3:2, 4:3, 5:4, and some larger numbers like 16:9. To obtain the aspect ratio, just simplify the fraction formed by the number of pixels, and put the larger number first. Here is an example for an early iPad:

$$\frac{1024}{768} = \frac{512}{384} = \frac{256}{192} = \frac{128}{96} = \frac{64}{48} = \frac{32}{24} = \frac{16}{12} = \frac{8}{6} = \frac{4}{3}$$

Sometimes the aspect ratio may not be exact. For example, the pixels might be 641:480. If the pixels were 640:480, then the aspect ratio would be 4:3. 641:480 is close enough to 4:3 to call it that.

Width and Height in inches. You may have to calculate these. To calculate the width and height, you could use the Pythagorean Theorem and your knowledge of the Aspect Ratio and the Pixel Density.

1. First, figure out how many pixels are on the screen from one corner to the other (diagonal measurement) using the Pythagorean Theorem. For the above iPad, the numbers might look like this:

$$\begin{aligned}
 1024^2 + 768^2 &= \text{diagonal}^2 \\
 1048576 + 589824 &= \text{diagonal}^2 \\
 1638400 &= \text{diagonal}^2 \\
 1280 &= \text{diagonal pixels}
 \end{aligned}$$

2. Second, use the Aspect Ratio and the Law of Similar Triangles to compute the height and width. You can do the following calculations for both width and height. I give only width as an example.

$$\frac{\text{Diagonal pixels}}{\text{Width pixels}} = \frac{\text{Diagonal inches}}{\text{Width inches}} = \frac{1280}{768} = \frac{9.7}{\text{Width}}$$

$$\text{Cross multiply: } 1280 \times \text{Width} = 768 \times 9.7$$

$$\text{Width} = (768 \times 9.7) / 1280$$

$$\text{Width} = 7449.5 / 1280$$

$$\text{Width} = 5.82 \text{ inches}$$

$$\frac{\text{Diagonal pixels}}{\text{Height pixels}} = \frac{\text{Diagonal inches}}{\text{Height inches}} = \frac{1280}{1024} = \frac{9.7}{\text{Height}}$$

$$\text{Cross multiply: } 1280 \times \text{Height} = 1024 \times 9.7$$

$$\text{Height} = (1024 \times 9.7) / 1280$$

$$\text{Height} = 9932.8 / 1280$$

$$\text{Height} = 7.76 \text{ inches}$$

HTML Table. After you've filled in all the numbers, make an HTML table. The HTML table template and general HTML template are on the blog. Make the table look super nice to include in your portfolio. Use good styles to create the table border lines and give some padding to the cells. Use readable fonts.

If you find that two rows have all the same data, you could combine all those devices into one row.