



Image Size Calculations

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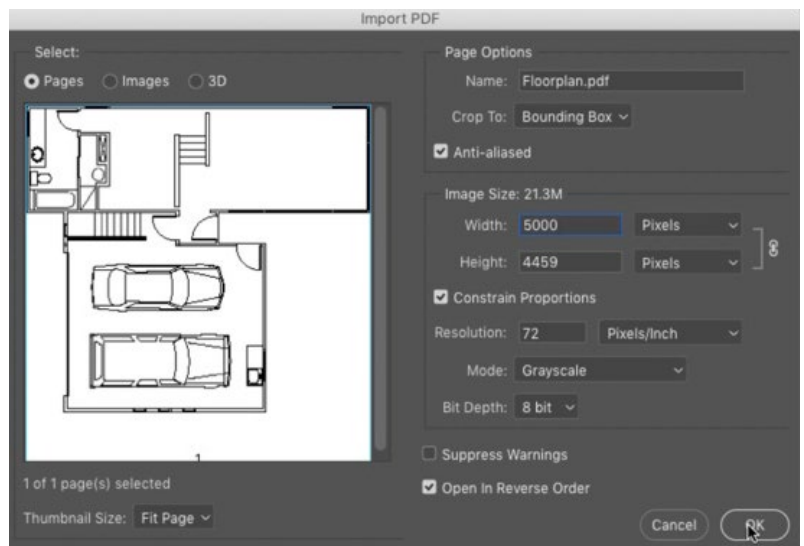
In this lesson, we're going to learn how to use the Image Size dialog box to do some useful calculations. In one example, we're going to open a floor plan in Photoshop and use the Image Size settings to correctly scale furniture so that it accurately fits into the plan. In another example, we're going to take three different images (of me) and scale an object (my head) within each individual document so that it is the same size in all documents.

Sizing furniture to fit in a floor plan

Open the floor plan PDF in Photoshop Let's start with the floor plan example. The floor plan document is a PDF file and we can open that in Photoshop simply by dragging it to the Photoshop icon. Alternatively, we could right-click on the file within Bridge and choose Open With > Adobe Photoshop CC from the pop-up menu. Photoshop will come to the forefront and the Import PDF dialog will appear.

There are two different types of PDFs: raster and vector. A raster image is made out of pixels and a vector image is made out of paths. You can tell which type of PDF file it is by clicking on the Image check box in the top left corner of the Import PDF dialog. If nothing shows up in the window below, it's a vector PDF. If individual images show up, it's a raster PDF. If it's a vector PDF, as we have here, it means that it can be scaled to any size without reducing quality.

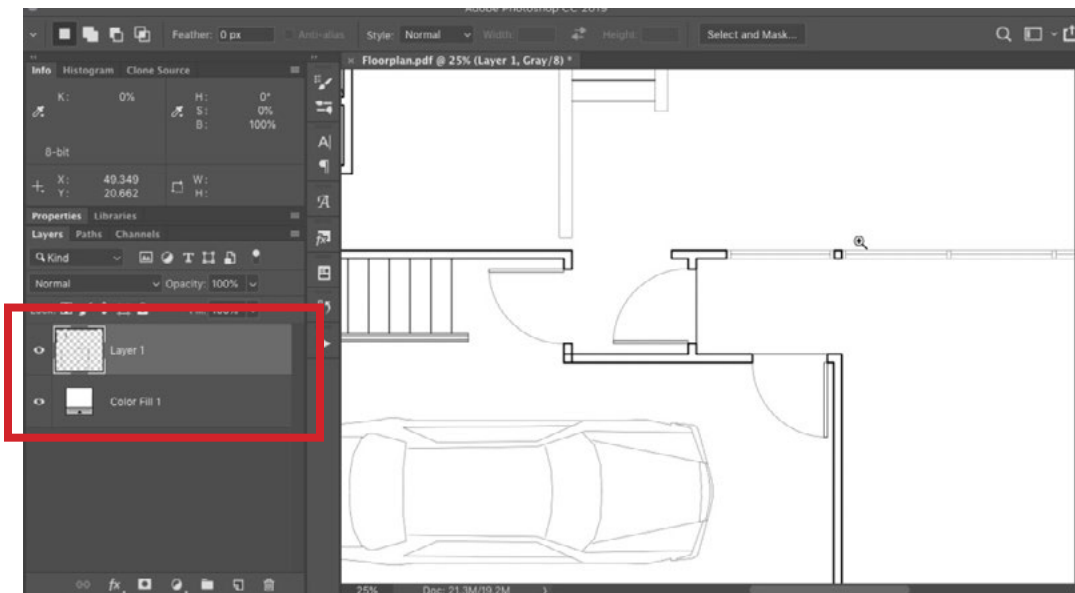
I'll click back on the "Pages" check box so that I can see the floor plan icon again. On the right side, we can specify how large we'd like the floor plan to be. We'll turn on the "Constrain



The Import PDF dialog appears when opening a PDF file in Photoshop. Here, we are using the Width field to open the file at 5000 pixels wide.

Proportions” check box so that the image does not become distorted when we change the dimensions. I want to make the floor plan huge, so I’ll set the Width field to 5000 pixels and then click OK.

Fill transparent background with white The PDF will open in Photoshop and the first thing we’ll notice is that there is a lot of transparency. The only parts of the image that don’t have the transparency checkerboard are the areas where the black lines of the plans are. We want to be able to see this a little better so we’re going to fill the transparent areas with white. We’ll click on the Adjustment Layer icon at the bottom of the Layers panel and choose Solid Color from the pop-up menu. The Color Picker will appear, we’ll choose white and then click OK. The Color Fill layer will appear at the top of the layer stack, so we’ll drag it beneath the layer that contains the floor plan.

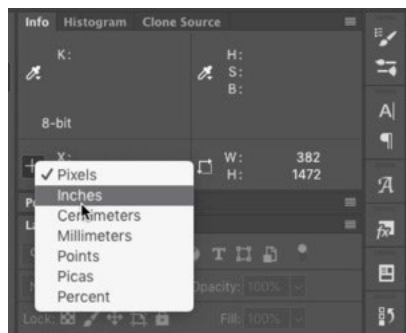


The floor plan had a transparent background, so we created a white solid color layer and placed it beneath the floor plan layer.

We’ll zoom in on the document and inspect the lines. Here, we can see a small amount of anti-aliasing on the edges. This is where there are some partially transparent pixels to try and make things look smoother. We only have a little of that here, but depending on what software created the document, you might experience much more of that. It may help the document, or it might be a problem. If it’s a problem, you can correct it and make all the lines look solid. To do this, duplicate

the layer multiple times, until all of the lines look solid when viewed closely. Then, flatten the image so there is a single layer containing the floor plan with a white background. That's what we'll do here.

Sizing the image Now we want to find an area of the floor plan that we know the correct size for. I know that the length of one of the rooms is 12'10". (I know that because I measured it with a tape measure.) We want to make it so that if I make



To change the units to inches, we are using the menu in the bottom left corner of the Info panel.

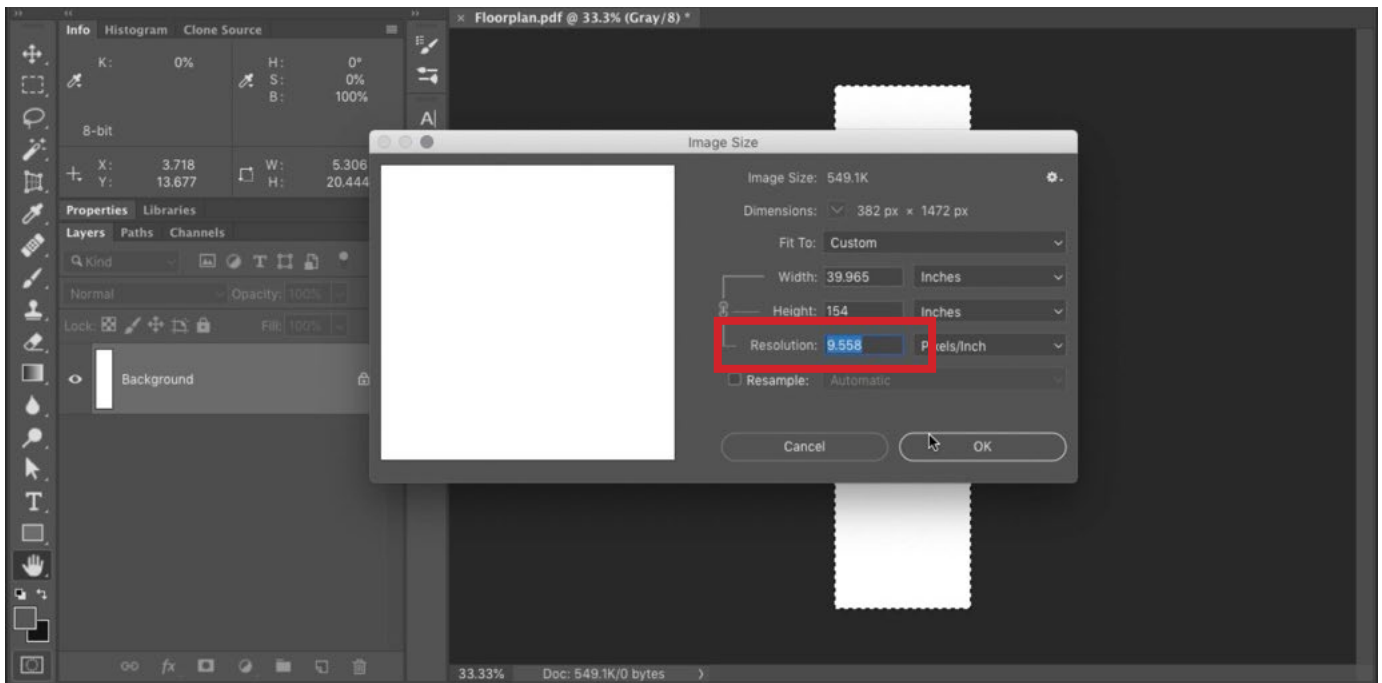
a selection of the area in Photoshop, that selection will numerically tell me the correct dimensions (12'10"). We can achieve that by using the Info panel and the Image Size dialog. If the Info panel is not open in your interface, you can access it by going to the Window menu and choosing Info. The Info panel is going to be set to the same units that the rulers are set to. We want the units to be set to inches. If they are not already reading inches, we can click on the crosshair in the lower left corner of the panel to access the units menu. Here, we can set the units to inches.

We'll make a selection of the length of the room that we know is 12'10". In our document, it's going to read as the height because of the orientation of the floor plan. Looking at the Info panel, we can see that the Height readout is 20.444 inches. We want the Info panel to think that it's 12'10" so that it accurately reflects the actual size. To do this, we need to tell it how big the pixels are that make up the document. In other words, we need to change the resolution, which is how large the pixels are when printed. We want to adjust this so that if we printed the document, the room would be 12'10".

With the selection of the room active, we'll go to the Image menu and choose Crop. This will crop the document to the size of the selection. Then, we'll go to the Image menu and choose Image Size. In the Image Size dialog, we'll set the unit menus to Inches and the Width and Height readouts show that the size of the selected area in the document was about 5" x 20".

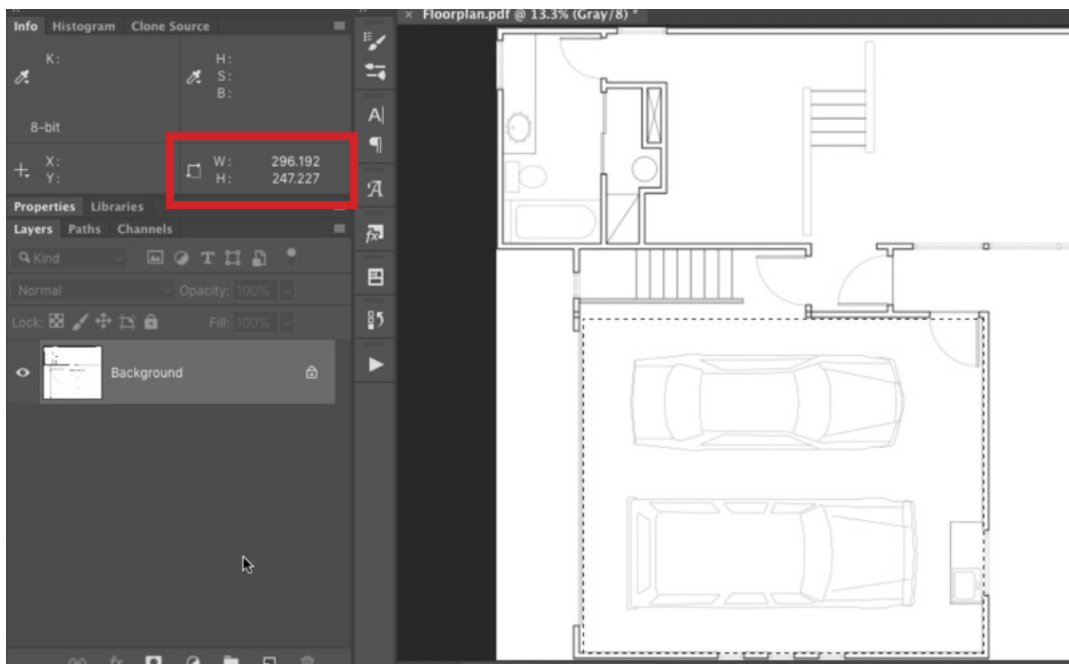
We'll first turn off the Resample check box because we don't want to change the amount of information that's in the file. We just want to change how big Photoshop thinks the pixels are. To do this, we need to calculate the resolution. The lower the Resolution number, the fewer the number of pixels that fit in an inch.

I know that 12'10" is 154" so we'll type 154 into the Height field. When we do this, the Resolution number changes to 9.558 and this is the number we need. (Remember that the Resample check box MUST be turned off in order to get an accurate result here.) Now we just used the Image Size dialog to calculate that resolution number, so we'll simply hit the Cancel button to exit the dialog. Then, we'll go to the Edit menu and choose Undo Crop. (We had only cropped so that we could make that calculation.)

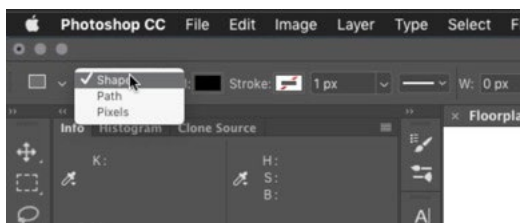


We know the area defined by this cropped document is 12'10" tall, which is 154" tall, so we entered 154 inches into the Height field. This gave us a resolution of 9.558. This is the number we must remember so that we can use it later.

Now, working on the uncropped version of the picture, we'll go back to the Image menu and, again, choose Image Size. Once again, we'll make sure that the Resample check box is turned off and we will enter in the resolution we just calculated: 9.558. We'll click OK to exit the dialog. The picture will not LOOK like it changed, but if we make the same selection and then look at the Info panel, the Height readout is going to read out 154", which is the correct size of the room. Now, anything we measure in the document should be the correct size. I'll make a selection of the garage and then look at the Info panel. The Width and Height readouts will now display the accurate dimensions for the space.



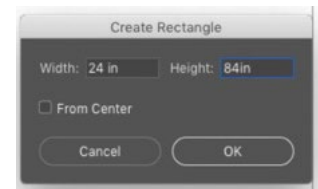
Now that the document is sized correctly, we can make a selection of a space and look at the Info panel to get the precise dimensions of the area.



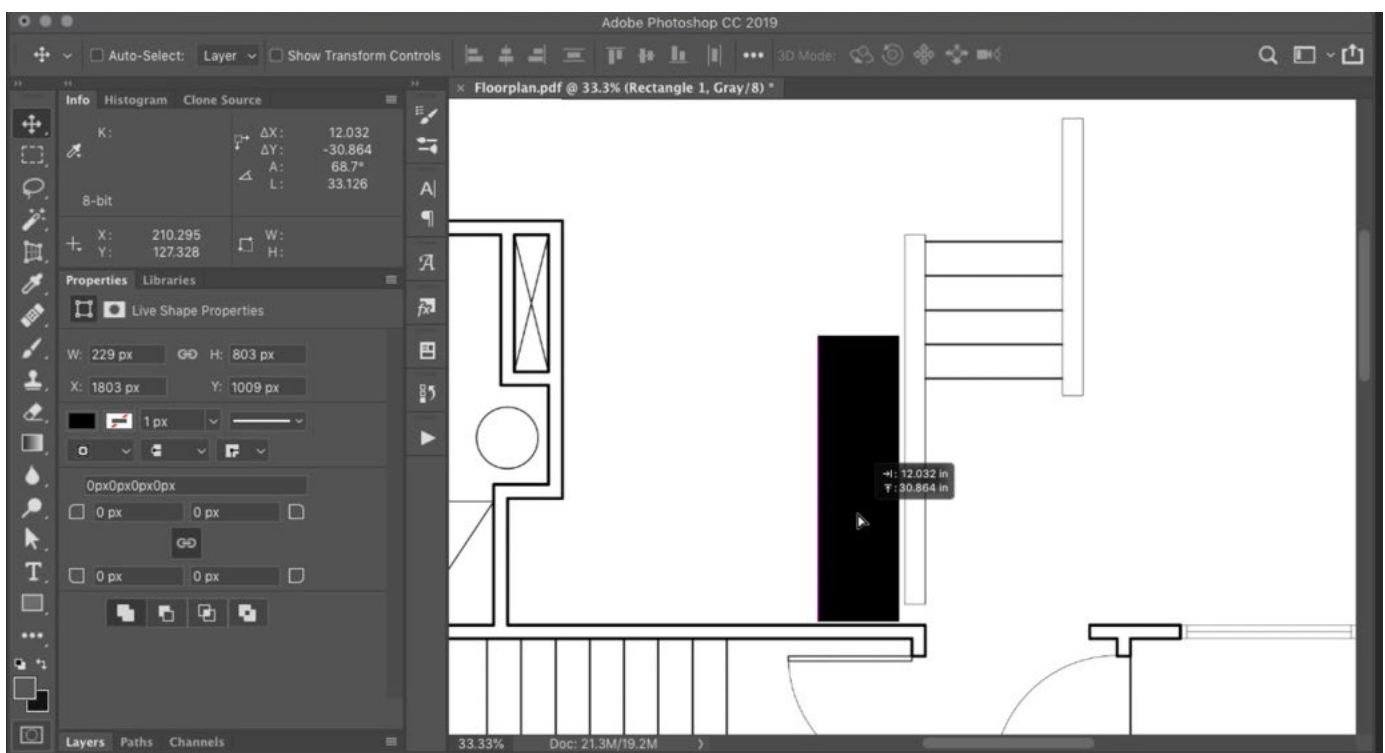
When using the Shape Tool to place furniture, we want to make sure the tool is set to create a Shape (not a path or pixels).

Now that we have the document sized to the same size as the house, we can easily place furniture of specific sizes to see how it would look in the space. Let's say that I want to see what a specific desk would look like in my office. We'll activate the Shape Tool and make sure that the menu in the Options Bar (above the image window) is set to Shape.

Then, instead of clicking and dragging to define a shape, we'll hold the Shift key and click once within the document. This will bring up the Create Rectangle dialog where we can enter in specific dimensions for the shape. The desk that I want to place is 24" x 84" so I will enter those dimensions into the Width and Height fields, making sure to type "in" after each number to specify that it's inches. We'll then click OK and the shape layer will appear in the document. We'll use the Move Tool to position the shape of the desk into the correct spot in the floor plan. This will give me a good idea of how large the desk will look in the space. We can create as many shape layers as we'd like to place furniture of specific sizes into the space. Again, the Marquee Tool can also be used to measure specific areas. We'd simply make the selection and then look at the Info panel to see the dimensions.



With the Shape Tool, we held the Shift key and clicked in the document. This allows us to enter the width and height.



A shape layer was created to represent a desk. It was set to a specific size so that I could see how it fit into my office space in the floor plan.

Scale an object to the same size in multiple images

Measure the height in pixels Now let's use the Image Size dialog to calculate the height of an object in pixels. In this example, we want to take the same object in three different documents and make it the same size in pixels across all the documents. The object in question here is my head.

First, let's look at all three images and find the one where my head appears the smallest. We will scale the other images down to this size. We're choosing this way because we don't want to scale anything up due to the loss in quality.

In Bridge, we'll select all three images and then double-click on one. This will open all of the images as separate Photoshop documents. We'll start on the image where my head is the smallest and we'll use the Rectangular Marquee Tool to create a selection that is the height of my head. Just as in the previous example, we'll now crop the document to the size of this selection by going to the Image menu and choosing Crop.



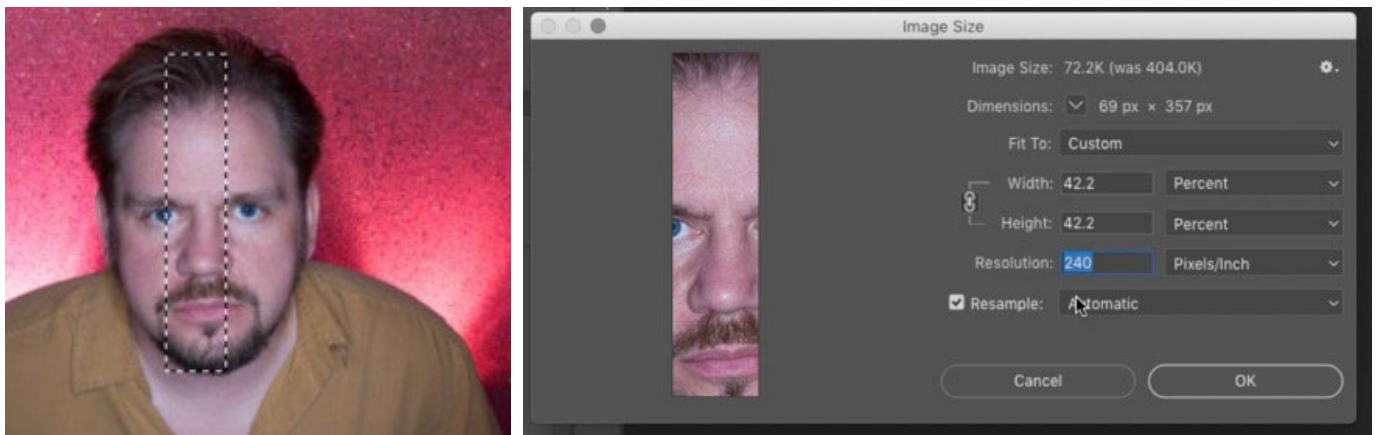
A selection is being made of the object (my head) so that we can see the height of the object in pixels.

We'll click on the Image menu and choose Image Size. We'll again use the Image Size dialog as a calculator. We want to set the units menus to Pixels, but in order to do this, we need to make sure that the Resample check box is turned ON. (If the Resample check box is turned off, the Pixels option will be grayed out in the units menu.) Once set to pixels, we'll simply make a note of the height in pixels, which is 357 in this case. This is the size we want my head to appear in the other two documents.

We only used the Image Size dialog to get that readout, so we'll click the Cancel button to exit the dialog. We'll also undo the crop by going to the Edit menu and choosing Undo Crop.

We'll now open one of the other documents and we want to resize it so that my head is the same size in pixels as it appears in the first image. We'll use the Rectangular Marquee Tool to make a selection of the area we want to work with (my head) and then we'll click on the Image menu and choose Crop. We'll then go back to the Image Size dialog (Image menu > Image Size) and we DO want to turn ON the Resample check box. This means that we want to change the amount of information that we have. We'll change the unit menus to display pixels and we'll change the number in the Height field to match the number that we recorded in the other document (357). We want to use this to scale the document.

Now we just want to click away from the height field by clicking on another field so that the Height is no longer highlighted. Then, we will change the unit menu on the Height field to read out the Percent. This will tell us the percentage that it scaled the image down in order to make it the height shown. In this case, it's 42.2%. We'll remember this number because it tells us how much we need to scale the entire document down.



LEFT: The same object is being selected in the second image. **RIGHT:** The Image Size dialog is being used to enter the height in pixels and then convert the units to percent so that we know what percentage to use when scaling the entire document.

Again, we'll click the Cancel button to exit the Image Size dialog and then we want to undo the crop so we'll click on the Edit menu and choose Undo Crop.

With the full image, we'll go back to the Image Size dialog and make sure that the Resample check box is turned on. We'll change the unit menus to Percent and we'll enter in 42.2, which is the percentage that we previously made a note of. We'll click OK and the image will resize. We can check our work by making a selection around my head and then looking at the dimensions in the Info panel to see that the height matches the height of my head in the first image. The same steps can be used to scale the third image, and then my head will be the same number of pixels tall in each image.

This technique can be used any time you want to make an object the same size across multiple documents.