Barrel and Pincushion distortions are optical problems that cause the lines in your image to bow inward or outward. Barrel distortion - outward bowing - usually only occurs at extreme wide angles, while pincushion distortion (inward bowing) occurs at extreme telephoto angles. Fortunately, these distortions are rarely extreme, are often hidden by the detail in your image, and are easy enough to remove using your image editing software.

Your lens may not have a big problem with barrel or pincushion distortion and, even if it does, the distortion may not be visible on all images. Sometimes, if the distortion is slight, it can be hidden by other curves and geometry within the image. Usually, you’ll spot the distortion in architectural photos or other images that have very obvious horizontal and vertical lines. In this tutorial, you’ll correct an image that was shot with an Olympus C2100UZ. With the lens zoomed out to full wide, the image barreled just a little bit.

Step 1: Open the Image
Open the image graphwall.tif, located on the Complete Digital Photography CD-ROM in the Tutorials>Chapter 13>Lens Distortion folder. Barrel distortion is easy to spot in this image because of the horizontal and vertical lines painted on the wall of the building. Nevertheless, the distortion is slight, so it’s a good idea to create some guides to help in our adjustments.

Step 2: Create Guide Lines
To make it easier to gauge the effects of your correction, it’s a good idea to create some simple vertical and horizontal guide lines. Choose View>Show Rulers to display Photoshop’s rulers at the top and left side of your document.

Click in the top ruler and drag to pull down a guide line. Drop it along the top horizontal line on the wall.

Next, click on the left ruler and drag to the right to place a vertical guide on the left side of the building. With these guide lines in place, all you have to do is correct your image until the painted lines on the wall match up with your guide lines. (Figure 1)

Step 3: Expand Your Canvas
To correct this distortion, we’re going to use a filter that will cause the image to distort to a size that’s larger than the current image’s canvas size. So, before you can start correcting the image, you need to add a little working room.

With the background color set to white, choose Image>Canvas Size, and set the Width to 10 inches.
and the Height to 8 inches. This is more canvas than you need, but you can always crop it later.

**Step 4: Correct the Image**

Photoshop's Spherize filter can apply a bulging, spherical distortion to your image. Fortunately, it can also create a depressed, bowl-like effect that is ideal for correcting barrel distortion. If you look closely at the graph wall image, you'll see that the distortion radiates from the center of the image in a spherical fashion. You'll also notice that the distortion gets worse toward the edges of the image.

Open the Spherize filter: choose Filter>Distort>Spherize. (Figure 2).

The Spherize filter is very simple. Simply enter a value for the amount of spherification that you want to apply. Positive percentages will cause the image to bulge outward, while negative values will bow the image inward. In other words, positive values will add barrel distortion while negative values will create pincushion distortion. You're simply going to use the Spherize filter's pincushioning ability to reduce the barrel distortion in the image.

How much spherizing to apply is simply a matter of trial and error. Enter a value of –50 and click OK. Figure 3 shows the results.

**Step 5: Try Again**

Obviously, -50 is way too much, but now you should have a good idea of what the filter does. Click Undo and open the Spherize filter again. Let's try something less extreme. This time enter –10.
Check out the results and you’ll probably find that this effect is still a little strong. Keep experimenting, but be certain that you examine the entire image when you evaluate your results. Don’t just look at the guide lines. You want to find a setting that provides the best results overall, not just a correction along the two guide lines.

A Spherize setting of –6 is probably about right.

Step 6: Crop

As you can see, the spherizing effect has changed the shape of the image. Click on the Crop tool in the main tools palette and crop off the curved edges of the image. (Figure 4)

You can correct pincushion distortion in exactly the same way; just use positive values in your Spherize command to add barrel distortion.