Resolution for Print

Determining image resolution for offset printing is a little bit different because of the way an image gets printed but the concept of image resolution is the same.
More resolution in a printed image results in more detail and higher quality than an image with less resolution.
A printing press can only apply ink to a solid area on a printing plate. A photograph; oil painting; or chalk drawing contain highlights, mid-tones and shadows. Because of the gradual change of tones of color or shades of gray, these images are called continuous tone.

Continuous tones are unable to be printed on a printing press so a method was developed to simulate the changes in tone by converting the tones into a series of solid dots.

The printer uses a halftone grid also called a halftone line screen to break up the continuous tone into a dot pattern. This is referred to as the LPI or lines per inch. The LPI is dependent on the output device that is the printer.

For example, a 600 DPI desktop laser printer can only print using an LPI of 65, resulting in coarser printed images.
Higher resolution printers or imagesetters can print using a much higher LPI such as, 150 or 175 resulting in smoother, almost-like-continuous tone images.

The lpi will determine the resolution of the image to be printed. The printer uses a formula of LPIx2=resolution of the image.

So an imagesetter using a 150 line per inch halftone screen would need an image that is 300DPI or 2x the 150 LPI, to get a high quality printed image.
If you were scanning an image, you would set the scanner at 300DPI and be sure the height and width are the exact size you need.

Some types of paper can only reproduce images using a lower LPI that results in a lower resolution, because of how the paper absorbs ink and how the dots of ink spread out on the paper. This spreading of ink is called dot gain.
Newsprint, a low quality paper typically uses an 85 LPI that results in a 170 dpi image.
The lower LPI creates halftone dots further apart and the dot gain is better controlled so the image is printed clearly on this type of paper.

High quality, coated paper can accept closely spaced dots using a 150 line screen or better because the ink sits on the paper and is not absorbed into the paper, so there is less dot gain.

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When preparing images for print you must consult with your printer before you begin scanning or sizing your images. Each print shop will use a different line screen depending on their equipment. You cannot determine the line screen or resolution on your own.
There are many variables you need to nail down ahead of time including the type of paper you will be using.
Ultimately, the printer will tell you what the resolution for the images should be.

Bottom line is, it is your responsibility to contact the printer BEFORE you begin to layout your project on the computer. It will save you time and money!