Accurate Cosplay Reference Scaling [Tutorial]

This tutorial is also available on my website! www.cestlasara.com **| For PERSONAL USE ONLY. Please do not redistribute this tutorial or my patterns without prior consent!**

Congratulations! You now have one of my patterns in your hands. This tutorial will explain **in-depth** how I scale patterns that are **not** at a 1:1 scale.

Scaling is extremely important for accuracy as you don't want a prop either too small or too large when you take pictures with your full costume ensemble. If you purchase someone else's 1:1 scale pattern template, this may not necessarily apply to your body size as the original author designed it for her/himself.

This tutorial is also available in video format and on my website! **www.cestlasara.com**

I will discuss some methods and tools I use for properly scaling my props. **In this tutorial, you will need:**

Software

- **ImageJ (free)** – Download here (works on Mac and Windows)
- **Adobe Photoshop*** (or **free** version- here, Enable Flash 10+)
  *I'll be using **Photoshop CS6** for the purpose of the tutorial. The free Pixlr version supports the similar concept.

Using ImageJ

ImageJ is a free tool I use for **measuring objects** in an image in **relation to the character** wielding said prop. I would then take these measurements, **set proportions** to my **actual height/body** or whatever else you want to use for points of reference for proper scaling. In other words, this tool helps you **calculate a character's height pixels into a known length**(i.e. your height) in inches (or cm), however you choose. While Photoshop can be used to "aesthetically" calculate or estimate a prop's scale to your own liking, ImageJ will give you **EXACT measurements** in cm or inches (or maybe yards or meters.. it's completely up to you).

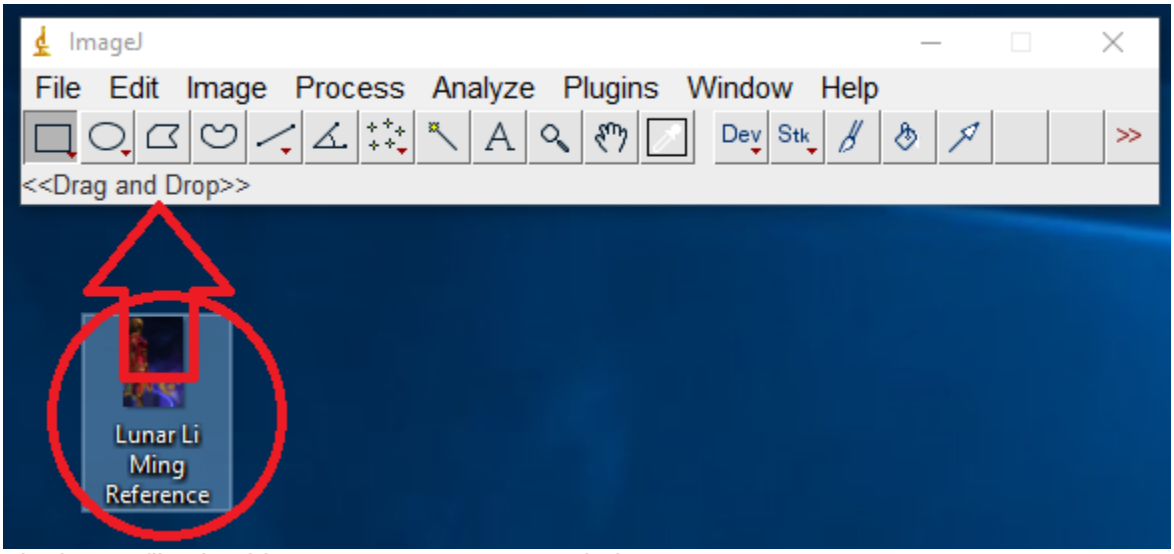
For the purpose of this article, I will primarily use **inches** as we're in the US and we're apparently special snowflakes by not using the metric system! I'll try my best to convert into CM as we go.

Note: This method works best with flat images, but in this tutorial I'll be using a character's 3D model .

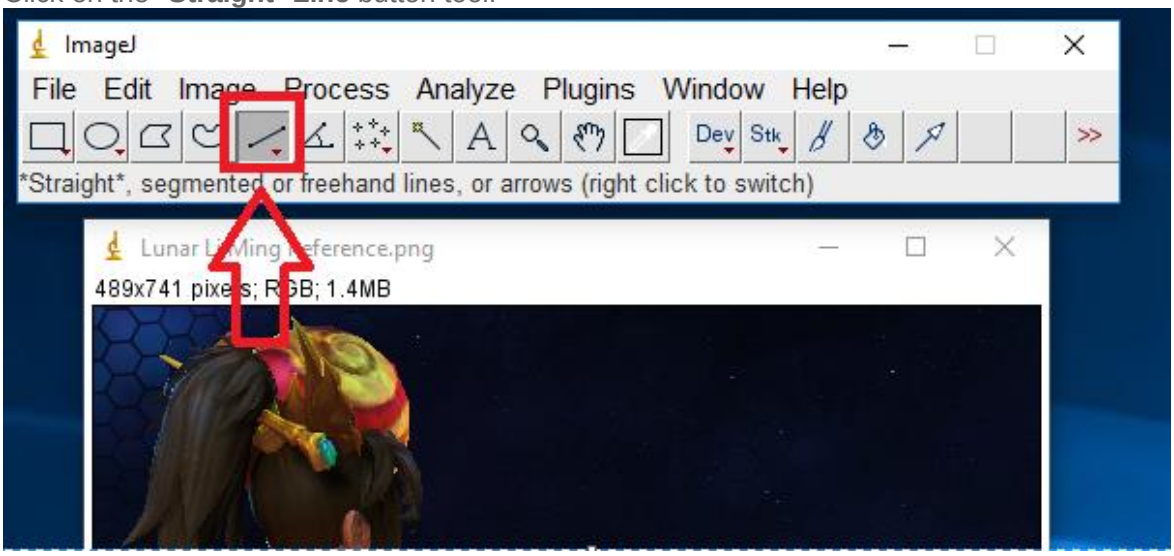
Download and extract all contents of the **ImageJ** *.ZIP file

Run ImageJ

Drag and drop your reference image into ImageJ (or open it through the program)

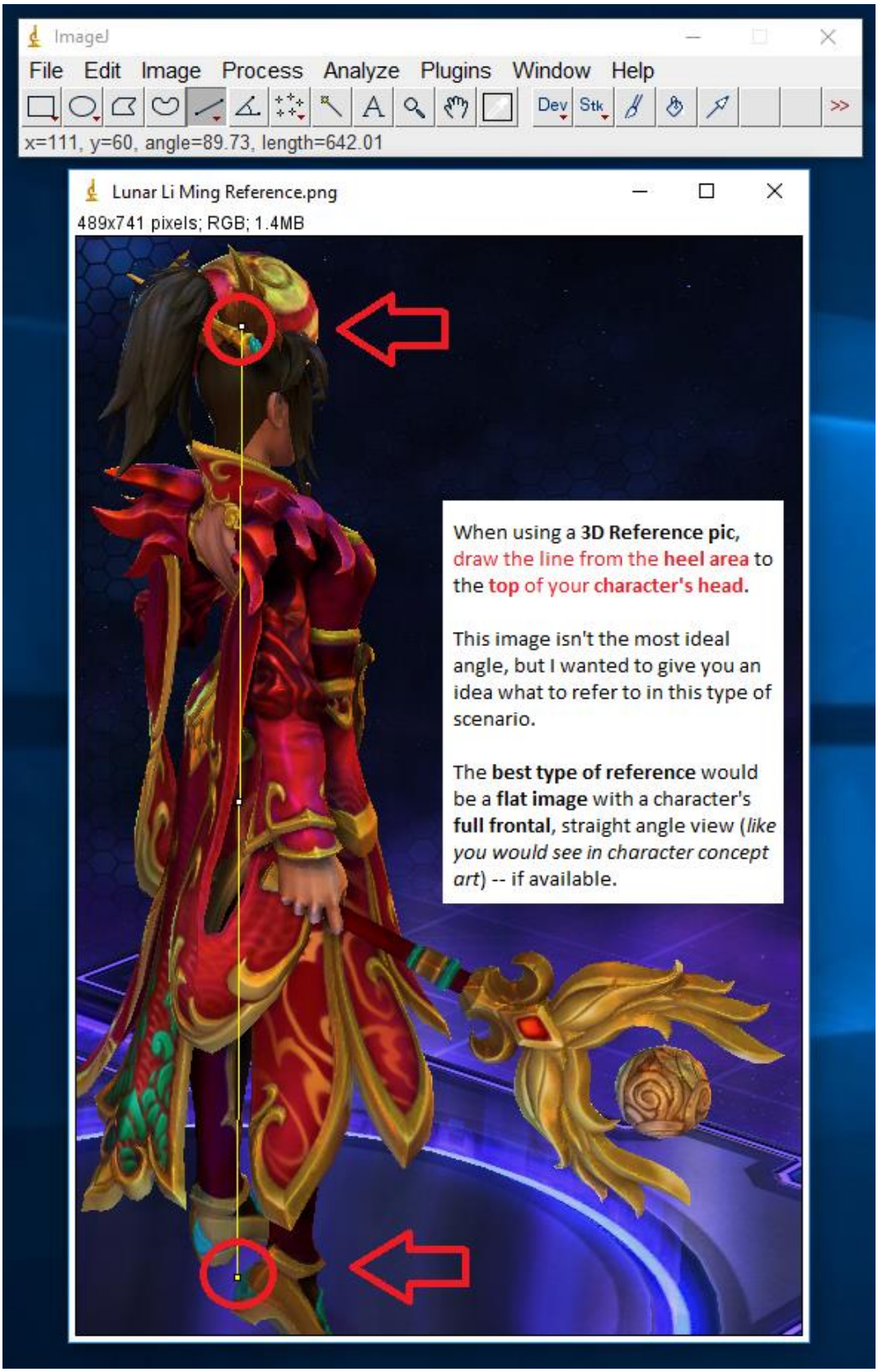


The image file should open up as a separate window.
Click on the ***Straight* Line** button tool.

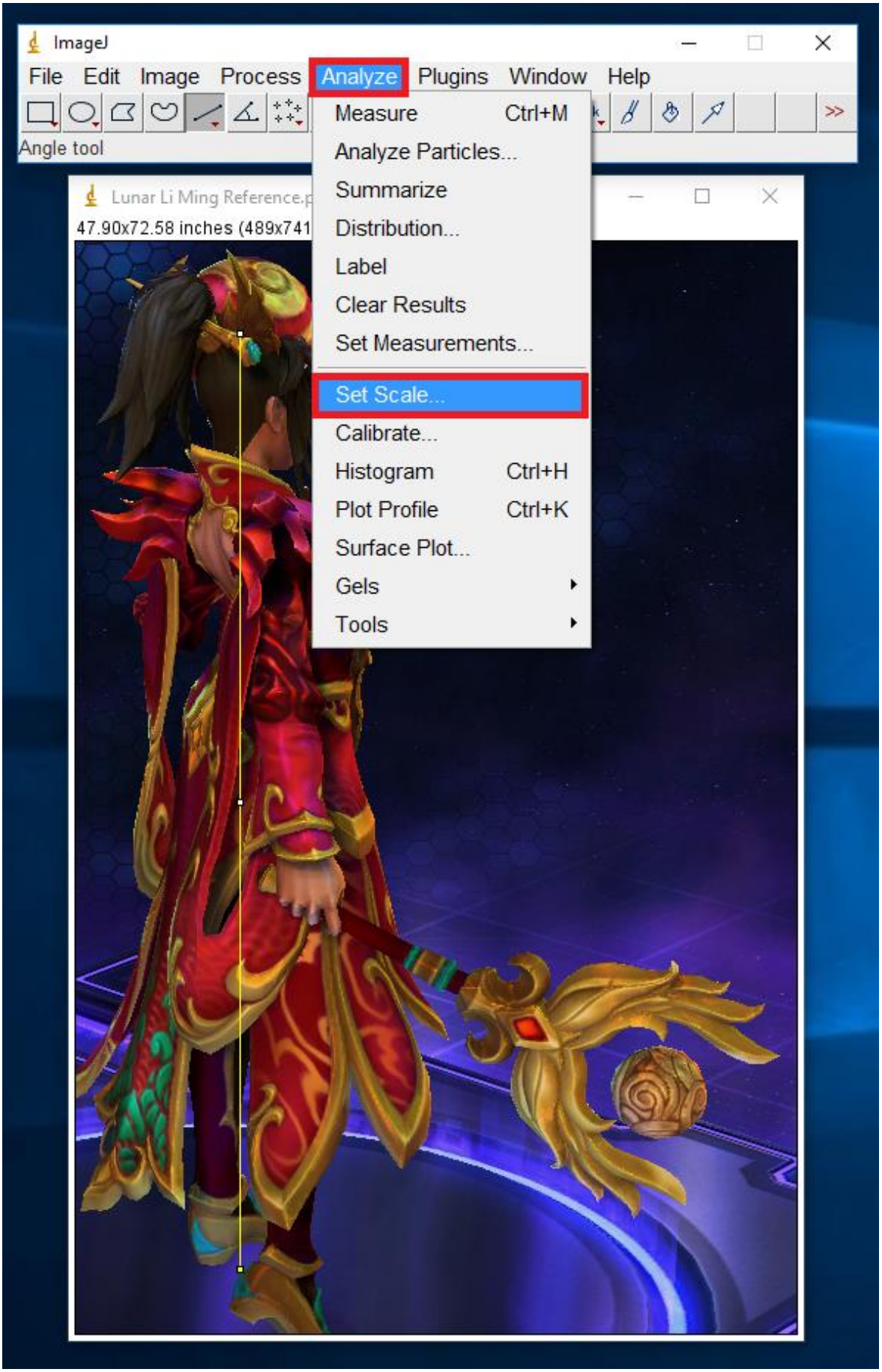


Using the **Straight Line tool**, set one point at the **top of your character's head**, and one point at its **bottom heel area**.

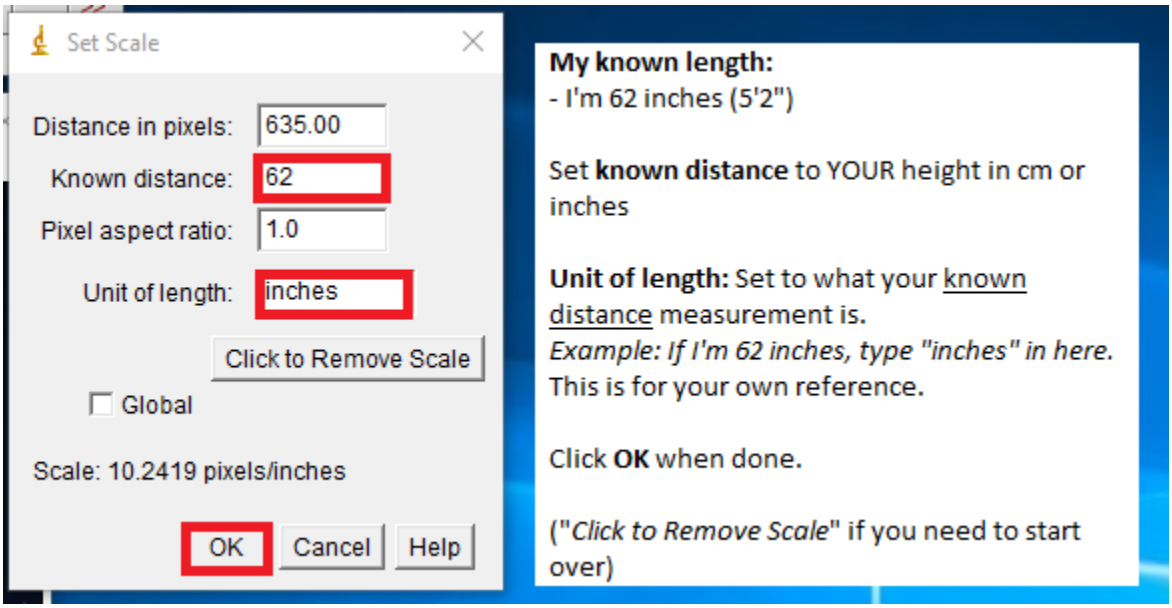
Refer to the notes in the screenshot below.



Navigate to **Analyze > Set Scale…**

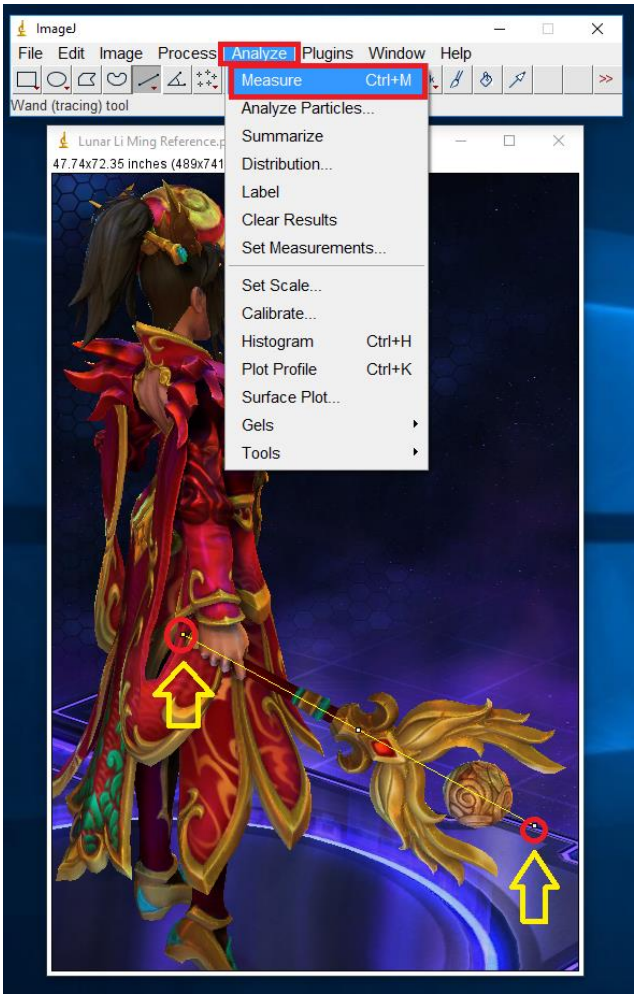


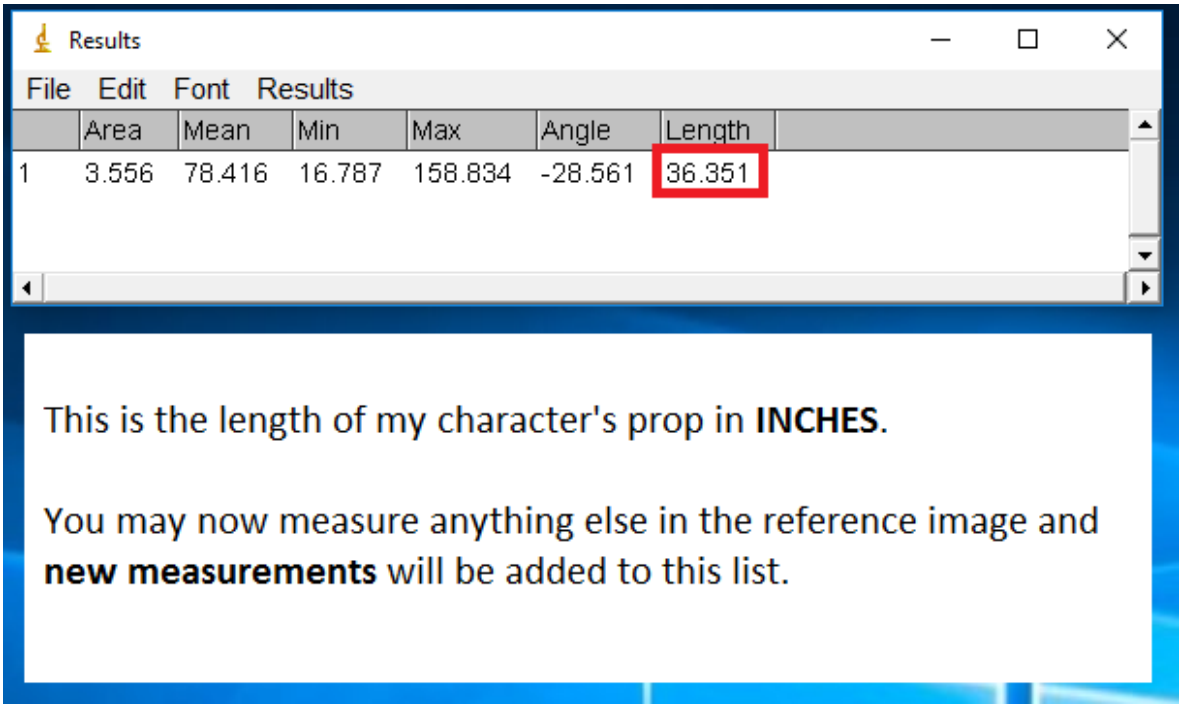
As the first point of reference – this next step will **convert the line's measurement to your own height** when measuring anything in this image.



While still using the Straight Line tool, draw a line from the **bottom to the top of the character's prop**.

Then go to **Analyze > Measure**





Using this info, you may now use this as a point of reference when printing and performing further visual scaling… such as the next part!

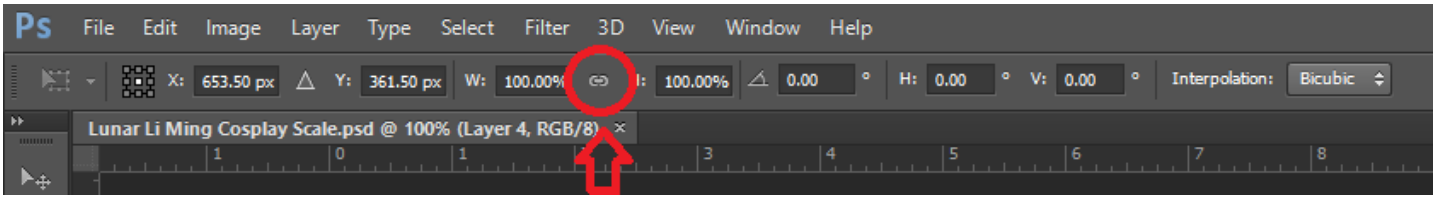
Using Adobe Photoshop

Using **Adobe Photoshop**, you can visually scale yourself to the reference picture.

In this screenshot below, the artist **Art Doge** at **Blizzard** posted this **front and back view reference** of my character.

I won't go into too far detail with Photoshop (this is not a Photoshop tutorial) – but with this image, I arranged the **reference picture in relation to myself**. I also took a screenshot of my own vectored pattern PDF to get the most accurate flat representation of the prop.

When scaling any images in Photoshop, make sure to **lock the proportions**!



This is how I arranged the layers on Photoshop:

- **Bottom** – Reference, set Opacity to about 50%
- **Layer 2** – Full frontal view of yourself
- **Layer 3** – Prop reference, 50% Opacity optional
- **Ruler guides** – Align the top and bottom of the reference picture to your own body

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Printing the Pattern to Your Size

Once you have determined the size of your prop as discussed with ImageJ measuring, you can now print out any pattern to the size you want!

In my example above, I have determined that my prop will be about 36″. You will do a little bit of easy math to determine how much % to increase your pattern when printing it out.

The formula looks like this:

Formula

$$\frac{100\%}{\text{1 page Prop printout (in/cm)}} = \frac{X\ \%}{\text{Your desired prop length (in/cm)}}$$

X = The value of the % to increase the scale when printing the pattern

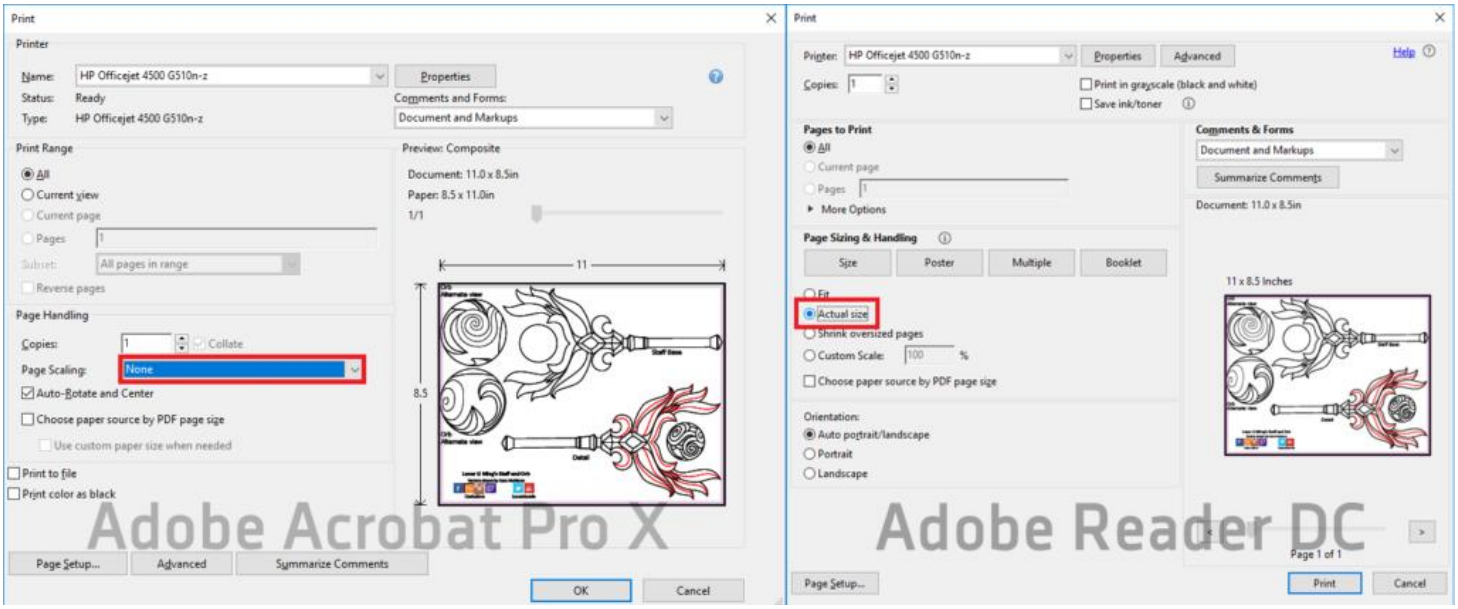
Stay consistent with units of measurement!

First, you will need to obtain your pattern PDF and make sure your printer supports the size you are viewing to prevent images from cutting off. **The original file should show a pattern on a single page.** For instance, if you are printing a US Letter pattern, the whole weapon should display on a single page for US Letter. (same applies for A4). If you need to print a US Letter pattern to A4, please refer to this page.

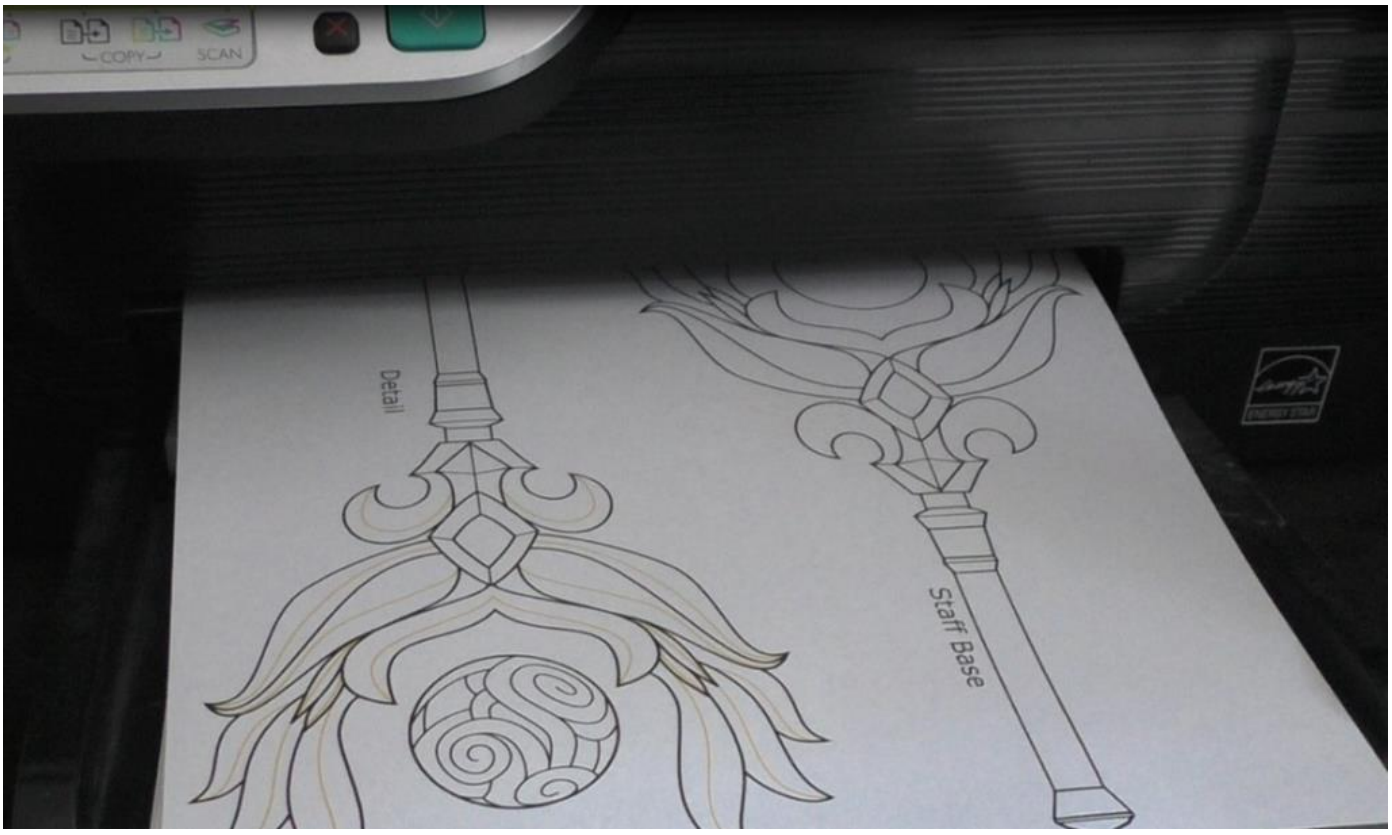
Print the pattern set to ZERO scaling, or 100%.

Adobe Acrobat X Pro
Page Scaling – None

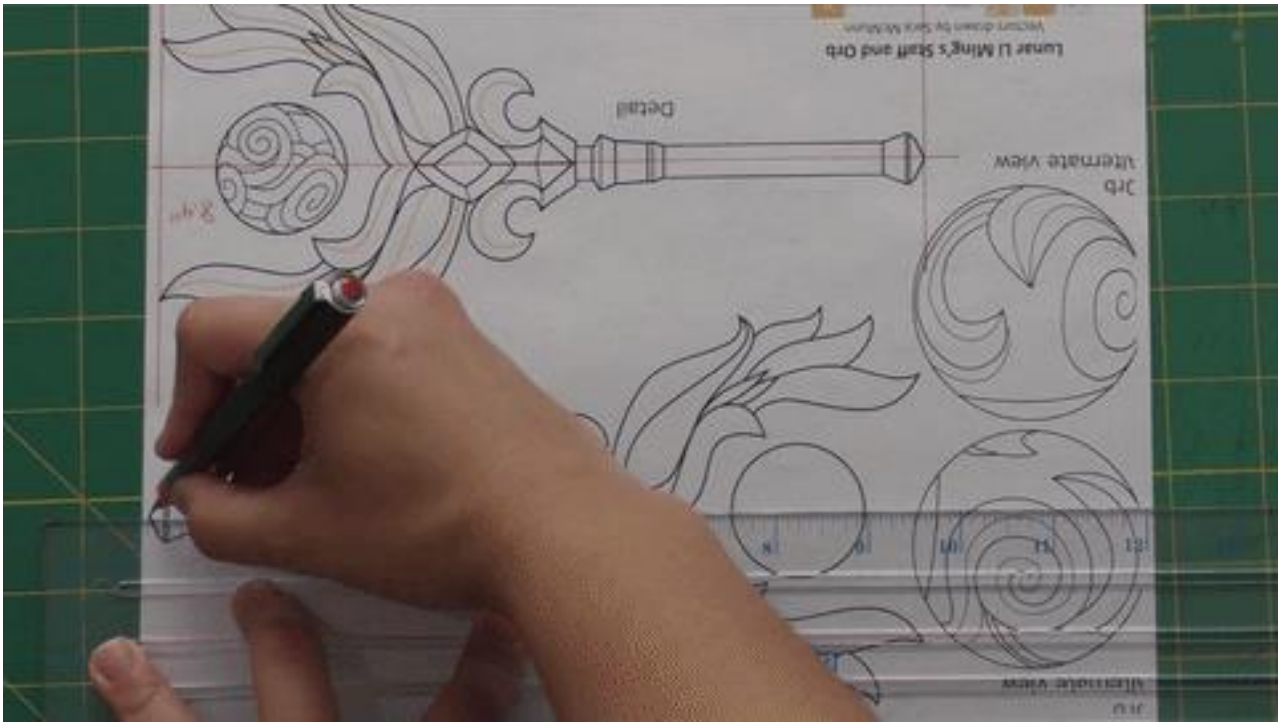
Adobe Reader DC
Page Sizing & Handling – Actual Size



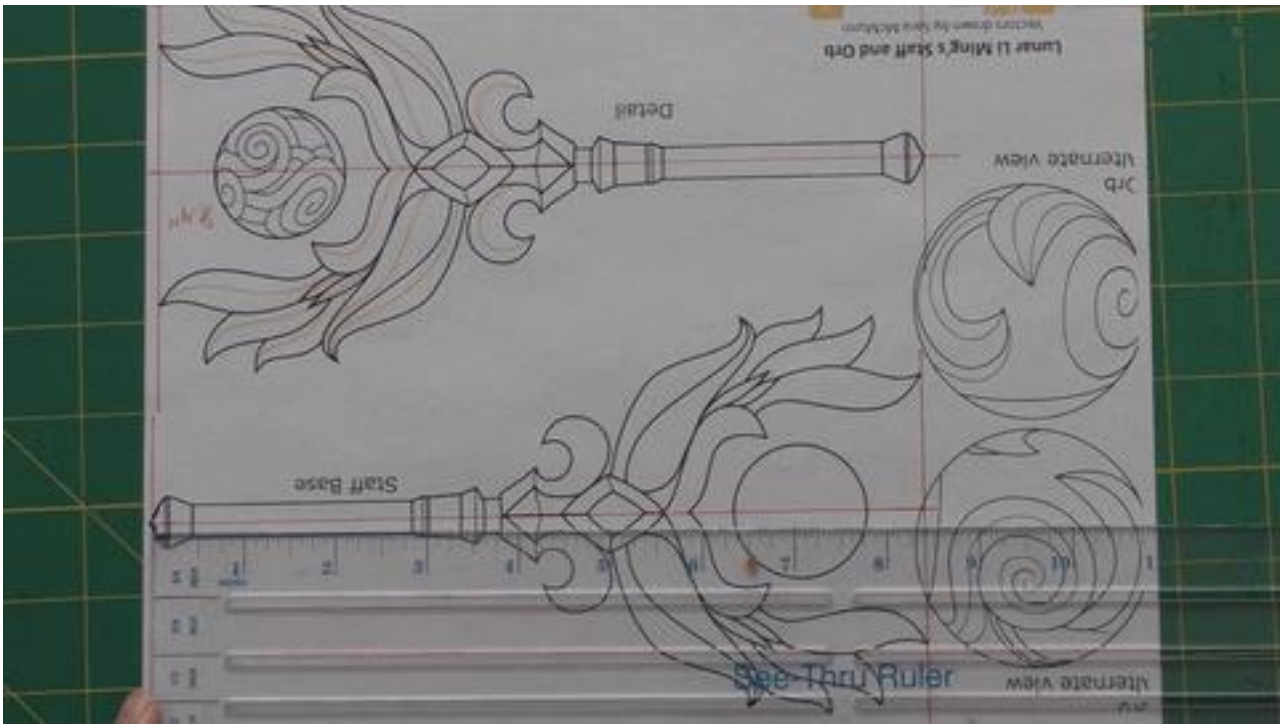
With the setting applied above, the printout looks like this from your printer.



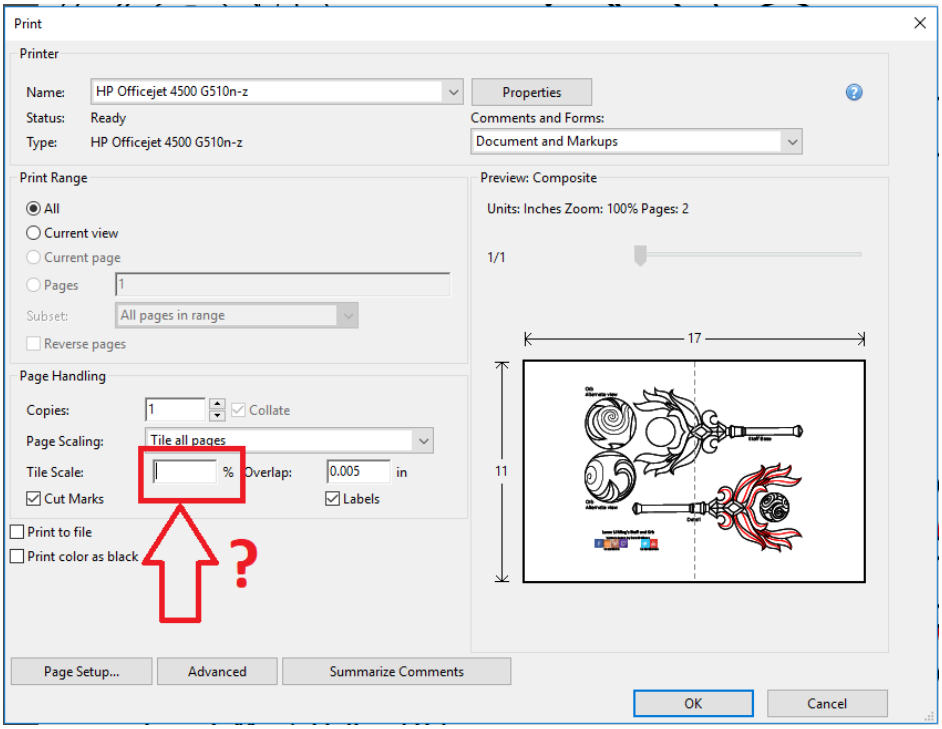
Next, you will draw a line through the center, meeting at the top and bottom of the prop.



Measure this length at the line intersections. This number will be your **[1 page prop printout]** length. In my example, mine measured to 8.4 inches.



Now, you want to know **what value** to put in here for scaling. (Adobe Reader DC says “Custom Scale: ___%”)



Remember, we found the imageJ length at 36 inches. 36″ is the **[Desired prop length]** value.
Referring to the formula below, this is how to find out what **number % to enter in for Adobe’s print window.**

Formula

$$\frac{100\%}{\text{1 page Prop printout (in/cm)}} = \frac{X\ \%}{\text{Your desired prop length (in/cm)}}$$

X = The value of the % to increase the scale when printing the pattern

Stay consistent with units of measurement!

EXAMPLE

1 page prop printout = 8.4 in
Desired prop length = 36 in

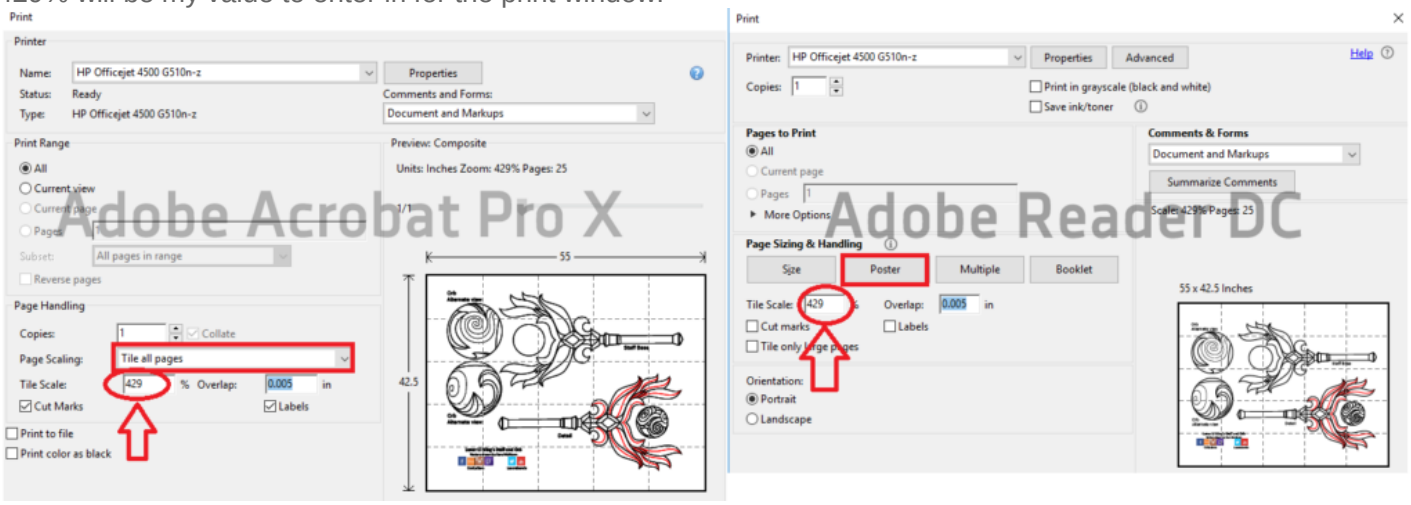
$$\frac{100}{8.4} = \frac{X}{36}$$

$$8.4 * X = 100 * 36$$
$$X = 3600 \div 8.4$$
$$X = 428.6\ \%$$

Round to: 429 %

Print patterns to any size!

429% will be my value to enter in for the print window!



Print out the pattern, assemble this, and your actual pattern template should be the length you measured in ImageJ!