The Mysteries of the Inch Revealed

Many students coming into Woodworking 108 are bewildered by "all those little marks between the numbers" on a tape measure or ruler. This hand-out is meant to help with this problem, since reading a ruler is one of the most basic skills needed to design and build effectively.

In this woodworking class, it is usual to refer to measurements in inches and parts of an inch, disregarding the feet measure. A board will be 20 ¾" long instead of 1' 8 ¾".

Parts of an inch will be referred to in fraction form instead of its decimal equivalent. ¾" will be used instead of .75".

Here is a short review of fraction terminology:

- **Denominator:** the term below the line in a fraction indicating the number of equal parts into which the unit is divided (Funk & Wagnalls Std. Dictionary). In ½", the denominator is 2. An inch is divided into 2 equal halves.

- **Numerator:** the term above the line in a fraction indicating how many of the parts of a unit are to be taken (also Funk & Wagnalls Std. Dictionary). In ½", the numerator is 1.

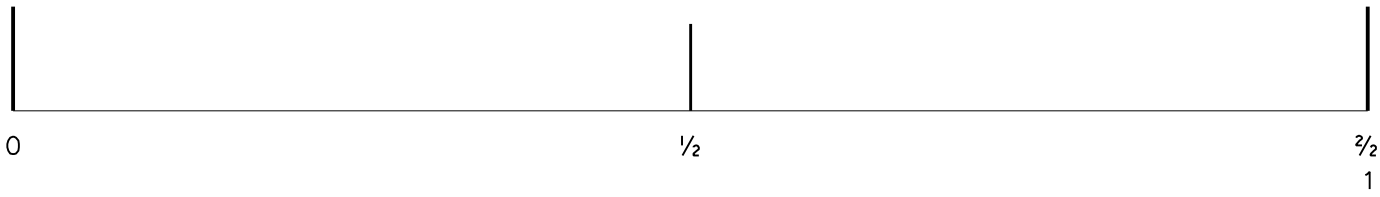
Inch marks in a ruler are broken into smaller increments based on divisions of 2:

1" ÷ 2= ½"
½" ÷ 2= ¼"
¼" ÷ 2= 1/8"
1/8" ÷ 2= 1/16"
1/16" ÷ 2= 1/32"
1/32" ÷ 2= 1/64"

Notice the denominator doubles each time the increment is divided in half.

In this class we will be measuring to the 32^{nd} of an inch. Professional woodworkers work to tolerances finer than a 64^{th}.

The different increments are usually shown on a ruler with different heights of line. In the examples on the following page, the inch designation is magnified for clarity.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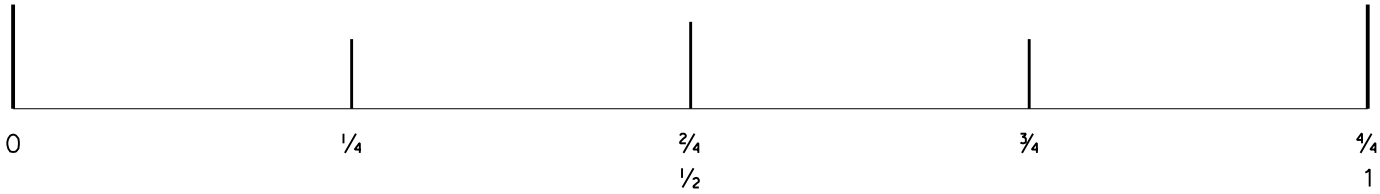
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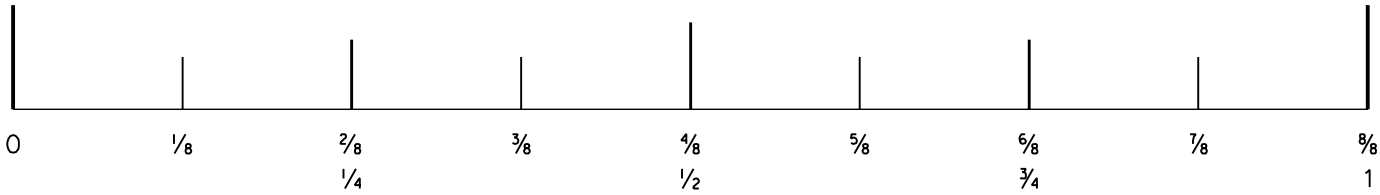
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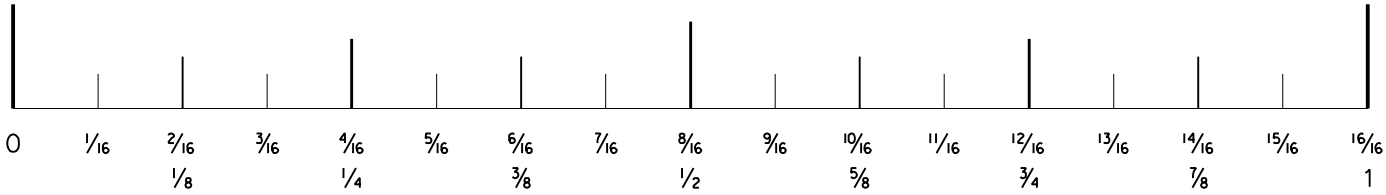
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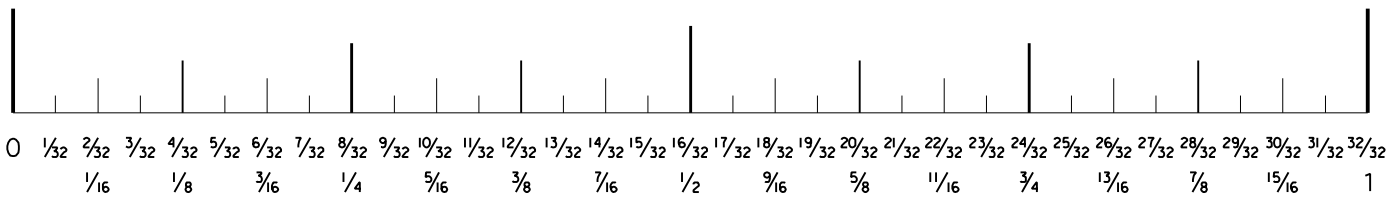
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15/16
31/32
32/32
1

Fractions are reduced by dividing the numerator and denominator by the same number that will go evenly into both. 2/4 reduces to ½ when both the numerator and denominator are divided by 2. 4/16 is the same as 2/8, but since 2/8 can be reduced still further, it should be. ¼ is 4/16 reduced to **the lowest common denominator**.

Measurements in inches are read as the number of whole inches plus any remaining fraction of an inch. If directions told you to cut a piece of wood 12 13/16", you would measure 12 whole inches and 13/16 of the next inch.

One way of finding the 13/16" is to count off 13 of the 1/16 measures in the next inch. Another way is to realize there are 16/16 in an inch and count back 3 of the 1/16 measures from the end of 13".

As the measurement marks get smaller, into the 32nds and 64ths, counting becomes more difficult. For example, if the measurement was 19/32", counting either forward or back from the inch mark is a pain, and losing your place while counting is easy. Realize that 19/32" is between 18/32" and 20/32". 18/32" reduces to 9/16" and 20/32" reduces to 5/8", therefore 19/32" is the 1/32 mark between 9/16" and 5/8".

Many times in construction you need to find the center of a board. It is great to have a board that measures exactly 11", but what if your board measures 11 3/8"?

> Divide the whole inch measurement by 2
> 11" ÷ 2= 5 ½"
>
> Divide the partial inch measurement by 2
> 3/8" ÷ 2= 3/16" (a short cut is to keep the numerator the same, and double the denominator)
>
> Then add the measurements together
> 5 ½"+3/16"= 5 8/16"+3/16= 5 11/16"

The key to becoming proficient at reading a ruler or tape measure is to practice. ½" and ¼" marks are easy to spot quickly for reference points. A little experience will teach you to recognize 1/8" and 1/16" marks, and then, suddenly, there you are, an expert.