

Draw and Measure a Circle Without a Pattern

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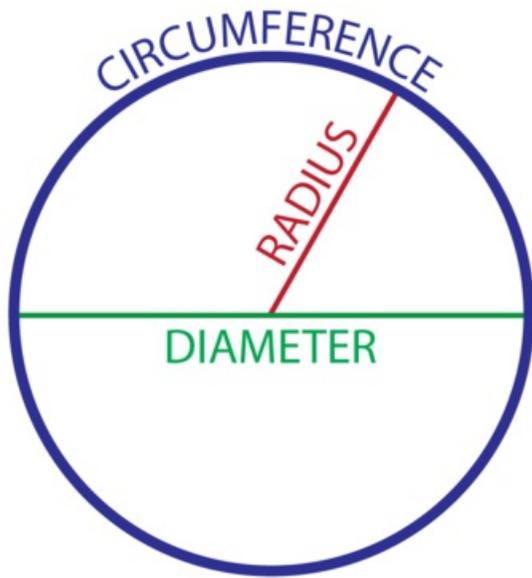
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The circle is, in my humble opinion, the Queen of the geometric shapes. Don't get me wrong; I like all those squares, rectangles, triangles, octagons, and whatnot; but the circle is the coolest of the bunch: smooth and pretty and endlessly useful. However, trying to draw a perfect circle without a pattern is a challenge, and figuring out the proper size of an opening into which a circle can be inserted requires working with Pi (or π), which is not the delicious kind you can eat with a bit of ice cream. We're here today to help you with the steps you've forgotten since high school geometry class (*or maybe never learned because you were too busy passing notes with Susan Ellery!*). We'll show you the parts of a circle, how wide to cut fabric to fit a circle, and how to draw a circle without a pattern. We've also included a handy conversion from decimals to inches, which is necessary when working with Pi.

The parts of a circle

Let's start with remembering what all the parts of a circle are called and how Pi (π) fits into the mix.



Radius: the distance from the center of the circle to the outside edge

Diameter: the distance across a circle through its center point

Circumference: the distance around the outer edge of a circle

π or Pi: the name given to the ratio of a circle's circumference to its diameter, expressed as the decimal 3.14

How wide to cut fabric to fit a circle

If you know the **diameter** of your circle, you can use a standard formula to figure out the *width* of the fabric cut needed to make a tube. That width is the **circumference** of the circle that will be inserted into the tube (we have a [great step-by-step tutorial](#) on how to insert a circle into a tube)

The formula: **$3.14 (\pi) \times \text{diameter} = \text{circumference}$**

Example: You want a finished 12" diameter base (a 12" diameter circle) in a duffle bag.

$3.14 \times 12 \text{ inches} = 37.68 \text{ inches}$

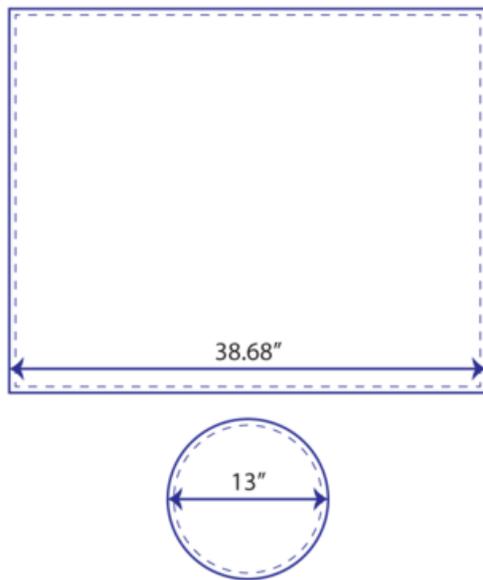
(This works with the metric system as well: $3.14 \times 30 \text{ cm} = 94.2 \text{ cm}$)

An important step many people miss at this point is forgetting to add extra (*to both pieces*) for the seam allowance. If you use a standard $\frac{1}{2}$ " seam allowance, you need to **add 1"** to the **diameter** of your circle (the diameter increases by double the seam allowance) **and 1" to the width** of your fabric ($\frac{1}{2}$ " for both sides of the seam allowance). In our example, that means:

The circle should start as 13" in diameter.

The fabric should be 38.68" in width

The height of your fabric cut is variable and dependent on your project. For example, a tall duffle bag might be 30" in height whereas a shorter bucket might be only 10".



Converting a Decimal to a US Ruler Measurement

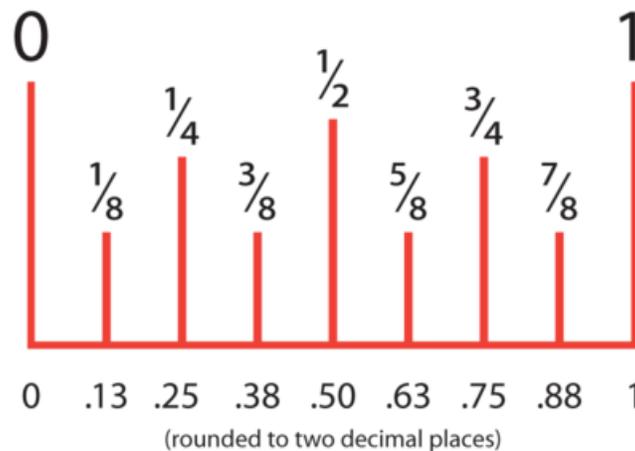
If you are using Pi, remember it always returns a decimal number. If you already deal with the metric system, you rock – no conversion necessary.

For those of us in the world of inches, you need to find a yardage conversion.

In our example we have 38.68 inches. *Harumph!* The table below will give you a close-enough ruler match.

The decimal .68 is closest to .63 or $\frac{5}{8}$ ". We can use $38\frac{5}{8}$ " as the width of the fabric piece you are cutting for your tube.

DECIMAL TO INCHES CONVERSION



How to Draw a Circle

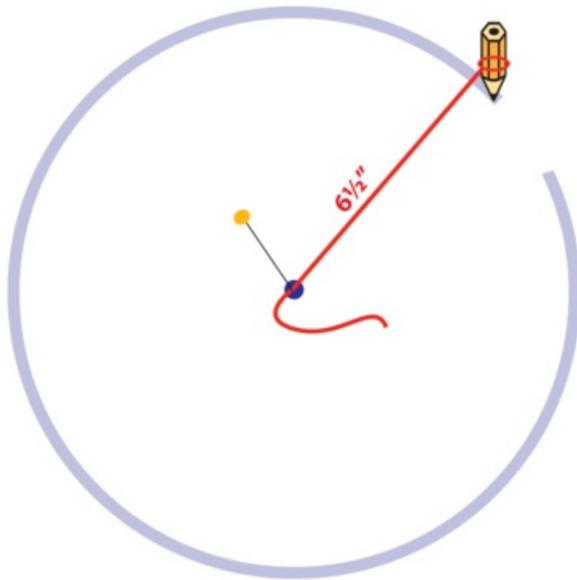
If you have a supply of large compasses, you're in luck, and can easily draw yourself all sizes of circles. But you can also easily make your own compass to draw a circle.

To start, you need to know how big you want your circle (the diameter). For our ongoing example, we want a 13" diameter circle

To draw a circle you need to know its radius. As you learned above in the first section, the radius is one half of the diameter. In our example, one half of 13" is $6\frac{1}{2}$ ".

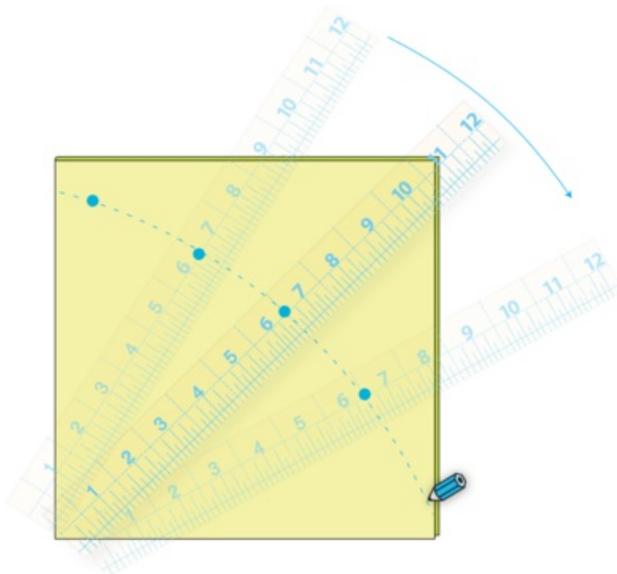
The full circle method

1. Use a sheet of lightweight paper (graph or pattern paper works well) that is at least 1" larger all around than the circle you want to draw.
2. Cut a piece of string about 4" - 5" longer than your radius. We used a 10" length of string.
3. Tie one end of the string to a short pencil.
4. Place the point of the pencil toward the outer edge of the paper with enough room from the edge to make a full sweep.
5. Measure from where the point of the pencil touches the paper backwards by the length of the radius (in this case $6\frac{1}{2}$ ").
6. Pin directly through the string into the paper at that exact point.
7. Keeping the string taut, draw a perfect circle using your homemade compass.



The folded quarters method

1. Again, start with a square of lightweight paper at least 1" larger than the circle you want to draw.
2. Fold the paper into quarters. Make sure your original square is even and true! Position the paper with its folded edges along the bottom and left side and the open edges along the top and right side.
3. Place a see-through ruler at the exact center of the bottom left corner of your folded square. Swing the ruler from the top to the bottom of the square, like a pendulum or compass, measuring and marking a dot at the $6\frac{1}{2}$ " point in three to four spots. You are creating a semi-circle arc. Make sure the end of the ruler at the corner point doesn't shift position.



4. Cut along the arc through all the layers and unfold the finished 13" circle. You can now use this paper pattern to cut your fabric circle.

With your spiffy new circle, you can now sew the side seam in the main fabric cut. Then pin the base to the resulting tube and sew the tube to the circle using a 1/2" seam allowance. The result is a 12" diameter finished base.

As mentioned above, for more on this technique, see our tutorial: [How to Insert a Flat Circle Into a Tube](#)

Sewing Tips & Tricks

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