

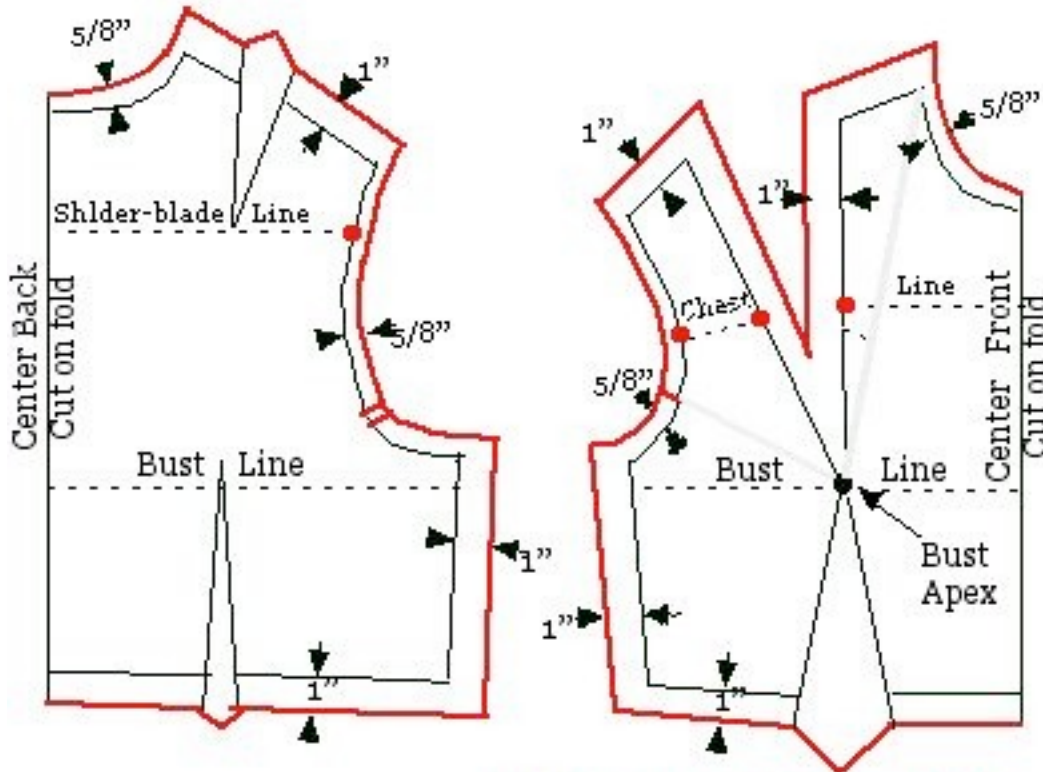
## Preparing your pattern & muslin/garment for fitting

Your original sloper or block draft needs some additions before you can cut it out of muslin. (Commercial patterns usually have these markings already, but you may want to modify the seam allowances). The following are discussed in this article.

- reference lines
- seam allowances
- matching guides: dots, circles and notches
- apexes

The following sketch illustrates these additions to a bodice sloper:

### Adding Reference Lines, Seam Allowances, Notches & Other Match Points to Bodice Sloper



Black lines are seamlines; Red lines are cutting lines (SAs);

When you cut out your muslin, all but the seam allowances need to be marked onto the fabric.

## Reference lines

Vertical and horizontal reference lines, also called balance lines, are essential to a good fit. Verticals must always be plumb (perpendicular to the floor); horizontals must be level with (parallel to) the floor. If either of these are off, adjustments are needed.

If these are not marked on your sloper or pattern, draw them on the paper first, making sure they are perfectly vertical or horizontal (depending on the line). I like to lay my see-through pattern over a 1" marked grid, and I also use a T-square.

The following are recommended reference lines (see sketch, above, for bodice example). Each of the horizontal reference lines are detailed in separate sections, below.

### All garments:

- center front (CF) line
- center back (CB) line
- grain line (only if CF/CB is not on grain)

### Bodice, blouse, shirt, dress, vest, jacket, coat

- [chest line](#)
- [shoulder-blade line](#)
- [underarm, bust, or midriff line](#)
- [shoulder line](#)
- [shoulder line on sleeve](#) (see also [Cat's Bodice & Sleeve Sloper](#)).
- [hip line](#) (all waist darts should be open before drawing line)

### Skirt

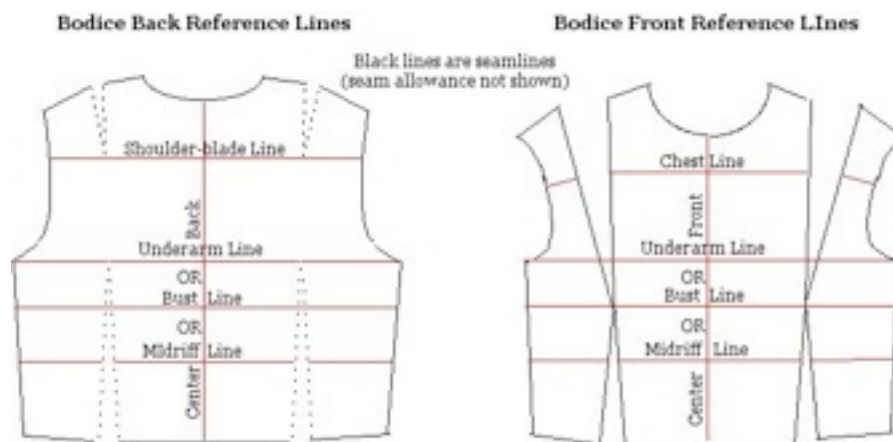
- [hip line](#) (all waist darts should be open before drawing line)

### Pant, trouser, shorts, culottes

- Fitting these garments is very tricky - too much for this article.

## Summary: Horizontal Reference Lines on Bodice Sloper, Back & Front

The following sketches illustrate the reference lines for a bodice sloper muslin:

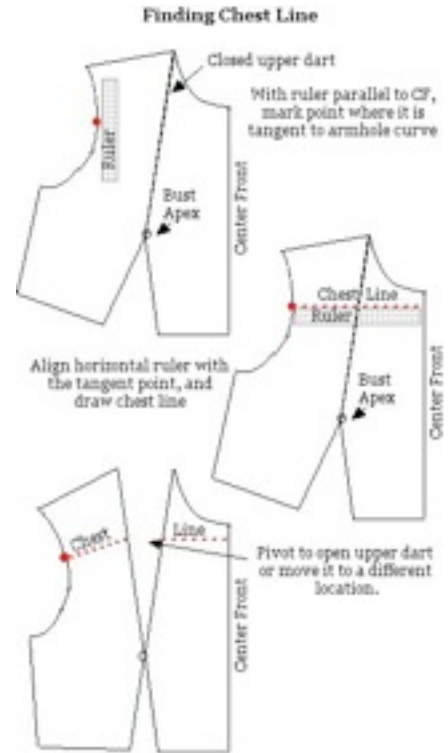


### How to find the chest line

First pivot to close all neckline, shoulder & armhole darts, moving them to the sideseam or waist dart position. With your pattern on top of a 1" grid with center front aligned with a vertical gridline, place your ruler on top of the pattern, parallel to the CF. Then slide it toward the armhole, keeping it parallel to the CF, until it just touches (is tangent to) the armhole seam. Mark that point.

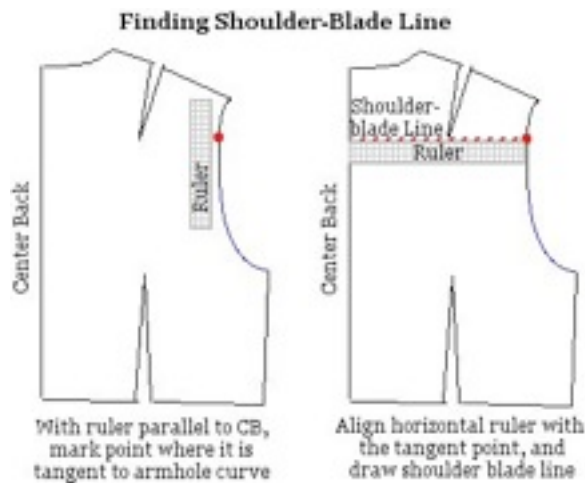
Turn your ruler to be perpendicular to CF, line it up with the point you just marked and draw the horizontal chest line along the ruler's edge from armhole to CF.

Now you can pivot your darts back to where they were originally (or to new location); this will cause parts of the chest line to be at an angle to horizontal, but when the darts are sewn closed, the chest line will be restored to a straight horizontal line.



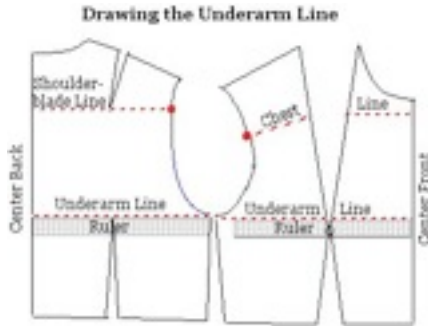
### How to find the shoulder-blade line

Repeat the same process (as used to find the chest line) on the back, except don't pivot to close the neckline or shoulder darts. After drawing the line, redraw the back neck or shoulder darts so that their point just touches the shoulder-blade line (for a sloper or block), or come to a point 1" above the shoulder-blade line for a designed garment.



When you are fitting your sleeve cap to the armhole, the chest line point on the front armhole should correspond to the point on the sleeve's front cap curve where it changes from concave near the sideseam, to convex at the top of the cap. Similarly, the shoulder line point on the back armhole should correspond to the point on the sleeve's back cap curve where it changes from concave to convex.

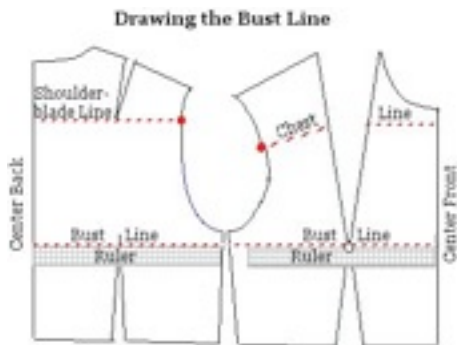
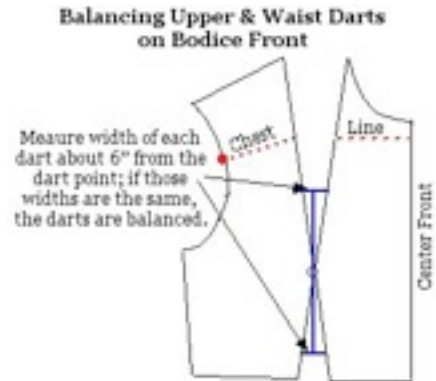
## Drawing the underarm, bust, or midriff line



The **underarm line** works well on the back because there is no intersecting dart (the waist dart point just reaches the underarm line on a sloper, and is below the line on garments).

Lay your ruler so it is perpendicular to the center back, and aligned with the point where the armhole curve meets the sideseam. Draw the horizontal line across the pattern.

For **men**, use the same method on the front. For **women**, the upper & waist darts must be in balance before you can draw the line across the pattern (see sketch, right). Even then, it doesn't work very well for the underarm line, unless the bust apex is right on the line, because the bust protrusion disturbs the line. Instead, I suggest using the bust OR midriff line, on both front & back (you don't need both).



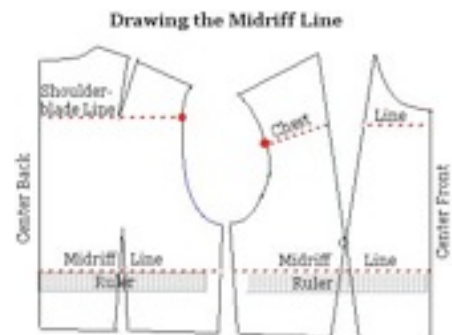
To draw the **bust line**, first pivot the outer (armhole/sideseam) section to achieve dart balance, as shown, right. Then lay your ruler so it is perpendicular to the center front, and align it through the bust apex. Draw the horizontal line across the pattern from side seam to CF (through the apex).

Next align front and back at sideseam and mark the intersecting bust-line point on the back sideseam.

Lay your ruler so it is perpendicular to the center back, and align it through point on the sideseam, then draw your bust-level line across the pattern.

Alternately, you can draw the line across the **midriff** of the front and back (midway between the underarm and the waist). Do not close the waist darts, but just as for the front, you want a good balance between the waist and shoulder dart as described above for the bust line.

When the darts are balanced, lay your ruler so it is perpendicular to the center front, 2" to 6" below the bust apex (midway between bottom of armhole and waist at sideseam), and proceed as for the bust line, on front and back.



### How to draw the shoulder line on bodice front & back

For a sloper or block, the shoulder line is the shoulder seam, so doesn't need to be marked as such on the pattern. But for designed patterns that include a yoke or other design element that moves the seam away from the shoulder line (such as a back yoke on shirts), you will need to mark the original shoulder line as you draft the design.

1. Join back & front bodice/shirt sloper along the shoulder seam.
2. Superimpose yoke over joined sloper pieces so that its center back/front align with that of the sloper. Trace the original shoulder line onto the yoke, as shown in the sketch, right.
3. Place a dot on neck & armhole seam lines at each end of the shoulder line. Some commercial patterns mark the ends of the shoulder line with a small triangle instead of a dot.



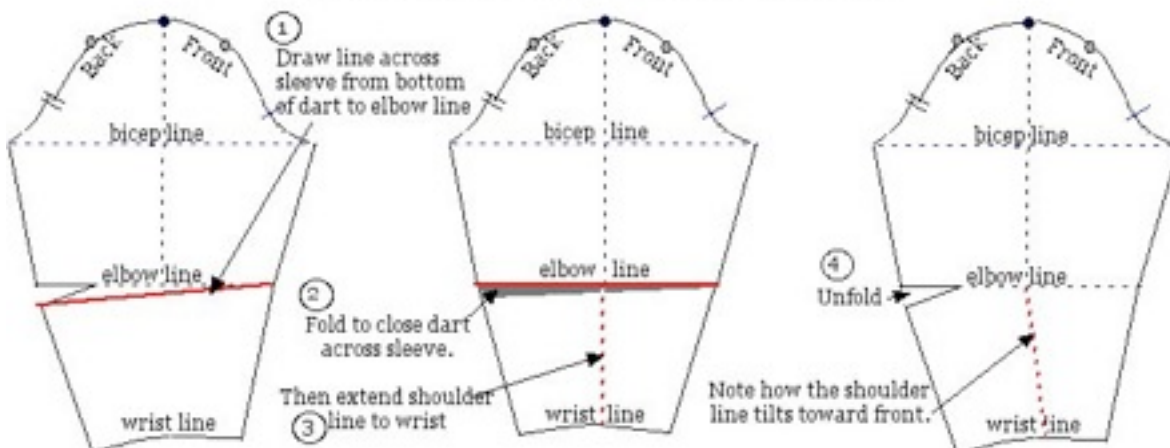
### How to draw the shoulder line on sleeve

(see also [Cat's Bodice & Sleeve Sloper](#))

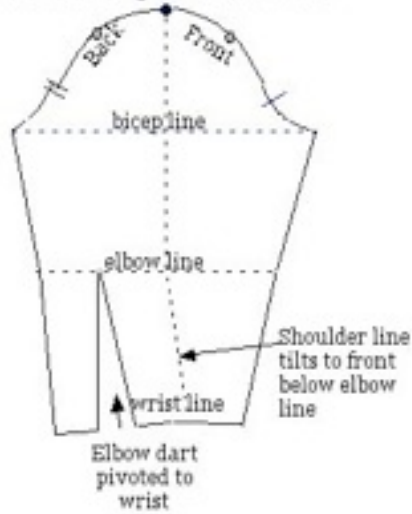
The top of the shoulder line is at the very top of the sleeve cap, and matches the shoulder line on the bodice, when the sleeve seam is sewn. The line is then vertical (parallel to grain) from the top of the cap to the wrist line. However, if your sleeve includes an elbow dart, it will cause the shoulder line to tilt to the front below the elbow line.

To determine the tilt, draw a line across the sleeve from the point where the lower dart leg meets the sideseam, to the point where the elbow line meets the sideseam on the other side of the sleeve. Fold along this new line and move it upward to meet the elbow line - like folding a dart. Then extend the shoulder line from the elbow line to the wrist line, remaining parallel to grain. Unfold the paper and note that the line now tilts.

How an Elbow Dart Affects the Shoulder Line



Elbow dart pivoted to wrist



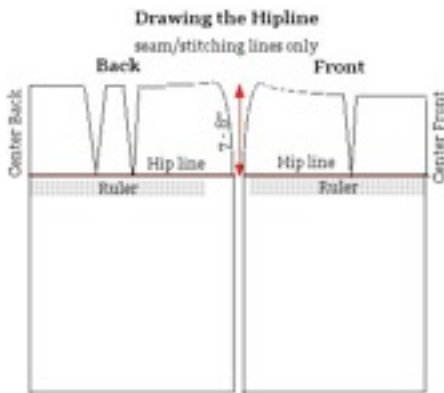
Note: long slim sleeves that button at the wrist also have elbow darting that has been pivoted from the underarm seam to the wrist. Such sleeves also have the shoulder line tilt to front below the elbow (see sketch at left).

Similarly long sleeves pleated into a cuff that buttons on the side of the wrist, also have elbow darting - the dart has just been pivoted to the wrist, then converted to pleats.

To find the tilted shoulder line on this type of sleeve: First determine the dart legs of that modified wrist dart, then measure the width of that dart (distance between the dart legs at the wrist seam). Note on the wrist line, where the vertical shoulder line would touch the wrist line if it were not tilted, then measure over toward the front half of the sleeve,

that dart width amount and make a mark. Draw a straight line from the point where the vertical shoulder line meets the elbow line, to this new mark on the wrist line.

### How to find and draw the hip line



The standard hip line position is 7 - 8" below the waist at the side seam, and does not necessarily mark your largest circumference. On a young adult body, it marks the level where the buttocks protrude the most, when viewed from the side. As we age, our buttocks drop, so you can either use that new position, or you can use the standard position.

Another way to find the hip line position is to stand erect, then move one of your legs outward, to the side. Feel along your side to find the divot where leg bone

(femur) meets pelvic bone. That point marks the hip line level.

To draw the hip line on your sloper or block, mark the hip-level position on the sideseam of both front and back. Then, with your ruler perpendicular to the center front/back and aligned with the hip-level mark, draw the line across the pattern from side seam to center front/back.

Note that the point of each downward-pointing waist dart should just touch the hip line. For blocks and designed patterns, the point of the longest back dart should be about 1" above the hip line. The points of any other back darts and the front darts should be even farther from the hip line.

Note: If you have saddle-bags on the sides, their apex is not the hipline. Still, they need to be accommodated in the fit, so mark their apex on the pattern as well. The sideseam (which is really a dart) then needs to have it's dart point about 1" above this apex. That is, the seam needs to continue curving outward as it goes down from the waist, until about 1" above the apex level.

### Add seam allowances

Slopers/blocks are drawn on the seam/stitching lines and do not include seam allowances, primarily because you fit to the seam, not the cutting line. But the fabric needs a seam allowance (SA) - extra fabric between the seam and cutting line - for strengthening a seam. The SA is also useful if you need to adjust the position of the seam.

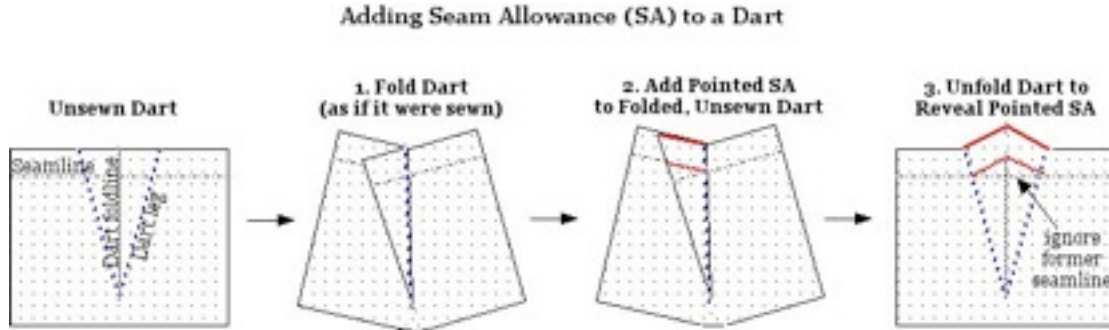
While commercial patterns typically allow a standard 5/8" SA for most seams, I recommend the following for fitting SA's in case extra width/length is needed:

Seam	Seam allowance (SA)
Center back	1" or more (if not cut on fold of fabric)
Center front	1" or more (if not cut on fold of fabric)
Side seams	1" or more
All hems	1" or more
Sleeve underarm	1"
Waist	1"
Princess	1" (except use 5/8" on sharp curves)
Yoke	1" (except use 5/8" on sharp curves)
Neckline	5/8"
Armhole	5/8"
Collar	5/8"
Sleeve cap	5/8"
Cuff	5/8"

Use a see-through ruler with 1/8" grid (or other guide) to draw cutting lines (add SA):

- on the paper pattern using a pencil; or
- on the fabric (around the pinned pattern piece) using chalk.

**Darts:** To draw the seam allowance for darts, fold the pattern along the dart fold line (center of dart), then fold the dart to the side along a dart leg (generally, fold toward CF/CB), then trace the cutting line that superimposes the folded dart. This causes the dart cutting line to make a point in the opposite direction as the dart point, as in sketch:



Darts wider than 1 1/2" should be treated as a seam with 5/8" - 1" SA until the SA's for the two dart legs meet near the dart point (see upper front dart on page 1 sketch).

### Add outlets (Optional)

Commercial fitting patterns include 'outlets' that run horizontally across the pattern, to provide extra length, if needed. Pin them closed for the initial fitting; if extra length is needed, re-pin for less take-up. Stitch outlets closed when correct amount of extra length has been determined.

If desired, add outlets to your sloper, as in sketch, right.

1. Slash across pattern where you will not intersect darts; in the armhole area, and/or below the underarm line. Note that the upper bust dart has been moved from the shoulder to the armhole to allow for the upper outlet.
2. Separate sections by 1" or more;
3. Then fill in gaps with paper.

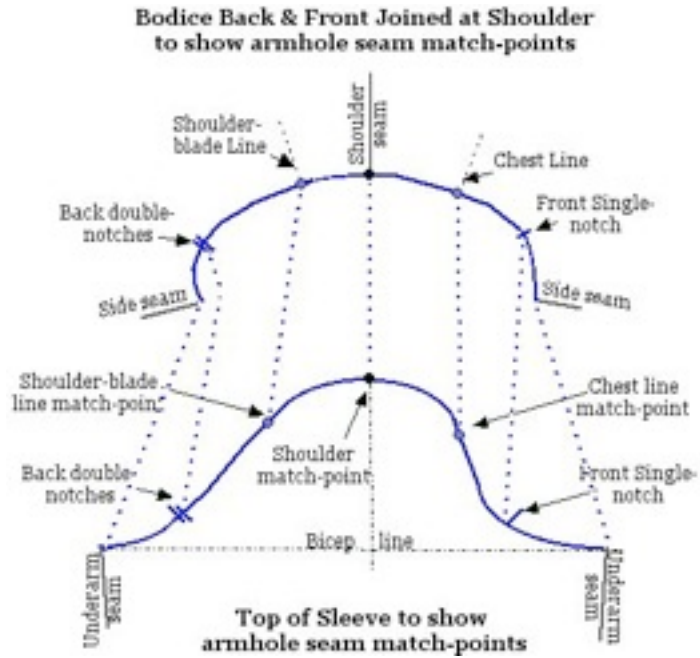




## Notches & match-points

Dots, circles and notches help when sewing seams together, by matching point for point. These are illustrated on the bodice sketch, page 1.

Another example is the sleeve cap and armhole, shown right. Typically the sleeve cap seamline is longer than the armhole seamline because of added ease. Matching the back/front notches, chest line & shoulder-blade line dots, and shoulder line circle help you distribute the ease appropriately for the best fit.



Be sure to mark match points on your pattern, along the seamline. Then, after adding seam allowances, extend matching-points & notches from the seam to the cutting line.

Examples of matching-points are:

- center back/center front line position;
- chest line position
- shoulder-blade line position
- hip line position
- hem position
- shoulder position (if not on a seam)
- notches and dots on sleeve cap and armhole
- dart leg position

## Mark apexes

Apexes are very important when fitting. The apex of the garment must be directly over the apex on the body or the garment will not hang well. Once it is positioned correctly on the pattern, it can be used to move darts to other locations for design purposes.

These points should be marked on the pattern and transferred to the fabric with an 'X' so that it shows well on the right side. Use the same contrasting thread used to mark reference lines. Examples:

- bust apex (for women); see bodice sketch above for this example;
- a hump in the back;
- protruding shoulder blades;
- 'saddle bags' below the hip

## ***Mark reference lines, match points and apexes on the fabric***

**Reference Lines:** Mark these on the wrong side, with pencil, or using a tracing wheel and colored transfer paper. Then baste them along the marked lines, using a contrasting color thread that can easily be seen in the mirror (or double-mirrors for back-side view). If you cannot see it well in the mirror, you can:

- ▶ Use several strands of embroidery floss;
- ▶ run a fine yarn through the long stitches on the right side; or
- ▶ for quite heavy fabrics like denim, baste with a thin string such as crochet cotton, instead of thread.

I recommend basting these by hand, because it's easier to see the lines, and it's easier to rip out than machine sewing. I use a running stitch that is about 1/2" - 3/4" long on the right side of the fabric, and just a tick (1/16" or less) on the wrong side.

**Match Points:** Dots & circles are typically marked on the seam line with a tailors tack; or make a tiny clip into the seam allowance (about 1/8") from the cutting line, at each of these points.

**Notches** are typically marked on the cutting line with a tiny clip into the seam allowance.

## **Baste garment/muslin together**

I prefer to hand-baste, because it is less destructive to the fabric and easier to rip out later. To baste, I use a running stitch, about 1/8" long. Be sure to match corresponding match points when basting the seam; using pins can help with this.

- **For a bodice or shirt:** start with darts (if any), the shoulder seam (or yoke seams), center front/center back seams (if any) and side seams. If there are princess seams, baste them as well. If the center front (CF)/back (CB) of the garment is not cut on a fold - such as for a buttoned or zippered opening - I recommend cutting the fitting muslin CF/CB on the fold anyway. Then slash down the center front from neckline down several inches so you can pull the garment over your head.

Get this torso garment to fit perfectly before basting on the sleeve, collar and other features.

- **For a skirt:** start with darts or pleats at waist (or yoke seams), side seams and center front/center back seams, if any. Be sure to leave an opening along center front, center back, or left side seam, from the waist down 7 - 9 inches, so you can pull the garment over your hips.
- **For a dress, jacket or coat:** same as bodice or shirt.
- **For pants, trousers, jeans or shorts:** Fitting pants is very tricky - too much for this article. Practice refining your technique on shirts & skirts first.