Chapter 12 "The construction parameter g and z values"

Content

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The g and z values complete the palette of construction parameters so that basic blocks can be drafted from scratch. The g values deliver the relationship to the measurement chart of the construction system. The z values allow for calculation of construction parameters with numerical values or values measured in the construction.

The emphasis of this chapter lies, again, with the exercises for which you should take your time. The gradeable basic blocks displayed are exercise results.
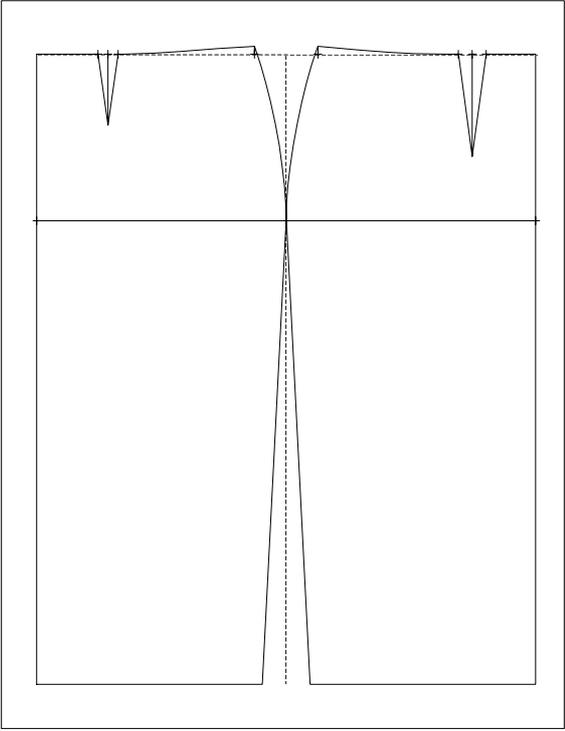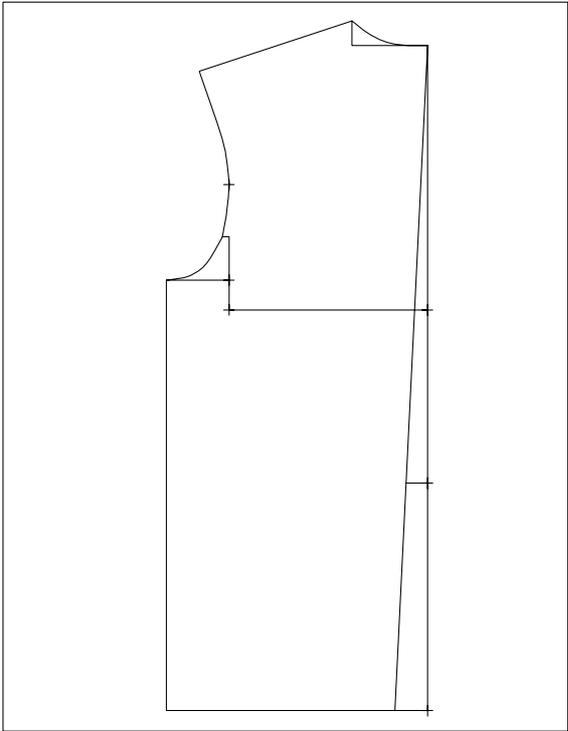
12.1 The g values

g values are the size values of the current construction system which are logged in the well-known measurement charts. g1 defines the first value of the current measurement chart, g2 the second value and so on. In the construction system "23-Werte Hohenstein Damen" for example g1 is the bust and g3 the height (see Picture 12-1). The measurement charts can be edited, viewed and/or printed via *Extras | Measurement Charts...*

Always consider the selected construction system when working with g values!

The step-by-step guide for construction system 23-Werte Hohenstein Damen is as follows:

    p+l+c+r   below p+w+h:
      w=g4   type and <ENTER>
      h=g3   type and <ENTER>
    p+w+h   click
        p on x&y with x=y=0
    measure
Check the result by measuring.

2nd Exercise
Construct a rectangle with the bust as width and waist to floor as height. Grade the sizes 38, 538, 42

| 23-Werte Hohenstein Damen V | Gr =___42_0 | KERSTIN | 05-02-96 | VF |

No.	Measurement	Indiv.	Diff.	
1	Bust	960	[900]	-60
2	Hip	1015	[1000]	-15
3	Height	[1680]		
	---------- Secondary measurements ----------			
4	Waist	780	[750]	-30
5	Nape to waist (centre back)	[416]		
6	Neck/shoulder to waist o. bust	[449]		
7	Across back (part of bust)	[375]		
8	Body rise	[280]		
9	Waist to knee	[606]		
10	Waist to hip	[210]		

Labels on left: **G1**, **G2**, **G3**, **G4**, **G5**, **G10**
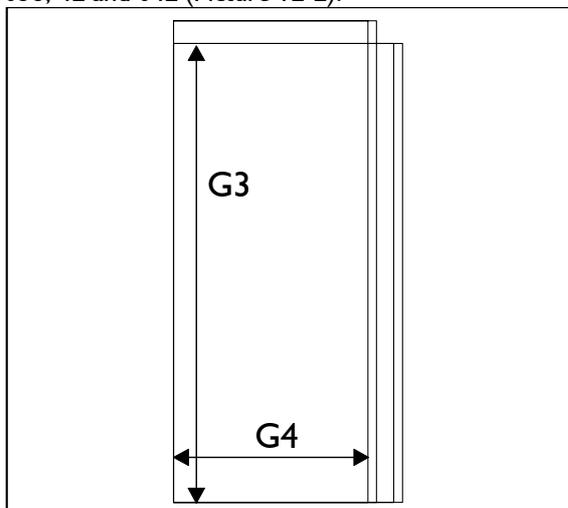
Picture 12-1

g values are applied in the same way as x values (section 11.2, Picture 11-11). In conjunction with the z values - which will follow - they allow for drafting basic blocks on screen.

Exercises

1st Exercise
Construct a rectangle with the waist as the width and the body height as the height. Grade in sizes 38, 038, 42 and 042 (Picture 12-2).
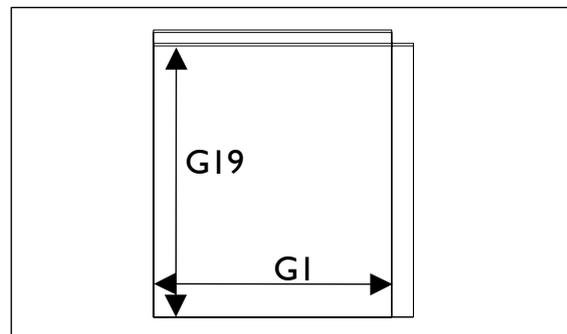

Picture 12-2

and 542 (Picture 12-3).
The step-by-step guide for construction system 23-Werte Hohenstein Damen is as follows:

    p+l+c+r   below p+w+h:
      w=g1   type and <ENTER>
      h=g19   type and <ENTER>
    p+w+h   click
        p on x&y with x=y=0

Picture 12-3

3rd Exercise
Construct the displayed figure or a similar shape in the construction system 23-Werte Hohenstein Damen. The circumference measurements are not halved or quartered. The calculation of g values is possible with the application of z values (next section).

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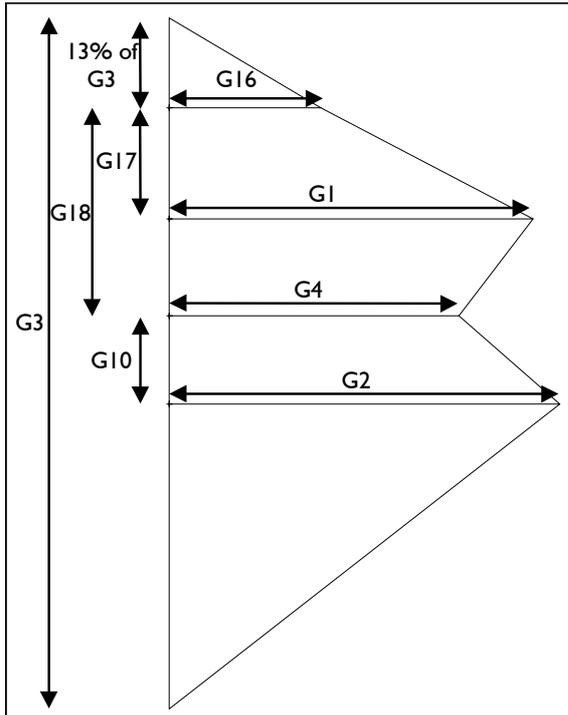
Picture 12-4

```
p+l+c+r
    p+lg+dir with lg=g3
    p_____
        rlg on l with rlg=13.
    p+d on l with d=g17
    p+d on l with d=g18
    p+d on l with d=g10
    p+lg+dir with lg=g16
    p+lg+dir with lg=g1
    p+lg+dir with lg=g4
    p+lg+dir with lg=g2
    p==>p                    construct contour
grading
```

12.2 The z values

What are z values?

z values are calculated construction parameters. For the calculation of z values

- all defined construction parameters (x and g values),
- previously defined z values,
- measurements from the construction, so-called process data,
- numerical and mathematical functions

can be used.

Defined z values are applied in the same way as x values (section 11.2, Picture 11-11).
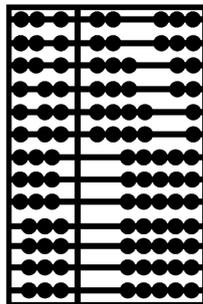
Entering and altering z values

Entering and altering z values is started with the function key <F11> or via *Extras | Z Values*. With few exceptions this is possible in all menus after *test run* or a record function.
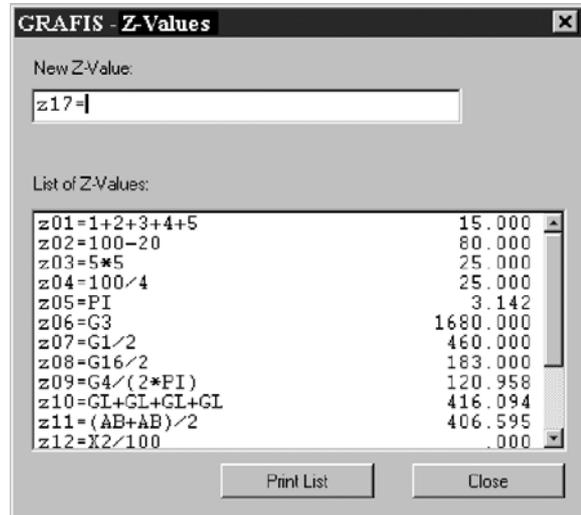
Picture 12-5

After having pressed <F11> a field for entry of a new z value appears (Picture 12-5). In the edit window „New Z Value:" a z value entry can be made. The „List of Z Values" contains all entered z values with the calculation results for the base size. This list can be scrolled with <Page up> or <Page down> or the scroll bar at the right edge. „Print List" prints the list of current z values.

z value entry is terminated with „Close". The <ESC> key aborts z value entry.

Syntax (spelling) of the z value entry

- Each instruction is to begin with z1= or z20=. It is recommended to enter the z values in the given ascending order.
- Small and capital letters have the same significance. Spaces are ignored.
- The calculation of expressions in brackets is possible.
- Angles are to be entered in Grad (e.g. 90 Grad), the German word for degrees.
- GRAFIS reports errors in mathematical expressions. They are marked with a small arrow below the position of the incorrect syntax.
- Defined x and g values, mathematical functions and process data can be used to calculate z values (see examples). Processing previously defined z values is also possible.
- The number of z values is limited to 50 per part.

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z values can be re-entered and overwritten for further use without influencing previous construction steps. Subsequent correction of a z value is possible with resetting the construction record, only.
The calculation of z values is recorded. Resetting the record resets the z values also!

Permitted operators

+	for addition
-	for subtraction
*	for multiplication
/	for division
#	for exponent

Permitted operands

g6	g values g6=sixth value of the current measurement chart
x3	x values x3=third value of the x value table (*active part*) of the current part
xg5	x values of all parts (see chapter 13) xg5=fifth value of the x value table of all parts of the style
z4	z value z4
number	numbers, e.g. 12; -12.0; 23.6 Grad (degrees), with the point as decimal point
pi	the constant pi (=3.1415927)

Functions permitted as operands

cos	for cosine
sin	for sine
tan	for tangent
atn	for arc-tangent
sqr	for square root
btr	for absolute value

Process data permitted as operands

gL	full length of a clicked line
Ri	direction of a line in the "click point"
xK	x co-ordinate value of a point
yK	y co-ordinate value of a point
Ab	distance between two points

For the process data gL and Ri existing lines of the construction are to be clicked. The definition of the process data xK, yK and Ab is possible with the functions *click p, click l* or *click pl*.

Examples for correct z values

$z1 = 12.3-124.3+100-33-.123$
$z2 = 123.4-pi+gL+sin(Ri-Ri)$
$z3 = (gL+gL)*1.05+g1/100$
$Z4 = z1+x12-g2/3.5+Ab$
$z5 = sqr((xK-xK)\#2+(yK-yK)\#2)$
           theorem of Pythagoras
$z6 = atn(z1/z3)$

Exercise on entering z values

Call the basic block 001 "bodice after Hohenstein" and define two x values. Enter the following z values. Scroll in the list of z values and check the calculated values on the right side of the list, see also Picture 12-5. The values apply to the base size.
<F11> or *Extras | Z Values...*
$z1 = 1+2+3+4+5$ <ENTER>
$z2 = 100-20$
$z3 = 5*5$
$z4 = 100/4$
$z5 = Pi$ the number Pi
$z6 = G3$ body height (23-Werte Hohenstein Damen)
$z7 = G1/2$ half of the bust
$z8 = G16/2$ half of the neck
$z9 = G4/(2*Pi)$ radius of a circle with circumference = waist
$z10 = GL+GL+GL+GL$ <ENTER>
Now you are required 4x to click a line. In the menu only click l is shown. In the bodice after Hohenstein you can click the 4 armhole curves (front and back) one after the other. In this case z10 equals the full length of the armhole curves.
$z11 = (Ab+Ab)/2$ <ENTER>
Measure the distance between the final points of side seam in front and back by clicking the points at side seam / armhole and side seam / hem in the front with *click p* and then in the back. z11 is the average value of this distance.
$z12 = x2+100$
$z13 = z2/2$
$z14 = (Ab+Ab+Ab+Ab)*2$
Measure four distances between 2 points, respectively, e.g. the waist in front and back without darts.
$z15 = z3+z4$
$z16 = sqr(16)$
Define your own z values and combine different functions, process data and construction parameters.

Exercises on the application of g values in z value calculations

<u>1st Exercise</u>
Construct a ½ circular skirt with the waist being identical to the waist in the measurement chart and a length of 615mm from waist. Draw the hip circle at waist to hip (g10) + 30. The result is contained in Picture 12-6.
   Set the record to 000
   p+l+c+r
      p+digi   vertical auxiliary line
         p on x&y with *x=y=0.*
   test run
      <F11>
      $z1 = g4/(2*pi)$
      $z2 = z1+g10+30.$
      $z3 = z1+615.$

_____

p+l+c+r
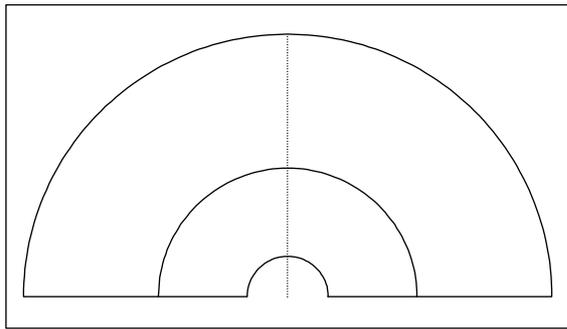
Picture 12-6

cp+p	waist circle
click pl	centre point
plg on l with *plg=z1*	
cp+p	hip circle
click pl	centre point
plg on l with *plg=z2*	
cp+p	hem circle
click pl	centre point
plg on l with *plg=z3*	
p==>p	connect hem and waist

Grade the circular skirt in 5 sizes.

2nd Exercise

Construct a ½ circular skirt with g, x and z values. The x value x1 is to be processed as an addition to the hip circle and x2 is to define the skirt length. Draw the hip circle again at a distance of waist to hip +x1.

From this skirt construct 1/4, 1/3 and other panel skirts (Picture 12-7).
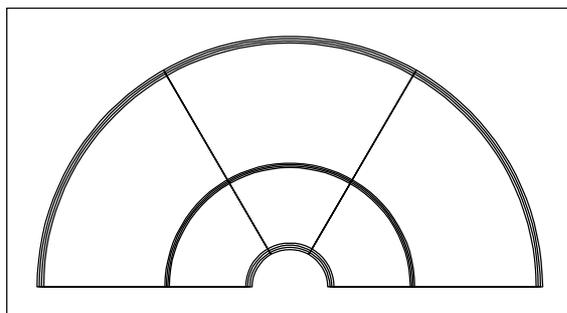
Picture 12-7

The steps are analogous to Exercise 1 with x1=30 and x2=615 and the z values:

Extras | x values
<F11>
z1=g4/(2*pi)
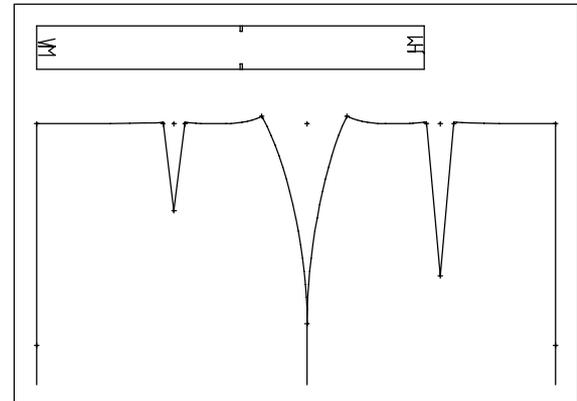*z2=z1+g10+x1*
z3=z1+x2
further as Exercise 1

Assign the x values with different values according to the different figure types.

Exercises on the application of <u>measurements of the construction (process data</u> in z value calculations

1st Exercise

Design a waistband with the length of the waist lines in basic block 017 "skirt after Hohenstein" (Picture 12-8).

Picture 12-8

Suggestion for construction steps:

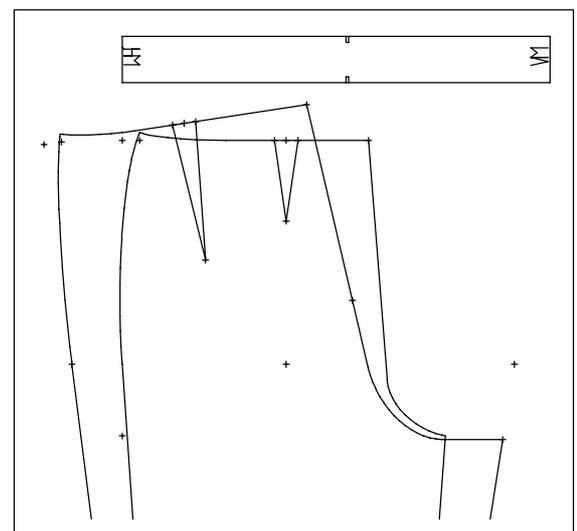|	
call	
<F11>	
z1=gL+gL+gL+gL	click waist lines
z2=gL+gL	click waist line front
<F6>	
p+l+c+r	
p+w+h with *w=z1* and *h=40*	
p on x&y with *x=0* and *y=50*	
symbols	
notch place on	
plg on l with *plg=z2* side seam	

Grade the construction in 5 different sizes.

2nd Exercise

Design a waistband with the length of the waist lines of the basic block 008 "trousers after Hohenstein" (Picture 12-9).
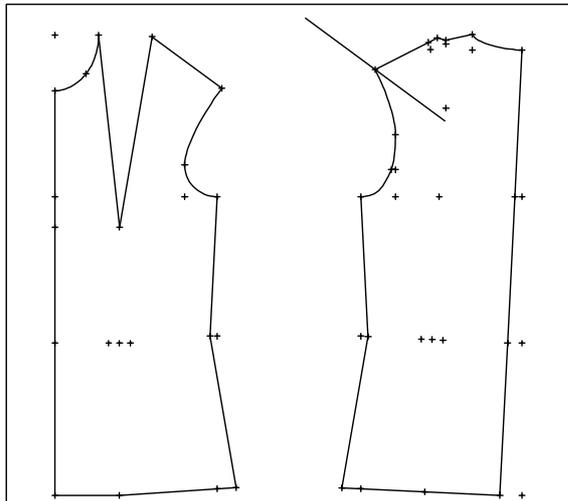

Picture 12-9

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Suggestion for construction steps:
call
separate   waist lines at the darts
<F11>
$z1=gL+gL+gL+gL$ click waist lines
$z2=gL+gL$ click waist line front
<F6>
p+l+c+r
    p+w+h with $w=Z1$ and $h=45$
        p on x&y with $x=0$ and $y=50$
symbols
    notch place on
        plg on l with $plg=z2$ side seam
grading

3rd Exercise

Construct in the basic block 001 "bodice after Hohenstein" the front shoulder onto the back shoulder with the help of z values (Picture 12-10). Use z values for both the shoulder length and the direction of the shoulder.
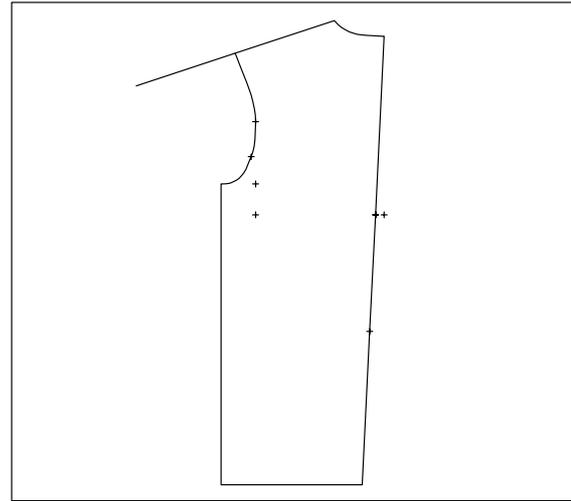

Picture 12-10

Suggestion for construction steps:
call
<F11>
$z1=gL$ shoulder front
$z2=Ri$ click front shoulder outside
$z3=Ri$ click front shoulder inside
p+l+c+r
    p+lg+dir with $lg=z1$ and $dir=z2$
    p+lg+dir with $lg=z1$ and $dir=z3$

Work out why the shoulder was constructed in two variations. Compare the values of $z2$ and $z3$. They contain the direction as an angle in relation to the positive x axis (see also chapter 4.3).

4th Exercise

Construct the shoulder in basic block 016 "bodice (bk) after OPTIKON" in the same direction as the original shoulder, using z values (Picture 12-11). Use z values for both the length and direction of the shoulder.
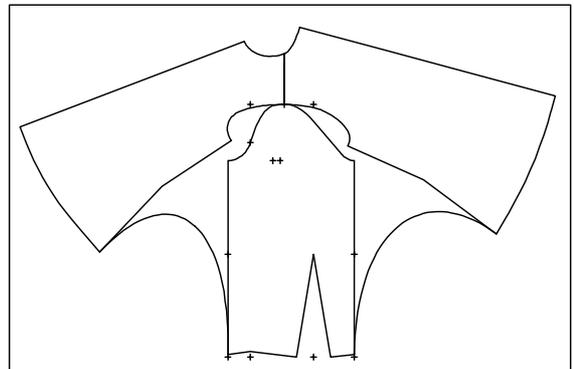

Picture 12-11

Suggestion for construction steps:
call
<F11>
$z1=gL$ shoulder
$z2=Ri$ click shoulder
p+l+c+r
    p+lg+dir with $lg=z1$ and $dir=z2$

12.3 Complex Exercises

1st Exercise

Develop a bat wing construction from the basic blocks 001 "bodice after Hohenstein" and 004 "one-piece sleeve". Use the z value calculation to ensure that both curves have the same length (Picture 12-12).

Picture 12-12

Suggestion for construction steps:
call
modify   relocate bust dart
p+l+c+r   draw shoulder dart bk
separate   remove hood
modify   relocate back shoulder dart
delete   dart lines
link   hem front + back
call   one-piece sleeve
p+l+c+r   aux. line at sleeve head notch
transform   ft and bk to the aux. line
curves

_____

<F11>
$z1=(gL+gL)/2$ side seam ft+bk
lengthen
    forming
    lengthen to z1   click side seam back
    lengthen to z1   click side seam front

2nd Exercise

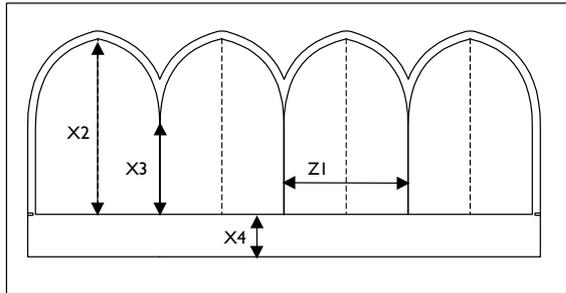Construct a children's hat (Picture 12-13) with the values

    X1   head circumference in mm (460.)
    X2   hat height in mm (165.)
    X3   head height in mm (80.)
    X4   seam allowance in mm (40.)
    $z1=x1/4 + 5$

Picture 12-13

Suggestion for construction steps:
    p+l+c+r
        p+lg+dir with *lg=x3*
            p on x&y with *x=y=0*
        p+lg+dir with *lg=z1*
            click pl
        p+lg+dir with *lg=x2*
            rlg on l with *rlg=50.*
    curves
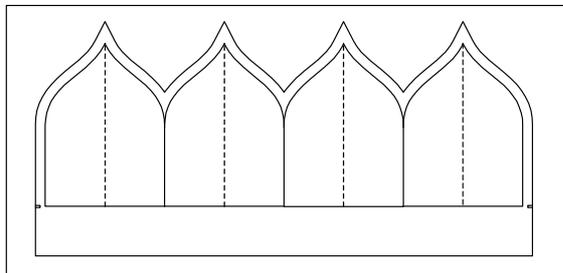   *transform*
        mirror
    parallel
    corners
    symbols
    attributes

Other hats can be obtained with different curve forms for example (Picture 12-14).
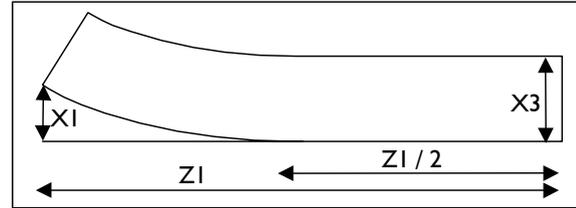
Picture 12-14

3rd Exercise

Construct a stand-up collar with x, g and z values (Picture 12-15).

    X1   collar inset in mm (20.)
    X2   reduction in mm (2.)
    X3   collar width in mm (30.)
    $Z1 =g16 / 2 - x2$
or $Z1=gL+gL$ (neck lines in front and back)

Picture 12-15

Suggestion for construction steps:
    p+l+c+r
        p+lg+dir with *lg=z1*
            p on x&y with *x=y=0*
        p+lg+dir with *lg=x3*
            click pl
        p+lg+dir with *lg=x1*
            click pl
    curves
    p+l+c+r
        p+lg+dir with *lg=x3*
            click pl
    parallel
    corners
    grading

4th Exercise

Construct a straight skirt with g, x and z values (Picture 12-16).

x value table pre-assignment:
    x1   dart width ft in mm (25.)
    x2   dart width bk in mm (35.)
    x3   dart length ft in mm (90.)
    x4   dart length bk in mm (130.)
    x5   hem reduction side seam in mm (30.)
    x6   waist reduction side seam in mm (40.)
    x7   skirt length in mm (590.)
    x8   position dart ft from CF in mm (90.)
    x9   position dart bk from CB in mm (80.)
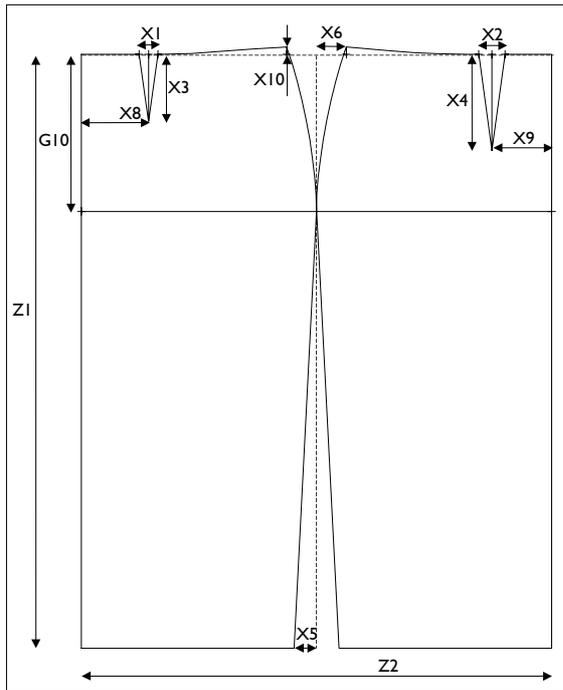   x10 lift waist in mm (10.)
z value table:
    $z1=g10+x7$
    $z2=g2/2+x1+x2+2*x6$
    $z3=z2/2$
    $z4=x1/2$
    $z5=x2/2$

Picture 12-16

Suggestion for construction steps:
   Extras | X Values...
   <F11>   enter z values
   p+l+c+r
      p+w+h with *w=z2* and *h=z1*
      NB: The zero point is positioned at the bottom left in this case. Alternatively, a rectangle can be constructed with *p+dir+lg*.

      p_____
        rlg on l with *rlg=50*   waist line
      perp. p=>l   side seam
      p=>p   hip line
        plg on l with *plg=g10*
        plg on l with *plg=g10*
      p+d on l. with *d=x6*
      p+d on l. with *d=x6*
      p+d on l. with *d=x9*
      p+d on l. with *d=x8*
      p+d on l. with *d=z4*
      p+d on l. with *d=z4*
      p+d on l. with *d=z5*
      p+d on l. with *d=z5*
      p+lg+dir with *lg=x3*
      p+lg+dir with *lg=x4*
      p+lg+dir with *lg=x10*
      p+lg+dir with *lg=x10*
      p+d on l. with *d=x5*
      p+d on l. with *d=x5*
  p+l+c+r   draw lines
  curves   hip bow
  transform
    mirror   hip bow
  curves   waist lines
  grading

5th Exercise

Construct the bodice (bk) after OPTIKON with g, x and z values (Picture 12-17). Apply the following x and z values:

List of x values:
- x1   addition to back length in mm (0.)
- x2   inset centre back in mm (20.)
- x3   addition to bust in mm (60.)
- x4   shoulder pad height in degrees (4.)

List of z values:
$$z1 = 3/40 * g3 + 125 + (g1-920)/20$$
$$z2 = g5 + x1$$
$$z3 = g5 + g10$$
$$z4 = g16/6 + 8 + x3/40$$
$$z5 = g16/6 - 39 + 3/200 * x3$$
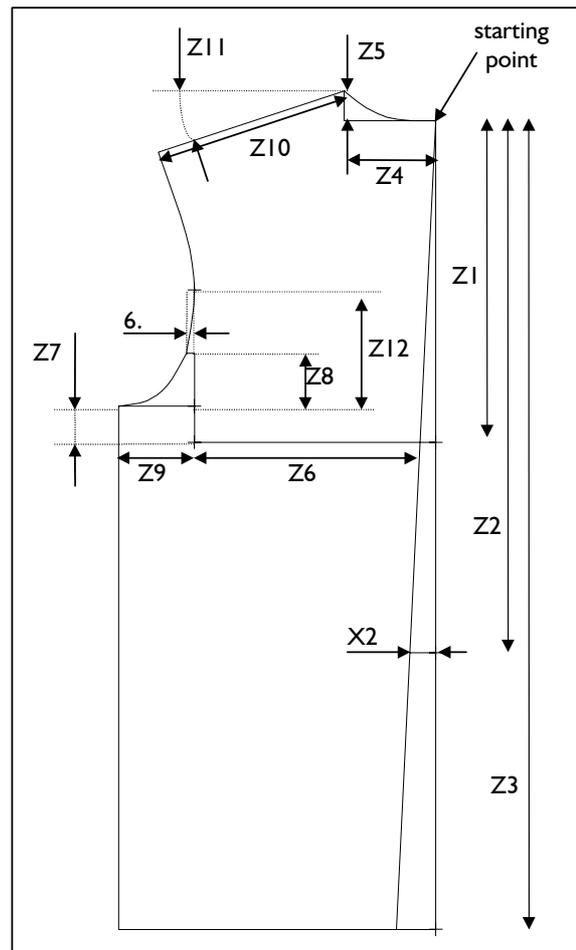$$z6 = (g1+x3)/8 + 56$$
$$z7 = (3*g3-g1)/40 - 61 - x3/4$$
$$z8 = (g1+x3)/20 - 6$$
$$z9 = g1/8 - 62 + 7/40 * x3$$
$$z10 = 7/80 * g1 + 67.5 + x3/10$$
$$z11 = 20 - 2*x4/5$$
$$z12 = (g1+x3)/20 + 43$$

Picture 12-17