SWANSON'S

LITTLE

"BLUE BOOK"

for

ROOF and STAIRWAY LAYOUT

• *"ONE-NUMBER℠ METHOD"* •
• *TABLES - FORMULAS* •
• *DIAGRAMS* •

Use with ALL Swanson Speed Line® Squares

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"BLUE BOOK"

FOR ROOF AND STAIRWAY LAYOUT

CONTAINS:

A SWANSON SPEED LINE® PRODUCT

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ASSEMBLING LAYOUT BAR ON "BIG 12"®

1. Put one 1/4" x 3/4" bolt through longest slot in layout bar so head of bolt and square shoulder drops down into recess in bar. Place washer on underside with one of the long hex nuts (1/4" rod couplings).

2. With "Big 12"® name on square facing up, place other 1/4" x 3/4" bolt through slot next to the words "Big 12".® Put a washer and hex nut on underside.

3. Place layout bar **under** square along the 12" scale matching the pointed ends of layout bar and square. With holes in the two "ears" matching up with scribe bar slot, put smaller bolts (3/16" x 3/4") up through ears from underside and through scribe bar slot. Head of this bolt fits recess in underside of "ear". Place washers and wing nuts on top side. Tighten down keeping layout bar even with edge of square.

4. Reach under square, loosen the long hex "stop bolts" and adjust in slot for stairway rise and run measurements. Fig. on next page shows "Big 12"® square positioned on stringer to lay out rise and run (tread). Repeat this position over length of stringer until proper amount of treads and risers are marked. Be accurate. Make sure lines meet at edge of material.

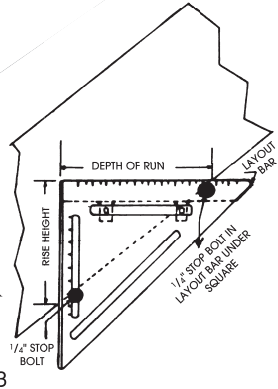
5. For drainage on OUTSIDE STAIR TREADS, loosen wing nuts and adjust pointed end of **Layout Bar** out beyond edge of square 1/8"at a point directly over edge of stringer.

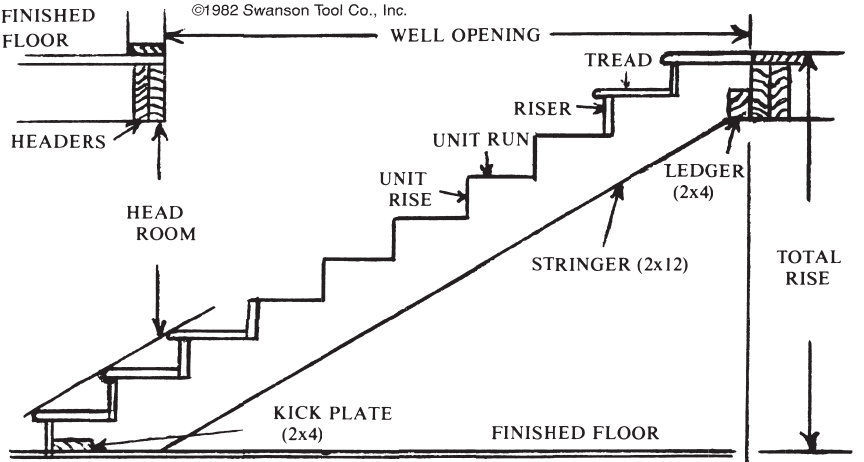
6. To use layout bar in "OUT OF SQUARE" CORNER, remove the two hex stop bolts. Attach layout bar back onto square. Hold square flat, pushing it into corner. Loosen wing nuts, adjust layout bar to fit into "crooked corner" and tighten wing nuts. Now transfer this angle to your other material for proper fit.

7. The "Big 12"® square has a SCRIBE BAR, notched every 1/4 inch for a pencil. By sliding square along edge of material, parallel lines can be drawn for any layout work.

VIEW FROM
UNDERSIDE
OF BOARD

"BIG 12"® SQUARE
POSITIONED ON STRINGER





BASIC STAIR **FIG. 1**

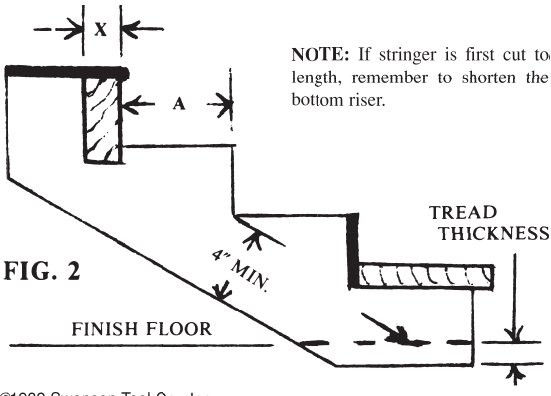
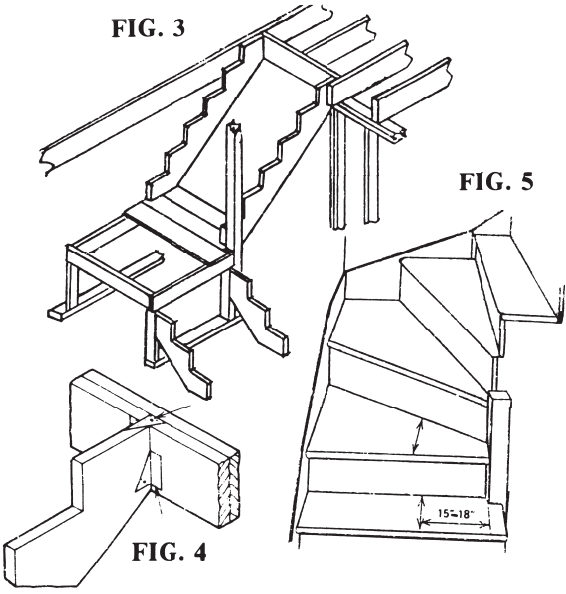


FIG. 2

In layout of stringer allow enough stock to tie in top end of stringer to supports being used. If top end of stringer is to tie in behind joist header (as in Fig. 2) remember to cut out extra width "X" to maintain correct tread width at top step "A". The top riser may be formed by some part of the upper floor or landing framework.

The bottom riser must he reduced by tread thickness (Fig. 2) because first tread will increase riser height by the thickness of tread material. This dropping down of the stringer will now increase top riser height by the same amount. This is necessary because the tread will shorten top riser by tread thickness. Remember, the top step is the finished floor (not another tread) from which you took your overall height measurement.

LANDING AND TURN



Figures 1 through 7 give you a visual picture and basic ideas to apply to your particular stairway layout. When building your supports for a landing or attaching stringers into the framework, "BUILD IT ON PAPER FIRST!" If stringers are over 36" apart a third center stringer may be required.

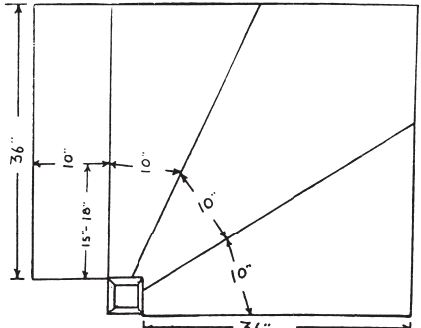


FIG. 6

WINDERS

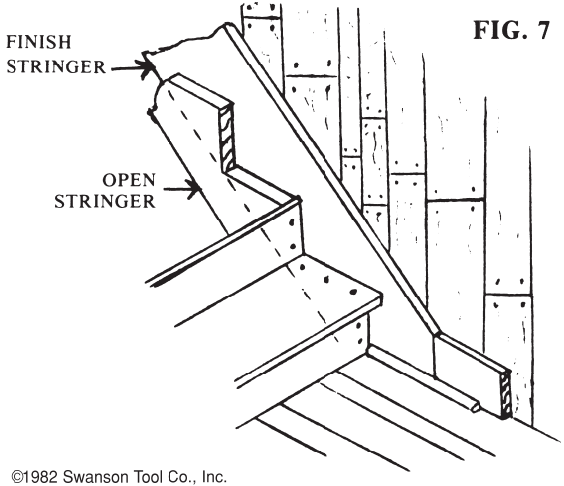


FIG. 7

You can build a second stringer by nailing the triangular cutouts from the first stringer on the edge of a 2x4 or 2x6, thus saving material. Make sure it matches the rise and run of the other stringer. A good fitting riser adds support to a tread rather than leaving the stairs "open" without a riser.

Fig. 4 shows stringer supported by metal joist hangers. At cement walls you may even want to support stringers with legs down to the floor. There is usually more than one way it can be done, but stay with the basic rules and information for proper layout.

When installing the risers and treads, set riser down behind and nail into back edge of tread.

BASIC STAIRWAY LAYOUT

- Draw your complete stairway on paper! It's a lot easier to erase pencil lines than to tear out wood!
- The sum of all unit runs (tread less nosing) = TOTAL RUN.
- The sum of all unit risers = TOTAL RISE (measured from FINISHED floor to FINISHED floor).
- As the angle of a stairway changes, so does the riser-tread ratio. (see chart A)
- Three general rules for Riser-Tread Ratio (excluding Tread nosing, which extends 1" to 1-1/2" beyond riser):
  1. Rise plus tread width = 17" to 18"
  2. Rise times tread width = 72" to 76"
  3. Sum of two risers plus tread width = 24" to 25"

• An "ideal" ratio is 7-1/2" rise and 10" tread. These dimensions may vary slightly if the rise and / or run of a stairway must be held within certain limits. This is explained later.

• Avoid going more than 8-1/4" rise or less than 9" wide tread. Try to keep around the 34º to 37º angle.

• A main stairway should be at least 36" wide, or even 42" if possible, with 6'8" headroom. This width and height is needed for moving furniture as well as people.

• Handrails should be 30" to 34" above nosing of steps, and 34" high on landings.

• If you must turn a stairway 90º, using a landing is more desirable and safer than three winding steps (called winders). A landing is treated as a regular step with a larger tread. The landing can be supported by legs going down to the floor below, and it should be at least as wide and long as the width of the stairs. If you are making a 'U" turn in the stairs, the landing will have to be at least two times the width of the stairs in order to accommodate the second set of stringers that lead on down. These stringers are tied into the framework of the landing in the same manner as though you were coming from the regular floor. Maintain the same rise and tread width all the way down. (Fig. 3)

• Using three winders (Fig. 5 & 6), each tread tapers from a wide to narrow, but not pointed, tread at inside of turn. At a point 15" to 18" from the narrow end, where you normally walk, tread width on the three winders should be the same as the rest of the stairs. To

determine proper size and shape of the three winders, first layout three full size winders on templates of paper or cardboard and fit them into your turn.

FIGURING THE RISERS:

First: See note Page 5

Assume we have a stair with a total rise of 7'11" (95"). We want about a 7" rise per step (staying close to a 35º angle). To determine the number of risers we take 95 ÷ 7 = **13.571 risers. We can't use a half riser, so we will increase each of the 13 risers just a little to make up this approximately 3-1/2" (1/2 riser). Now 95" ÷ 13** = 7.308". About the closest you will get to 7.308 is 7-5/16" which is 7.312. (See chart in back of book). Now we will recheck by taking 7.312 x 13 = 95.056" total rise. This is almost 1/16" too much. Rather than trying to divide .056 up between the 13 risers. (unless you want to. Then it is .004 off each riser), just take it off of the bottom riser. We are now back to our 95" total rise.

In building the stairs, if each riser is within l/8 inch of any of the other riser heights there should not be any noticable difference as you "walk the stairs." This allows you to "adjust" the stringer to the correct total rise. You can also do this with the tread width for total run, but that is not usually any problem.

FIGURING THE TREADS:

With 13 risers at 7-5/16" each, we will have 12 treads (always one less tread). Using our three general rules we have:

1. 7-5/16" (rise) + 10-3/16" (calculated run) = 17½" (17-18 ideal).

2. 7.312 (riser height) x 10.187 (run) = 74-1/2 (72"-76" ideal).

3. 7.312 + 7.312 (sum of 2 risers) + 10.187 (run) = 24.81 (24" - 25" ideal). 12 treads x 10.187" (run) = 122-1/4" (10' 2-1/4") for total run.

What if you don't have 122-1/4"? You could get away with a 9-11/16" run (smallest amount which when added to the rise would give us 17") for a total run of 116-1/4"; or use a steeper stair with only 12 risers and just 11 treads. 95" rise ÷ 12 risers = 7.917. We'll use 7-59/64" (7.922 per unit rise). This is almost 8". Don't go any steeper. 7.922 x 12 = 95.064, again within 1/16". Checking our #1 rule, we could use a 9-1/16" (9.062) run. 9.062 x 11 treads = 99-5/8" total run. If that is still too long a run, you will need a landing to turn the stairs either to the right. left or "U" turn. In that case, re-adjust the run and rise to work closer to the 35° angle.

To figure the length of stringer use the following example as a guide:

Rise of 95": 95x95 = 9025

Run of 122": 122x122 = 14884

9025 + 14884 = 23909

Square root of 23909 = 154-5/8" or approx. 13'.

Add on 12 to 18 inches for waste.

DETERMINING LENGTH OF STAIRWELL OPENING

$$\frac{\text{Treadwidth (less nosing)}}{\text{Riser Height}} \times H = \text{Well Opening}$$

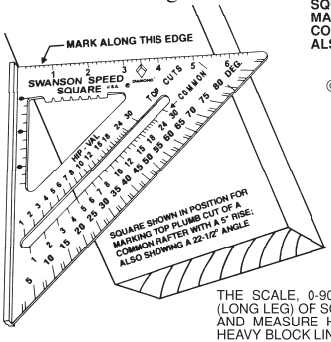
H equals required head room plus total distance through upper finished floor construction. (see Fig. 1).

CHART A

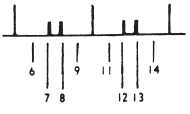
Approx. Angle to Floor Line	Rise (Inches)	Tread Run	Approx. Angle to Floor Line	Rise (Inches)	Tread Run
30½º	6½	11	41¾º	8¼	9¼
32º	6¾	10¾	43½º	8½	9
33¾º	7	10½	45º	8¾	8¾
35¼º	7¼	10¼	46½º	9	8½
37º	7½	10	48¼º	9¼	8¼
38½º	7¾	9¾	50º	9½	8
40º	8	9½			

FOR OUTSIDE STEPS. . . riser-tread ratios are slightly different. Concrete steps are much safer with a 6" to 6-1/2" rise with a 12" to 13" tread width. On wood, a 6" to 7" maximum rise using 2" x 12" stock for treads (which gives about 11-1/2" tread width) can be used. The treads of exterior stairs should slope forward about 1/8" for drainage, so the cuts in the stringers are slightly more than 90º. This can be done by simply cocking pointed end of layout bar 1/8" out beyond edge of "Big 12"® square where it crosses outside edge of stringer. Keep other end of layout bar flush with square. In effect, you are laying out a "crooked corner" 1/8" out of square.

"ONE-NUMBER℠ METHOD:" Helping Workmen Make Correct Angle Cuts.



SQUARE SHOWN IN POSITION FOR MARKING TOP PLUMB CUT OF A COMMON RAFTER WITH A 5" RISE; ALSO SHOWING A 22½" ANGLE.

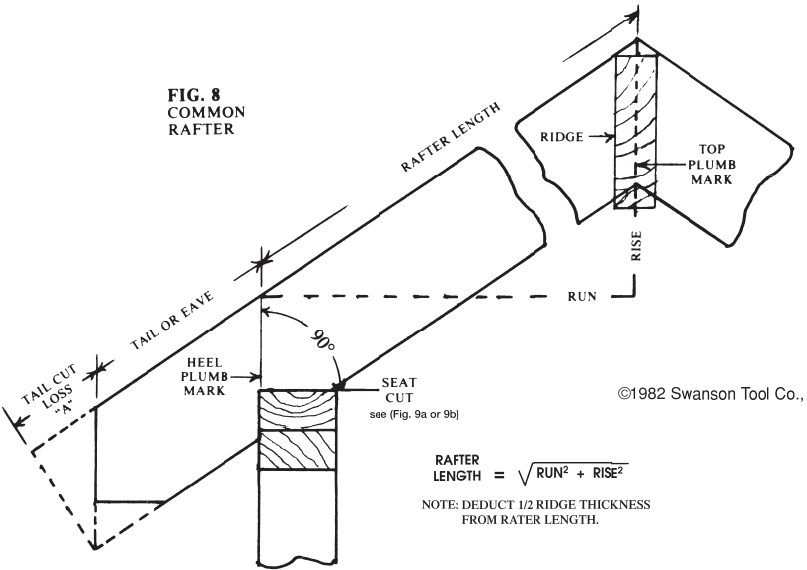


THE SCALE, 0-90 DEGREES, ACROSS BOTTOM (LONG LEG) OF SQUARE ALLOWS USER TO MARK AND MEASURE HIS WORK IN DEGREES. EACH HEAVY BLOCK LINE IS 1º WIDE. EACH SPACE IS 2º WIDE. THIS MAKES IT MUCH EASIER FOR THE EYE TO PICK OUT A LOCATION ON THE SCALE.

FRAMING A ROOF using a Swanson Speed® square, "Big 12"® square or Speedlite® square, although they differ in size (7",8",12") as well as some of their other features, requires the use of only one number, the inch rise per 12 inches of horizontal rafter run. The **"ONE-NUMBER℠ METHOD"** was developed by SWANSON TOOL CO., INC. to simplify roof framing.

The above diagram shows square set for 5" rise of common rafter. For 5" rise of the hip or valley, pivot square to #5 on HIP-VAL scale. Always line up the rise number from the same edge of material as you pivot square. The mark along top edge of square will be the PLUMB LINE. Keep pivot point tight against material. You can also read the roof angle on degree scale - 5" rise is a 22.5º angle.

FIG. 8
COMMON
RAFTER



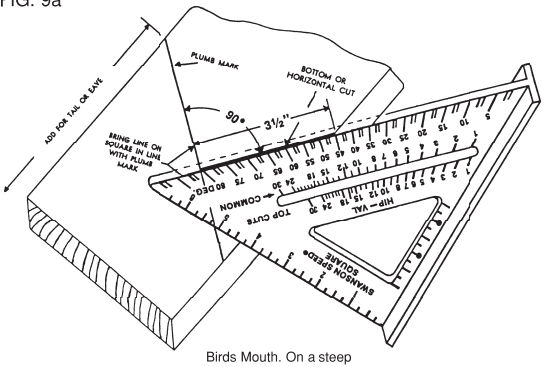
$$\text{RAFTER LENGTH} = \sqrt{\text{RUN}^2 + \text{RISE}^2}$$

NOTE: DEDUCT 1/2 RIDGE THICKNESS
FROM RATER LENGTH.

THE COMMON RAFTER

In laying out **any** rafter, if the lumber is not straight, put the crown or high side up as you lay out your cuts. At top end of rafter draw a plumb line for your roof rise. This gives the plumb cut to fit against the ridge (Fig. 8). To find length look under "Using Rafter Length Tables." Measure the rafter length along top edge of rafter. Mark another plumb cut same as above. This line represents outside wall of the building, (the same point from which you measured the width of the building) and would be the heel plumb line. Add length for a tail or eave to the rafter lengths given in the table in back of book. See example for figuring tail lengths under the Hip Rafter layout. Mark another plumb cut at end of tail for the Fascia Board to nail against. Figs. 8 & 19 shows a horizontal (plancher) cut to provide flat nailing surface for eave construction. **Before you cut the rafter,** move the top plumb cut line toward tail of rafter an amount equal to 1/2 the thickness of the ridge board (Fig. 8). The tails of the rafters may be cut on the ground, or wait until rafters are all in place and mark the ends to a line and cut - whatever is easiest. To lay out the **birdsmouth** (cut out for top plate on wall) see Fig. 9a or 9b. Use first rafter cut as a pattern for the rest. Keep top edge of pattern flush with top edge of each new rafter laid out so that height above plate is uniform.

FIG. 9a



Birds Mouth. On a steep pitch do not exceed 1/2 rafter width for seat cut.

FIG. 9b

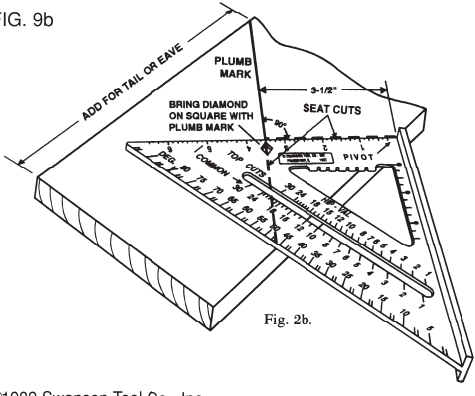
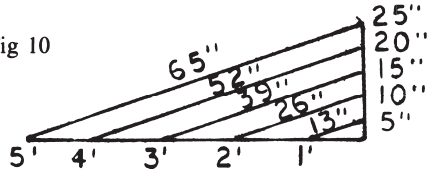


Fig. 2b.

When using the "Big 12"® square, run the plumb line through the 1"-12" scale at the 7" mark and in line with notch at opposite side. Adjust square up or down plumb line until 3-1/2" mark is at edge of material. **Mark** along inch scale for seat cut. (Fig. 9a or 9b)

Fig 10



5' TOTAL RUN = 25" RISE

RUN-RISE RELATIONSHIP TO RAFTER LENGTH

In the example in Fig. 10 the common rafter rises 5" for each 12" of run; and this requires 13" of rafter length Each additional 12" of run makes the rafter 13" longer (See Table C at 5" rise). At a 5' total run, rafter length is 5 x 13" or 65" long. Fractions of foot run are figured in proportion. 6" of run 2.5" rise & extra 6.5" rafter length. 3" of run = 1.25" rise & extra 3.25" rafter length, etc.

Remember, our tables in back of book are for total WIDTH of building, so a 3" RUN would be equal to a 6" building WIDTH (run 1/2 width or span).

LAYING OUT HIP OR VALLEY RAFTER

Because a HIP or VALLEY RAFTER runs at a 45º angle, it has a "longer reach" to the ridge than the common rafter (see Fig. 17). Therefore it will always have a 16.97"(rounded off to 17") run for every unit of rise, in comparison to the 12" run of the common rafter in Fig. 10 (16.97 is the length of the diagonal - which is what the HIP/VALLEY is - of a 12" x 12" square). Using the example from Fig. 10, each additional 17" (not 12") of run would make the HIP/VALLEY 17.69" longer (see Table C at 5" rise). A Valley rafter, because it has to carry more weight, should be one or two sizes larger.

The basic length of the rafter can be taken from the Tables in back of book, but I would suggest you measure each one separately (see Fig. 13). If the building isn't square they will vary. With the crown up, mark the plumb cut at top end using HIP-VAL scale. Measure down top of Hip for proper length and draw another plumb mark. This plumb mark will be part of the birds mouth layout and will fall in line with corner of plate (Fig. 13). Add on any additional amount for overhang by using HIP-VAL building width tables 1"-11" in back of book. Remember a 5" overhang increases the building width by 10" so measurement at "10" would be length to add. A 15" overhang would increase building by 30" so 3 x measurement at "10" would be length to add.

Fig. 13 shows Tail of Hip fit into corner of Fascia Board. If you should "mess up" the double cheek cut (explained in Fig. 11 & 15) and tail ends up being too short, nail a scab onto the sides of Hip (dotted line on Fig. 13).

Because the plane of the roof breaks down from the center line of the Hip, this leaves the edges of the Hip about 1/4" too high on 1-1/2" wide lumber. The Hip can be dropped by cutting seat cut 1/4" deeper, thus lowering the Hip (Line G, Fig. 11). Valley rafter is not dropped.

For ease of explanation, the hip and valley measurements and layouts are based on the usual framing practice where the ridge and rafter material are the same thickness, 1-1/2" in the following example.

Before cutting, move back from top plumb line "A" approximately 1/4" to line "B" (Fig. 11). Set saw to 45º angle and cut on "B". Determining distance from plumb lines "A" to "B" is explained under SHORTENING OF THE HIP (p.23).

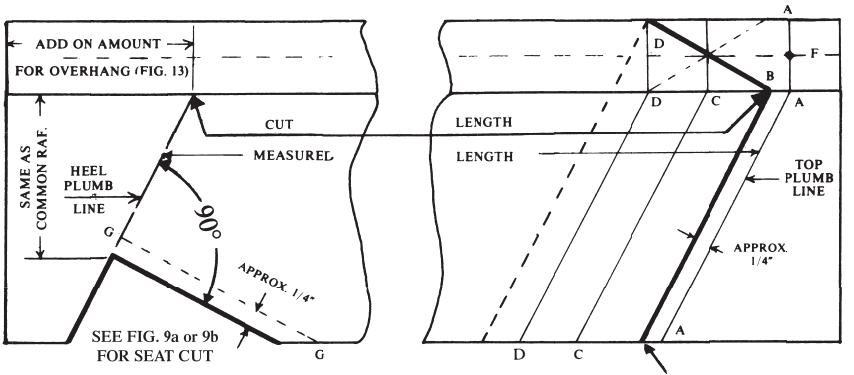


FIG. 11

LAYING OUT HIP OR VALLEY RAFTER TO DROP HIP CUT ON LINE G

PLUMB OUT MARKED FROM *HIP-VAL SCALE*. USE *SAME NUMBER* AS USED ON COMMON-NUMBER REPRESENTING *INCH RISE* PER FOOT RUN – TILT SAW TO 45° AND CUT ALONG PLUMB MARK. THIS WILL GIVE BOTH PLUMB AND SIDE CUT WITH ONE SAWING OPERATION.

TO FIND INTERSECTION POINTS OF CENTER OF HIPS ON RIDGE

Leave ridge about a foot too long at point where both hips intersect the ridge. Take a regular length common rafter (such as used on main roof). Place seat cut over edge of plate and in line with ridge. Make sure your walls are straight. Place top end of common rafter along side of the ridge. Bring top point of common even with top of ridge (Fig. 12). Mark across top of ridge at this point. This mark is the **center line** of the two intersecting hips. The common rafter used to get this intersection point would be placed in the same position as the one in Fig. 18 that comes in line with the ridge and runs underneath the little dormer on the 20'0" wall side. This way you know the rise of the hips will be the same as the rise of the common rafter on main roof.

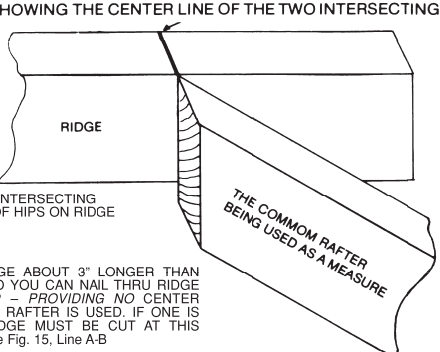
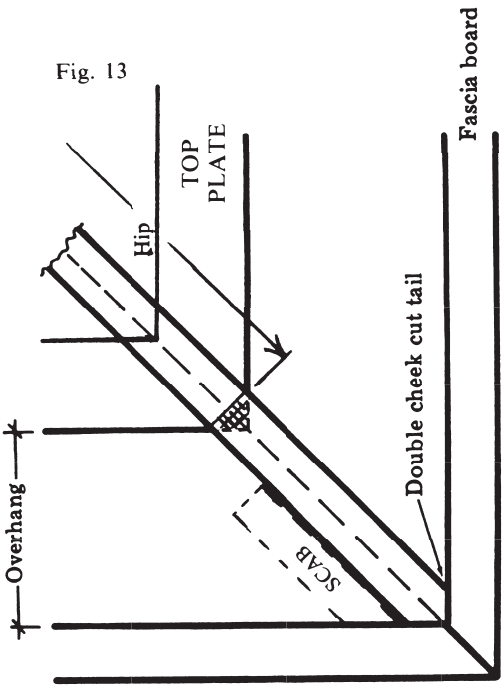


FIG. 12

FINDING INTERSECTING POINTS OF HIPS ON RIDGE

CUT RIDGE ABOUT 3" LONGER THAN MARK, SO YOU CAN NAIL THRU RIDGE INTO HIP – *PROVIDING NO* CENTER COMMON RAFTER IS USED. IF ONE IS USED RIDGE MUST BE CUT AT THIS MARK See Fig. 15, Line A-B

Fig. 13



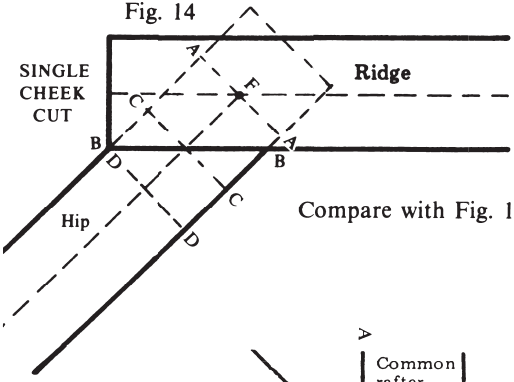
When setting HIP, cut off outside corner of plate, (shaded area). This allows HIP to set against a flat corner, rather than the outside point. Measure HIP from corner of plate (arrow) to center of ridge at a point just past (1/2 thickness of common rafter) your intersecting HIPS line. (Line A B in Fig. 15).

EXPLANATION OF SHORTENING OF THE HIP (p.19)

Compare lines A,B,C,D in Fig. 11 with same ones in Fig. 14 to see the shortening effect of the Hip (using 1-1/2" thick lumber) at the ridge. This same effect would be true with a Jack Rafter against the Hip or Valley rafter. Layout as follows: (Fig. 11) Draw a center line on top edge of Hip. Draw Plumb Line at top end and square across top (A). At 90º to line A, measure distance equal to 1/2 the 45º thickness (1-1/16") of ridge, draw plumb line at C (this is shortening line) and square across top.

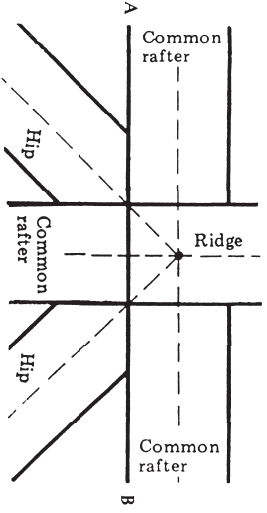
At 90º to line C measure over 1/2 the thickness of HIP (3/4"), draw plumb line D and square across top. Use HIP VAL scale for plumb lines. Lines should be parallel and accurate. From point D, draw line B through line C (where it crosses center line) to edge. From this point draw line B parallel (plumb) to line A. Set saw at 45º angle and cut on line B. For opposite cheek cut (dotted line) go from point D, through line C where it crosses center line, to opposite edge and plumb down opposite side. A DOUBLE CHEEK CUT is making both single cheek cuts, leaving the pointed end from point B, to C at the center line, and back to point D on the dotted line. The reason for this is the rafters and ridge lengths are figured as a pencil line from outside edge of top rafter plate to exact center of building, while the actual framing members are 1-1/2" thick, not a pencil line.

Fig. 14



Compare with Fig. 11

Fig. 15
Shortening of Hip



Double Cheek Cut

JACK RAFTERS: One which does not extend from plate to ridge. *Hip Jack* — one running from plate to hip at 90º to plate. *Valley Jack* — one running from ridge to valley at 90º to ridge. *Cripple Jack* — one which neither touches the ridge nor plate, but runs from a hip rafter to a valley rafter at 90º to the ridge (Fig. 18).

The rise and run of a jack rafter are the same as that of a *common* rafter, When marking jacks use the *common* rafter scale and same number (inch rise). Where rafter rests against hip or valley, mark plumb cut, then cut at 45º angle along this mark. This will give both plumb cut and side cut (Fig. 11). When resting on ridge or plate, lay out the same as for the common rafters. For cripple jacks, mark plumb cuts on both ends and saw at 45º as above.

When measuring the length of the jack rafter, measure from longest corner (plumb cut on 45º) to other plumb cut mark, along *Top Side* (same as shown in Fig. 11 for hip rafter). Cripples are measured from long point to long point diagonally along top edge. Measuring to the long point will compensate for 1/2 of the ridge thickness (or for jacks, 1/2 of valley or hip thickness). There is no problem in laying out these angles on the rafters as long as you keep in mind which side of the hip (or whatever) you want the rafter to fit against. Usually a carpenter will space the ceiling joist from an outside wall and working to a 48" center. This gives proper spacing for dry wall or panelling or whatever is used. Proper spacing of ceiling joist will aid in roof

construction. Measure shortest jack first (usually running next to a ceiling joist), from plate to hip rafter. The difference in length of the rest of the jacks is taken from chart. Set each rafter along side ceiling joist and spike well. The ceiling joist then ties the roof together.

Figure the rafter material lengths so you can cut a long and short jack rafter from each piece. When you have cut your shortest jack, the angle of the long end will then fit on the other side of the hip. Do this all the way up the hip, always leaving the cut off end for the other side. If lumber has crown in it, put crown *up on longest* cut off piece.

In some cases a carpenter will build the valley on top of the main roof, not using a valley rafter. This of course would be the easiest way on any remodeling job, room addition, etc. It saves cutting into and weakening the main roof. Mark location of valley on roof boards, 45º to common rafters (See Dormer, Fig. 18). Set long point of bottom end of rafter even with this line ("G" of Fig. 18). The top cut of the rafter is the same as top cut of common. Bottom end is a horizontal cut that extends all the way across rafter. Then tilt the base of your saw to the same angle as the roof on which the bottom end of the rafter will rest. I.E., if rafter end is to fit on a roof with 6" rise, you would tilt the base of saw to an angle of 26-1/2º (6" rise) and cut along horizontal line. With saw set at this angle you will see that it fits over the pointed end of top of common rafter, because this would also be a 26-1/2º (6" rise) angle. Save the cut off ends for the other side.

Fig. 18 shows a roof as is sometimes used over a door (See "H"). To get the pointed end cut, the square is held in position for the plumb cut of the flat roof. Then a line running from the pivot corner of the square thru the number representing the rise of the **main roof** is the cut wanted.

PLYWOOD ROOF SHEATHING, when used for a roof, can be cut on the horses as follows: from the far left hand corner of a 4'x8' sheet, measure to the right the distance given for the pitch wanted (Chart B). From this point draw a line back to the near left hand corner. These measurements are for a perfectly square roof. Better check the first piece cut for any changes required.

Chart B

Inch Rise per Foot Run	Measure from corner of Plywood
2”	3’ 11 3/8”
2 1/2”	3’ 11 ”
3”	3’ 10 5/8”
3 1/2”	3’ 10 1/8”
4”	3’ 9 5/8”
4 1/2”	3’ 9 ”
5”	3’ 8 3/8”
5 1/2”	3’ 7 5/8”
6”	3’ 6 7/8”
7”	3’ 5 3/8”
8”	3’ 3 7/8”
9”	3’ 2 3/8”
10”	3’ 7/8”
11”	2’ 11 3/8”
12”	2’ 9 7/8”

FOR UNEVEN PITCHED ROOFS

If your roof has no hips or valleys and you have more than one pitch, cut each section separately using the number representing the pitch of that section.

For instance, if the front section is 8” rise and 12’ run, you would use number 8 and find your rafter lengths under 24’ width. Then we’ll say the rear is 3” rise and 16’ run. Use number 3 on the square, and 32’ building width for your length. The top cut to fit against the ridge is plumb for both sections. Your rear plate would be 4’ higher.

DETERMINING THE RISE OF A ROOF

Assume your building has an 18' wide span and you want an 8' rise. Expressed as an equation:

$$\text{Inch rise per foot run} = \frac{\text{Rise x 12 (inches.)}}{\text{Run (feet)}}$$

The rise here is 8' and the run is 9' (1/2 of span) so:

$$\frac{8 \times 12}{9} = \frac{96}{9} \text{ or } 10\tfrac{2}{3}\text{" rise.}$$

Round this off to the closest inch (in this case 11"), which will increase the rise by 1/3" x 9' by 3" for this building. Now look in rafter table under 18' building width and 11" rise and your rafter is 12' 2½" not including overhang.

ROOF DIAGRAMS

In Fig. 16 **valley** 5 and **hip** 4 are in line when both spans and roof pitch are equal. Both **ridge** 3 and 6 are same height. The **ridge** is always centered between two outside walls with **hips** and **valleys** at a 45º angle. In Fig. 17 spans differ, making **valley** 4 change. Ridge 3 is now lower by one unit rise than **ridge** 8 due to shorter span. The length of **ridge** 8 (Fig. 17) equals length of building less building width. Leave the **ridge** 8" or so long at each end. This gives you some extra to nail the **hips** into and can be cut later. Use a ridge that is 2" wider than rafters so you have a full bearing surface for rafters. Rafters will tie into side of ceiling joist giving roof support, so lay out **ridge** accordingly before you raise it into the air.

ROOF DIAGRAMS

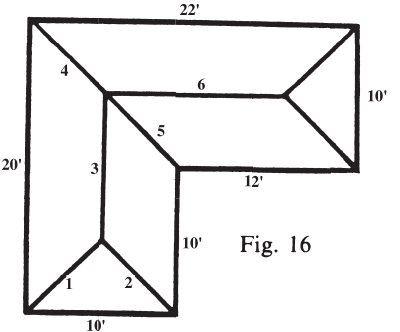


Fig. 16

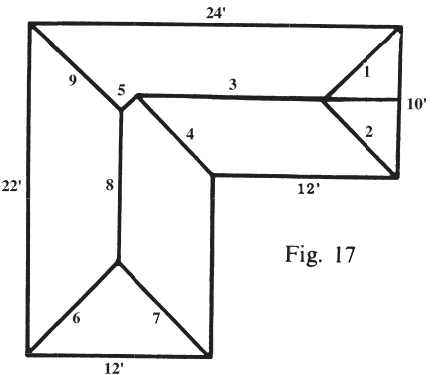
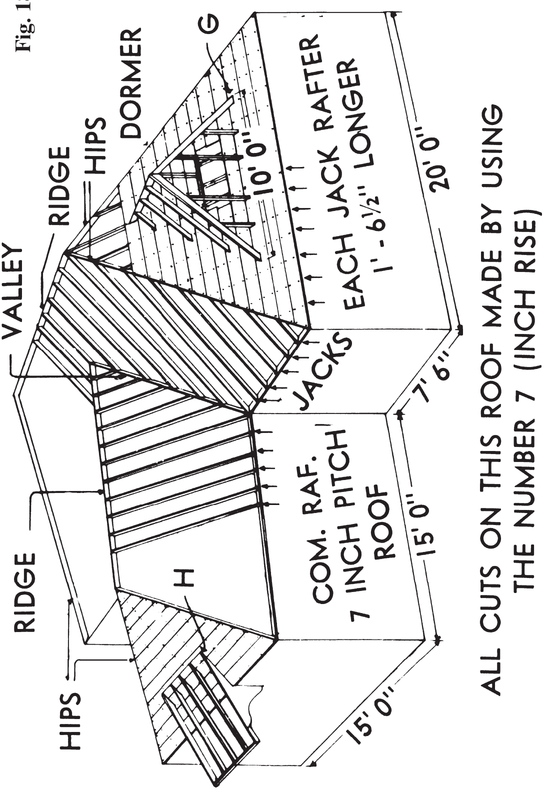


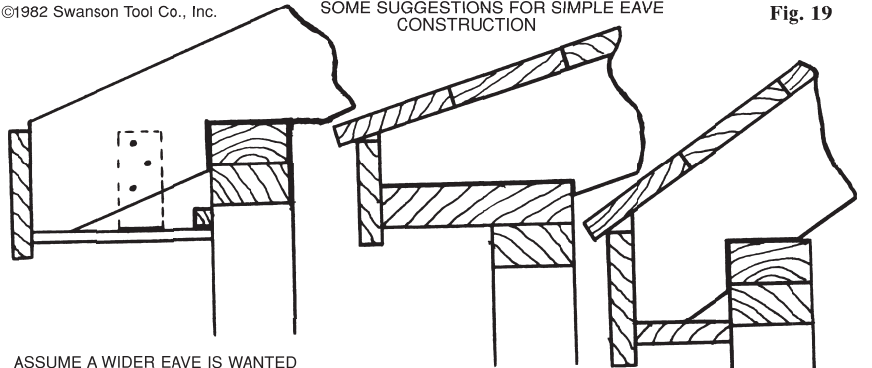
Fig. 17

Fig. 18



SOME SUGGESTIONS FOR SIMPLE EAVE CONSTRUCTION

Fig. 19



ASSUME A WIDER EAVE IS WANTED AND YOU ARE USING 3/8" PLYWOOD FOR THE SOFFIT. IF YOU GO VERY WIDE (24") SOME TYPE OF SUPPORT WILL BE NEEDED TO SUPPORT CENTER OF PLYWOOD. NAIL UP THRU PLYWOOD INTO SUPPORT.

IF YOU CHOOSE TO USE A 2 x 10 FOR TOP PLATE, THIS WORKS BEST ON A FLATTER PITCH ROOF (ONE WITH 4 INCH RISE OR LESS).

WHERE VERY LITTLE OVERHANG IS USED, CUT RAFTER TAILS TO ACCOMMODATE 1x6 OR 1x8 MATERIAL.

USING THE RAFTER LENGTH TABLES

The following tables give the lengths of the common, hip, valley and jack rafters for building widths up to 40 feet.

For building widths greater than is given in this book, take any two widths which when added together equal the width wanted. For instance for 49' width take width of 20 and 29 and add together.

NOTE: Lengths of rafters for pitches 2½, 3½, 4½, 5½: Use lower pitch, then add 1/2 of difference to next higher pitch.

A "width in inches" table is found in back of book which gives the amount to add for inches when the width does not measure out in even feet. Add the length given for the inches in relation to the rise, to the length given for the even foot tables. Lengths given do not include eave projection.

Fig. 18 gives one example of the use of these tables. The main building is 20' wide x 30' long with a 7" rise. Thus, the hip rafters are 15'3⅝" long and the common rafters 11'7". The 15' x 15' addition, hips and valleys are. 11'5⅝" long and the commons 8'8⅜". For the 10' Gable Dormer on top of the roof boards, the longest rafters are 5'9½".

RAFTER LENGTHS FOR 1"-30" ROOF RISE

To find total overall length of a common rafter refer to Table C. Example: For a 22" rise roof the length per foot run is 25.06". If building were 29'8" wide (forget the 8" for now) the run would be 14.5' (1/2 of 29'). 14.5 x 25.06" = 363.37" divided by 12" = 30.280 ft. (.280 of a foot multiplied by 12" = 3.36" or $3\frac{3}{8}$) or 30'$3\frac{3}{8}$". Turn to "inches in building width" table (p. 48). Go down rise column to 22 and across to 8" (not 4.) Add the $8\frac{3}{8}$" to 30'$3\frac{3}{8}$" = 30' $11\frac{3}{4}$". Deduct 1/2 of the thickness of ridge and add on overhang. If a 12" wide eave is desired a minimum of 25.06" is needed, plus tail cut loss "A" (fig. 8). If brick, consider distance brick work extends out from edge of top plate. Figure hip-val rafters the same. Tail cut loss "A" is based on 8" lumber. **Pitch** is a term which technically refers to total rise compared to total width; so a 1/2 pitch means roof rises a distance equal to 1/2 of total building width, or a 1/6 pitch means roof rises 1/6th of building width, etc. Although a mathematician may apply "pitch" as described above, the tradesman thinks of "pitch" in terms of inch rise per foot of run.

To convert use:

24 x pitch = rise per foot

$$\text{or } \frac{\text{rise per foot}}{24} = \text{pitch}$$

or see Table C

Table C

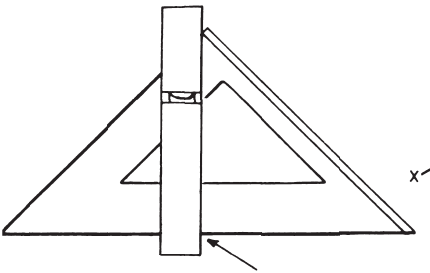
Angle in Deg.	Rise	PITCH	(Fig. 8) Tail Cut loss "A"	LENGTH PER FOOT RUN Common Rafters	Hip-Val Rafters
4¾	1			12.04"	17.00"
9½	2	1/12		12.16"	17.09"
14	3			12.37"	17.23"
18½	4	1/6	2¾"	12.65"	17.44"
22½	5			13.00"	17.69"
26½	6	1/4	4"	13.42"	18.00"
30¼	7			13.89"	18.36"
33¾	8	1/3		14.42"	18.76"
37	9		6"	15.00"	19.21"
39¾	10	5/12		15.62"	19.70"
42½	11			16.28"	20.22"
45	12	1/2	8"	16.97"	20.78"
47¼	13			17.69"	21.38"
49½	14	7/12		18.44"	22.00"
51¼	15		10"	19.21"	22.65"
53	16	2/3		20.00"	23.32"
54¾	17			20.81"	24.02"
56¼	18	3/4	12"	21.63"	24.74"
57¾	19			22.47"	25.47"
59	20	5/6		23.32"	26.23"
60¼	21		14"	24.19"	27.00"
61½	22	11/12		25.06"	27.78"
62½	23			25.94"	28.58"
63½	24	Full	16"	26.83"	29.39"
64½	25			27.73"	30.22"
65¼	26			28.64"	31.05"
66	27		18"	29.55"	31.89"
66¾	28			30.46"	32.74"
67½	29			31.38"	33.60"
68¼	30		20"	32.31"	34.47"

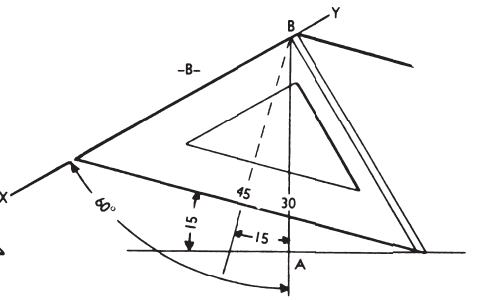
HANDY THINGS TO KNOW

- In any size **square shape** the length of the diagonal is 1.414 x the length of any side.
- To lay out a 90 corner, measure out 3' on one side and 4' on the other and adjust until the diagonal is exactly 5', or use 6' and 8', then 10' will be diagonal.
- Because a rule is laid out in 16ths of an inch, to change a decimal into 16ths multiply that number by 16 (ex. .375 x 16 = 6 so .375 = 6/16 or 3/8").
- If a portion of a foot is expressed as a decimal rather than inches, multiply by 12 to find inches (ex. .750 ft x 12 = 9 inches).
- If you have an open beam ceiling with, for example, a 6" wide Hip and 5" rise, then to figure amount to drop Hip, or amount of chamfer (or bevel) off each edge of Hip use this formula:

$$\frac{\text{Rise x 1/2 thickness of Hip (ex. 5" x 3")}}{16.97} = .88 \text{ or } 7/8"$$

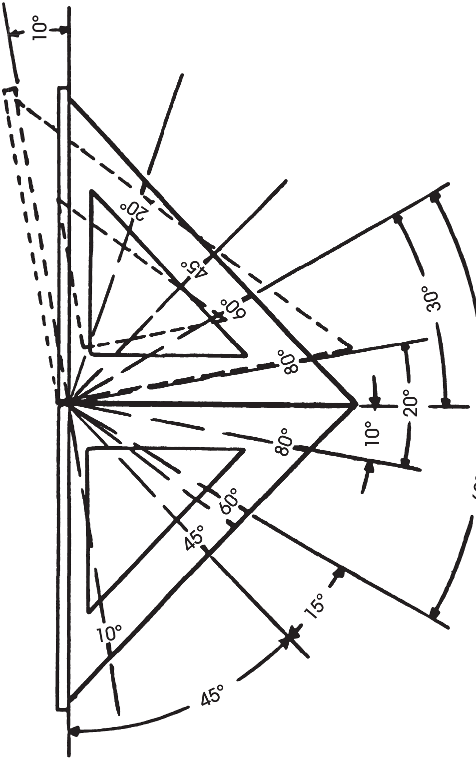
USING THE DEGREE SCALE





PLACE x 7" (OR LONGER) LEVEL ON FACE OF SQUARE WITH TOP EDGE OF LEVEL ALWAYS RESTING AGAINST "T" BAR AT PIVOT POINT ON SQUARE. *BUBBLE SHOULD ALWAYS INDICATE THAT THE LEVEL IS BEING HELD PLUMB.* PIVOT SQUARE FROM EDGE OF LEVEL. ARROW INDICATES POINT AT WHICH DEGREE IS SHOWN.

BY SWINGING THE SQUARE UP AGAINST XY, THE PLUMB LINE HAS SHIFTED 15° THUS ANGLE ABX = 60°. THIS SAME 15°. READING ALSO INDICATES BOTTOM EDGE OF SQUARE IS SETTING AT A 15° INCLINE.



SOLID LINES SHOW SQUARE IN TWO POSITIONS FOR LAYING OUT ANY ANGLE THRU 180°. DOTTED LINE SHOWS SQUARE PIVOTED TO A 10° ANGLE.

WIDTH OF BUILDING

Inch Rise	3 FEET Com.	Hip	4 FEET Com.	Hip
1	1'- 6 1/16"	2'- 1 1/2"	2'- 1/8"	2'-10 "
2	1'- 6 1/4"	2'- 1 5/8"	2'- 3/8"	2'-10 1/4"
3	1'- 6 1/2"	2'- 1 7/8"	2'- 3/4"	2'-10 1/2"
4	1'- 7 "	2'- 2 1/4"	2'- 1 3/8"	2'-10 7/8"
5	1'- 7 1/2"	2'- 2 5/8"	2'- 2 "	2'-11 3/8"
6	1'- 8 1/8"	2'- 3 "	2'- 2 3/4"	3'- 0 "
7	1'- 8 7/8"	2'- 3 1/2"	2'- 3 3/4"	3'- 3/4"
8	1'- 9 5/8"	2'- 4 1/8"	2'- 4 7/8"	3'- 1 1/2"
9	1'-10 1/2"	2'- 4 7/8"	2'- 6 "	3'- 2 3/8"
10	1'-11 3/8"	2'- 5 5/8"	2'- 7 1/4"	3'- 3 3/8"
11	2'- 3/8"	2'- 6 3/8"	2'- 8 5/8"	3'- 4 3/8"
12	2'- 1 1/2"	2'- 7 1/8"	2'-10 "	3'- 5 5/8"
13	2'- 2 9/16"	2'- 8 1/16"	2'-11 3/8"	3'- 6 3/4"
14	2'- 3 11/16"	2'- 9 "	3'- 7/8"	3'- 8 "

Inch Rise	5 FEET Com.	Hip	6 FEET Com.	Hip
1	2'- 6 1/8"	3'- 6 1/2"	3'- 1/8"	4'- 3 "
2	2'- 6 1/2"	3'- 6 7/8"	3'- 1/2"	4'- 3 1/4"
3	2'- 7 "	3'- 7 1/8"	3'- 1 1/8"	4'- 3 5/8"
4	2'- 7 3/4"	3'- 7 5/8"	3'- 2 "	4'- 4 3/8"
5	2'- 8 1/2"	3'- 8 1/4"	3'- 3 "	4'- 5 1/8"
6	2'- 9 1/2"	3'- 9 "	3'- 4 1/4"	4'- 6 "
7	2'-10 3/4"	3'- 9 7/8"	3'- 5 3/4"	4'- 7 1/8"
8	3'- 1/8"	3'-10 7/8"	3'- 7 1/4"	4'- 8 1/4"
9	3'- 1 1/2"	4'- 0 "	3'- 9 "	4'- 9 5/8"
10	3'- 3 1/8"	4'- 1 1/4"	3'-10 7/8"	4'-11 1/8"
11	3'- 4 3/4"	4'- 2 1/2"	4'- 7/8"	5'- 5/8"
12	3'- 6 1/2"	4'- 4 "	4'- 2 7/8"	5'- 2 3/8"
13	3'- 8 1/4"	4'- 5 7/16"	4'- 5 1/16"	5'- 4 1/8"
14	3'-10 1/8"	4'- 7 "	4'- 7 5/16"	5'- 6 "

WIDTH OF BUILDING

Inch Rise	7 FEET Com.	7 FEET Hip	8 FEET Com.	8 FEET Hip
1	3'- 6 1/8"	4'-11 1/2"	4'- 1/8"	5'- 8 "
2	3'- 6 5/8"	4'-11 7/8"	4'- 3/8"	5'- 8 3/8"
3	3'- 7 1/4"	5'- 1/4"	4'- 1 1/2"	5'- 8 7/8"
4	3'- 8 3/8"	5'- 1 1/8"	4'- 2 5/8"	5'- 9 3/4"
5	3'- 9 1/2"	5'- 2 "	4'- 4 "	5'-10 3/4"
6	3'- 11 "	5'- 3 "	4'- 5 5/8"	6'- 0 "
7	4'- 3/4"	5'- 4 1/4"	4'- 7 5/8"	6'- 1 1/2"
8	4'- 2 1/2"	5'- 5 5/8"	4'- 9 5/8"	6'- 3 "
9	4'- 4 1/2"	5'- 7 1/4"	5'- 0 "	6'- 4 7/8"
10	4'- 6 3/4"	5'- 9 "	5'- 2 1/2"	6'- 6 3/4"
11	4'- 9 "	5'-10 3/4"	5'- 5 1/8"	6'- 8 3/4"
12	4'-11 3/8"	6'- 3/4"	5'- 7 7/8"	6'-11 1/8"
13	5'- 1 15/16"	6'- 2 13/16"	5'-10 3/4"	7'- 1 1/2"
14	5'- 4 9/16"	6'- 5 "	6'- 1 3/4"	7'- 4 "

Inch Rise	9 FEET Com.	9 FEET Hip	10 FEET Com.	10 FEET Hip
1	4'- 6 1/4"	6'- 4 1/2"	5'- 1/4"	7'- 1 "
2	4'- 6 3/4"	6'- 5 "	5'- 7/8"	7'- 1 1/2"
3	4'- 7 5/8"	6'- 5 1/2"	5'- 1 7/8"	7'- 2 1/8"
4	4'- 9 "	6'- 6 3/8"	5'- 3 1/4"	7'- 3 1/4"
5	4'-10 1/2"	6'- 7 5/8"	5'- 5 "	7'- 4 1/2"
6	5'- 3/8"	6'- 9 "	5'- 7 1/8"	7'- 6 "
7	5'- 2 5/8"	6'-10 5/8"	5'- 9 1/2"	7'- 7 3/4"
8	5'- 4 7/8"	7'- 3/8"	6'- 1/8"	7'- 9 3/4"
9	5'- 7 1/2"	7'- 2 1/2"	6'- 3 "	8'- 0 "
10	5'-10 3/8"	7'- 4 5/8"	6'- 6 1/8"	8'- 2 1/2"
11	6'- 1 1/4"	7'- 7 "	6'- 9 3/8"	8'- 5 1/8"
12	6'- 4 3/8"	7'- 9 1/2"	7'- 7/8"	8'- 7 7/8"
13	6'- 7 5/8"	8'- 3/16"	7'- 4 7/16"	8'-10 7/8"
14	6'-11 "	8'- 3 "	7'- 8 3/16"	9'- 2 "

WIDTH OF BUILDING

Inch Rise	11 FEET Com.	11 FEET Hip	12 FEET Com.	12 FEET Hip
1	5'- 6 1/4"	7'- 9 1/2"	6'- 1/4"	8'- 6 "
2	5'- 7 "	7'-10 "	6'- 1 "	8'- 6 1/2"
3	5'- 8 "	7'-10 3/4"	6'- 2 1/4"	8'- 7 3/8"
4	5'- 9 5/8"	8'- 0 "	6'- 3 7/8"	8'- 8 5/8"
5	5'-11 1/2"	8'- 1 3/8"	6'- 6 "	8'-10 1/4"
6	6'- 1 7/8"	8'- 3 "	6'- 8 1/2"	9'- 0 "
7	6'- 4 1/2"	8'- 4 7/8"	6'-11 3/8"	9'- 2 1/8"
8	6'- 7 3/8"	8'- 7 1/8"	7'- 2 1/2"	9'- 4 5/8"
9	6'-10 1/2"	8'- 9 5/8"	7'- 6 "	9'- 7 1/4"
10	7'- 2 "	9'- 3/8"	7'- 9 3/4"	9'-10 1/4"
11	7'- 5 1/2"	9'- 3 1/4"	8'- 1 5/8"	10'- 1 3/8"
12	7'- 9 3/8"	9'- 6 1/4"	8'- 5 7/8"	10'- 4 5/8"
13	8'- 1 5/16"	9'- 9 9/16"	8'-10 1/8"	10'- 8 1/4"
14	8'- 5 7/16"	10'- 1 "	9'- 2 5/8"	11'- "

Inch Rise	13 FEET Com.	13 FEET Hip	14 FEET Com.	14 FEET Hip
1	6'- 6 1/4"	9'- 2 1/2"	7'- 1/4"	9'-11 "
2	6'- 7 1/8"	9'- 3 "	7'- 1 1/8"	9'-11 5/8"
3	6'- 8 1/2"	9'- 4 "	7'- 2 5/8"	10'- 5/8"
4	6'-10 1/4"	9'- 5 3/8"	7'- 4 1/2"	10'- 2 1/8"
5	7'- 1/2"	9'- 7 1/8"	7'- 7 "	10'- 3 7/8"
6	7'- 3 1/4"	9'- 9 "	7'-10 "	10'- 6 "
7	7'- 6 3/8"	9'-11 1/4"	8'- 1 3/8"	10'- 8 1/2"
8	7'- 9 3/4"	10'- 2 "	8'- 5 "	10'-11 3/8"
9	8'- 1 1/2"	10'- 4 7/8"	8'- 9 "	11'- 2 1/2"
10	8'- 5 5/8"	10'- 8 1/8"	9'- 1 3/8"	11'- 5 7/8"
11	8'- 9 3/4"	10'-11 5/8"	9'- 6 "	11'- 9 5/8"
12	9'- 2 3/8"	11'- 3 "	9'-10 3/4"	12'- 1 1/2"
13	9'- 7 "	11'- 6 15/16"	10'- 3 13/16"	12'- 5 5/8"
14	9'- 11 7/8"	11'-11 "	10'- 9 1/16"	12'-10 "

WIDTH OF BUILDING

Inch Rise	15 FEET Com.	15 FEET Hip	16 FEET Com.	16 FEET Hip
1	7'- 6 1/4"	10'- 7 1/2"	8'- 3/8"	11'- 4 "
2	7'- 7 1/4"	10'- 8 1/8"	8'- 1 3/8"	11'- 4 3/4"
3	7'- 8 3/4"	10'- 9 1/4"	8'- 3 "	11'- 5 7/8"
4	7'-10 7/8"	10'-10 7/8"	8'- 5 1/4"	11'- 7 1/2"
5	8'- 1 1/2"	11'- 3/4"	8'- 8 "	11'- 9 5/8"
6	8'- 4 3/4"	11'- 3 "	8'-11 1/2"	12'- 0 "
7	8'- 8 3/8"	11'- 5 5/8"	9'- 3 1/4"	12'- 2 7/8"
8	9'- 1/4"	11'- 8 3/4"	9'- 7 3/8"	12'- 6 1/8"
9	9'- 4 1/2"	12'- 1/8"	10'- 0 "	12'- 9 5/8"
10	9'- 9 1/4"	12'- 3 3/4"	10'- 5 "	13'- 1 5/8"
11	10'- 2 1/8"	12'- 7 3/4"	10'-10 1/4"	13'- 5 7/8"
12	10'- 7 1/4"	12'-11 7/8"	11'- 3 3/4 "	13'-10 1/4"
13	11'- 11/16"	13'- 4 5/16"	11'- 9 9/16"	14'- 3 "
14	11'- 6 5/16"	13'- 9 "	12'- 3 1/2"	14'- 8 "

Inch Rise	17 FEET Com.	17 FEET Hip	18 FEET Com.	18 FEET Hip
1	8'- 6 3/8"	12'- 1/2"	9'- 3/8"	12'- 9 "
2	8'- 7 1/2"	12'- 1 1/4"	9'- 1 1/2"	12'- 9 7/8"
3	8'- 9 1/8"	12'- 2 1/2"	9'- 3 3/8"	12'-11 1/8"
4	8'-11 5/8"	12'- 4 1/4"	9'- 5 7/8"	13'- 1 "
5	9'- 2 1/2"	12'- 6 1/2"	9'- 9 "	13'- 3 3/8"
6	9'- 6 1/4"	12'- 9 "	10'- 7/8"	13'- 6 "
7	9'-10 1/4"	13'- 0 "	10'- 5 1/8"	13'- 9 1/4"
8	10'- 2 5/8"	13'- 3 1/2"	10'- 9 3/4"	14'- 7/8"
9	10'- 7 1/2"	13'- 7 1/4"	11'- 3 "	14'- 4 7/8"
10	11'- 7/8"	13'-11 1/2"	11'- 8 5/8"	14'- 9 3/8"
11	11'- 6 1/2"	14'- 4 "	12'- 2 1/2"	15'- 2 "
12	12'- 1/4"	14'- 8 5/8"	12'- 8 3/4"	15'- 7 "
13	12'- 6 3/8"	15'- 1 11/16"	13'- 3 1/4"	16'- 3/8"
14	13'- 3/4"	15'- 7 "	13'- 9 15/16"	16'- 6 "

WIDTH OF BUILDING

Inch	19 FEET		20 FEET	
Rise	Com.	Hip	Com.	Hip
1	9'- 6 3/8"	13'- 5 1/2"	10'- 3/8"	14'- 2 "
2	9'- 7 5/8"	13'- 6 3/8"	10'- 1 5/8"	14'- 2 7/8"
3	9'- 9 5/8"	13'- 7 3/4"	10'- 3 3/4"	14'- 4 3/8"
4	10'- 1/4"	13'- 9 3/4"	10'- 6 1/2"	14'- 6 3/8"
5	10'- 3 1/2"	14'- 1/4"	10'-10 "	14'- 9 "
6	10'- 7 5/8"	14'- 3 "	11'- 2 1/4"	15'- 0 "
7	11'- 1/8"	14'- 6 3/8"	11'- 7 "	15'- 3 5/8"
8	11'- 5 "	14'-10 1/4"	12'- 1/4"	15'- 7 5/8"
9	11'-10 1/2"	15'- 2 1/2"	12'- 6 "	16'- 1/8"
10	12'- 4 1/2"	15'- 7 1/4"	13'- 1/4"	16'- 5 "
11	12'-10 5/8"	16'- 1/8"	13'- 6 7/8"	16'-10 1/4"
12	13'- 5 1/4"	16'- 5 3/8"	14'- 1 3/4"	17'- 3 7/8"
13	14'- 1/4"	16'-11 "	14'- 9 "	17'- 9 3/4"
14	14'- 7 1/4"	17'- 5 "	15'- 4 3/8"	18'- 4 "
15	15'- 2 1/2"	17'-11 1/8"	16'- 1/8"	18'-10 1/4"
16	15'-10 "	18'- 5 1/2"	16'- 8 "	19'- 5 1/4"
17	16'- 5 5/8"	19'- 1/4"	17'- 4 1/8"	20'- 1/4"
18	17'- 1 1/2"	19'- 7 "	18'- 1/4"	20'- 7 3/8"
19	17'- 9 1/2"	20'- 2 "	18'- 8 3/4"	21'- 2 3/4"
20	18'- 5 1/2"	20'- 9 1/4"	19'- 5 1/4"	21'-10 3/8"
21	19'- 1 3/4"	21'- 4 1/2"	20'- 1 7/8"	22'- 6 "
22	19'-10 1/8"	22'- 0 "	20'-10 5/8"	23'- 1 7/8"
23	20'- 6 1/2"	22'- 7 1/2"	21'- 7 3/8"	23'- 9 7/8"
24	21'- 2 7/8"	23'- 3 1/4"	22'- 4 1/4"	24'- 6 "

WIDTH OF BUILDING

Inch Rise	21 FEET Com.	21 FEET Hip	22 FEET Com.	22 FEET Hip
1	10'- 6 3/8"	14'-10 1/2"	11'- 1/2"	15'- 7 "
2	10'- 7 3/4"	14'-11 3/8"	11'- 1 3/4"	15'- 8 "
3	10'-10 "	15'- 1 "	11'- 4 1/8"	15'- 9 1/2"
4	11'- 7/8"	15'- 3 1/8"	11'- 7 1/8"	15'-11 7/8"
5	11'- 4 1/2"	15'- 5 7/8"	11'-11 "	16'- 2 3/4"
6	11'- 9 "	15'- 9 "	12'- 3 5/8"	16'- 6 "
7	12'- 2 "	16'- 3/4"	12'- 8 7/8"	16'-10 "
8	12'- 7 1/2"	16'- 5 "	13'- 2 5/8"	17'- 2 3/8"
9	13'- 1 1/2"	16'- 9 3/4"	13'- 9 "	17'- 7 3/8"
10	13'- 8 "	17'- 2 7/8"	14'- 3 7/8"	18'- 3/4"
11	14'- 3 "	17'- 8 3/8"	14'-11 1/8"	18'- 6 1/2"
12	14'-10 3/16"	18'- 2 1/4"	15'- 6 11/16"	19'- 5/8 "
13	15'- 5 3/4"	18'- 8 7/16"	16'- 2 5/8 "	19'- 7 1/8"
14	16'- 1 5/8"	19'- 3 "	16'-10 13/16"	20'- 2 "

Inch Rise	23 FEET Com.	23 FEET Hip	24 FEET Com.	24 FEET Hip
1	11'- 6 1/2"	16'- 3 1/2"	12'- 1/2"	17'- 0 "
2	11'- 7 7/8"	16'- 4 1/2"	12'- 1 7/8"	17'- 1 1/8"
3	11'-10 3/8"	16'- 6 1/8"	12'- 4 1/2"	17'- 2 3/4"
4	12'- 1 1/2"	16'- 8 5/8"	12'- 7 3/4"	17'- 5 1/4"
5	12'- 5 1/2"	16'-11 5/8"	13'- 0 "	17'- 8 3/8"
6	12'-10 3/8"	17'- 3 "	13'- 5 "	18'- 0 "
7	13'- 3 7/8"	17'- 7 1/8"	13'-10 3/4"	18'- 4 3/8"
8	13'- 9 7/8"	17'-11 3/4"	14'- 5 "	18'- 9 1/8"
9	14'- 4 1/2"	18'- 5 "	15'- 0 "	19'- 2 1/2"
10	14'-11 3/4"	18'-10 5/8"	15'- 7 1/2"	19'- 8 3/8"
11	15'- 7 1/4"	19'- 4 5/8"	16'- 3 3/8"	20'- 2 5/8"
12	16'- 3 1/8"	19'-11 "	16'-11 5/8"	20'- 9 3/8"
13	16'-11 7/16"	20'- 5 13/16"	17'- 8 5/16"	21'- 4 1/2"
14	17'- 8 1/16"	21'- 1 "	18'- 5 1/4 "	22'- "

WIDTH OF BUILDING

Inch Rise	25 FEET Com.	Hip	26 FEET Com.	Hip
1	12'- 6½"	17'- 8½"	13'- ½"	18'- 5 "
2	12'- 8 "	17'- 9⅝"	13'- 2⅛"	18'- 6¼ "
3	12'-10⅝"	17'-11⅜"	13'- 4⅞"	18'- 8 "
4	13'- 2⅛"	18'- 2 "	13'- 8½"	18'-10¾ "
5	13'- 6½"	18'- 5¼"	14'- 1 "	19'- 2⅛ "
6	13'-11¾"	18'- 9 "	14'- 6½"	19'- 6 "
7	14'- 5¾"	19'- 1½"	15'- ¾"	19'-10⅝ "
8	15'- ¼"	19'- 6½"	15'- 7½"	20'- 3⅞ "
9	15'- 7½"	20'- ⅛"	16'- 3 "	20'- 9¾ "
10	16'- 3¼"	20'- 6¼"	16'-11 11/16"	21'- 4 1/16 "
11	16'-11½"	21'- 13/16"	17'- 7⅝"	21'-10 15/16"
12	17'- 8⅛"	21'- 7 13/16"	18'- 4⅝"	22'- 6 3/16 "
13	18'- 5⅛"	22'- 3¼"	19'- 2 "	23'- 1 15/16"
14	19'- 2½"	22'-11 "	19'-11 11/16"	23'- 6 7/16 "

Inch Rise	27 FEET Com.	Hip	28 FEET Com.	Hip
1	13'- 6½"	19'- 1½"	14'- ⅝"	19'-10 "
2	13'- 8¼"	19'- 2¾"	14'- 2¼"	19'-11¼ "
3	13'-11 "	19'- 4⅝"	14'- 5¼"	20'- 1¼ "
4	14'- 2⅞"	19'- 7½"	14'- 9⅛"	20'- 4⅛ "
5	14'- 7½"	19'-11 "	15'- 2 "	20'- 7⅞ "
6	15'- 1 "	20'- 3 "	15'- 7⅞"	21'- 0 "
7	15'- 7¾"	20'- 7¾"	16'- 2⅝"	21'- 5 "
8	16'- 2¾"	21'- 1¼"	16'- 9⅞"	21'-10⅝ "
9	16'-10½"	21'- 7⅜"	17'- 6 "	22'- 5 "
10	17'- 7 "	22'- 2 "	18'- 2⅝"	22'-11⅞ "
11	18'- 3¾"	22'- 9 "	18'-11⅞"	23'- 7⅛ "
12	19'- 1⅛"	23'- 4½"	19'- 9⅝"	24'- 3 "
13	19'-10 13/16"	24'- ⅝"	20'- 7 11/16"	24'-11 5/16 "
14	20'- 8 15/16"	24'- 9 "	21'- 6⅛"	25'- 8 "

WIDTH OF BUILDING

Inch Rise	29 FEET Com.	29 FEET Hip	30 FEET Com.	30 FEET Hip
1	14'- 6 5/8"	20'- 6 1/2"	15'- 5/8"	21'- 3"
2	14'- 8 3/8"	20'- 7 3/4"	15'- 2 3/8"	21'- 4 3/8"
3	14'-11 1/2"	20'- 9 7/8"	15'- 5 1/2"	21'- 6 1/2"
4	15'- 3 1/2"	21'- 7/8"	15'- 9 3/4"	21'- 9 5/8"
5	15'- 8 1/2"	21'- 4 3/4"	16'- 3"	22'- 1 1/2"
6	16'- 2 5/8"	21'- 9"	16'- 9 1/4"	22'- 6"
7	16'- 9 5/8"	22'- 2 1/8"	17'- 4 1/2"	22'-11 3/8"
8	17'- 5 1/8"	22'- 8"	18'- 3/8"	23'- 5 3/8"
9	18'- 1 1/2"	23'- 2 5/8"	18'- 9"	24'- 1/8"
10	18'-10 3/8"	23'- 9 3/4"	19'- 6 3/8"	24'- 7 1/2"
11	19'- 8"	24'- 5 1/4"	20'- 4 1/4"	25'- 3 3/8"
12	20'- 6 1/16"	25'- 1 3/8"	21'- 2 9/16"	25'-11 3/4"
13	21'- 4 1/2"	25'-10"	22'- 1 3/8"	26'- 8 11/16"
14	22'- 3 3/8"	26'- 7"	23'- 9/16"	27'- 6"

Inch Rise	31 FEET Com.	31 FEET Hip	32 FEET Com.	32 FEET Hip
1	15'- 6 5/8"	21'-11 1/2"	16'- 5/8"	22'- 8"
2	15'- 8 1/2"	22'- 7/8"	16'- 2 1/2"	22'- 9 1/2"
3	15'-11 5/8"	22'- 3 1/8"	16'- 5 7/8"	22'-11 5/8"
4	16'- 4 1/8"	22'- 6 3/8"	16'-10 3/8"	23'- 3"
5	16'- 9 1/2"	22'-10 3/8"	17'- 4"	23'- 7 1/4"
6	17'- 4"	23'- 3"	17'-10 5/8"	24'- 0"
7	17'-11 1/2"	23'- 8 1/2"	18'- 6 3/8"	24'- 5 3/4"
8	18'- 7 5/8"	24'- 2 3/4"	19'- 2 3/4"	25'- 1/8"
9	19'- 4 1/2"	24'- 9 3/4"	20'- 0"	25'- 7 3/8"
10	20'- 2 1/4"	25'- 5 3/8"	20'-10"	26'- 3 1/4"
11	21'- 3/8"	26'- 1 1/2"	21'- 8 1/2"	26'-11 5/8"
12	21'-11"	26'-10 1/8"	22'- 7 1/2"	27'- 8 1/2"
13	22'-10 1/4"	27'- 7 3/8"	23'- 7 1/16"	28'- 6 1/16"
14	23'- 9 13/16"	28'- 5"	24'- 7"	29'- 4"

WIDTH OF BUILDING

Inch Rise	33 FEET Com.	33 FEET Hip	34 FEET Com.	34 FEET Hip
1	16'- 6 5/8"	23'- 4 1/2"	17'- 3/4"	24'- 1 "
2	16'- 8 3/8"	23'- 6 "	17'- 2 3/4"	24'- 2 1/2"
3	17'- 0 "	23'- 8 1/4"	17'- 6 1/4"	24'- 4 7/8"
4	17'- 4 3/4"	23'-11 3/4"	17'-11 "	24'- 8 1/2"
5	17'-10 1/2"	24'- 4 1/8"	18'- 5 "	25'- 7/8"
6	18'- 5 5/8"	24'- 9 "	19'- 1/8"	25'- 6 "
7	19'- 1 3/8"	25'- 2 7/8"	19'- 8 3/8"	26'- 1/8"
8	19'-10 "	25'- 9 1/2"	20'- 5 1/8"	26'- 6 7/8"
9	20'- 7 1/2"	26'- 5 "	21'- 3 "	27'- 2 5/8"
10	21'- 5 7/8"	27'- 1 1/8"	22'- 1 1/2"	27'-10 7/8"
11	22'- 4 5/8"	27'- 9 3/4"	23'- 7/8"	28'- 7 3/4"
12	23'- 4 "	28'- 6 7/8"	24'- 1/2"	29'- 5 1/4"
13	24'- 4 1/2"	29'- 4 5/8"	25'- 7/8"	30'- 3 1/4"
14	25'- 4 1/4"	30'- 3 "	26'- 1 1/2"	31'- 2 "

Inch Rise	35 FEET Com.	35 FEET Hip	36 FEET Com.	36 FEET Hip
1	17'- 6 3/4"	24'- 9 1/2"	18'- 3/4"	25'- 6 "
2	17'- 8 7/8"	24'-11 "	18'- 2 7/8"	25'- 7 5/8"
3	18'- 1/2"	25'- 1 1/2"	18'- 6 5/8"	25'-10 1/8"
4	18'- 5 3/8"	25- 5 1/4 "	18'-11 7/8"	26'- 1 7/8"
5	18'-11 1/2"	25'- 9 3/4"	19'- 6 "	26'- 6 5/8"
6	19'- 6 7/8"	26'- 3 "	20'- 1 1/2"	27'- 0 "
7	20'- 3 3/8"	26'-10 1/4"	20'-10 1/4"	27'- 6 1/2"
8	21'- 3/8"	27'- 4 1/4"	21'- 7 1/2"	28'- 1 5/8"
9	21'-10 1/2"	28'- 1/4"	22'- 6 "	28'- 9 3/4"
10	22'- 9 3/8"	28'- 8 3/4"	23'- 5 1/8"	29'- 6 5/8"
11	23'- 8 7/8"	29'- 5 7/8"	24'- 5 "	30'- 4 "
12	24'- 9 "	30'- 3 5/8"	25'- 5 1/2"	31'- 2 "
13	25'- 9 3/4"	31'- 1 7/8"	26'- 6 5/8"	32'- 5/8"
14	26'-10 3/4"	32'- 1 "	27'- 7 7/8"	33'- 0 "

WIDTH OF BUILDING

Inch Rise	37 FEET Com.	37 FEET Hip	38 FEET Com.	38 FEET Hip
1	18'- 6¾"	26'- 2½"	19'- ¾"	26'-11 "
2	18'- 9 "	26'- 4⅛"	19'- 3 "	27'- ¾"
3	19'- ¾"	26'- 6¾"	19'- 7 "	27'- 3⅜"
4	19'- 6⅛"	26'-10⅝"	20'- ⅜"	27'- 7⅜"
5	20'- ½"	27'- 3½"	20'- 7 "	28'- ⅜"
6	20'- 8¼"	27'- 9 "	21'- 3 "	28'- 6 "
7	21'- 5¼"	28'- 3⅝"	22'- ⅛"	29'- ⅞"
8	22'- 2¾"	28'-11 "	22'-10 "	29'- 8½"
9	23'- 1½"	29'- 7⅜"	23'- 9 "	30'- 5 "
10	24'- 1 "	30'- 4½"	24'- 8¾"	31'- 2⅜"
11	25'- 1⅛"	31'- 2⅛"	25'- 9⅜"	32'- ⅛"
12	26'- 2 "	32'- ⅜"	26'-10½"	32'-10⅞"
13	27'- 3½"	32'-11¼"	28'- ⅜"	33'-10 "
14	28'- 5⅛"	33'-11 "	29'- 2⅜"	34'-10 "

Inch Rise	39 FEET Com.	39 FEET Hip	40 FEET Com.	40 FEET Hip
1	19'- 6¾"	27'- 7½"	20'- ¾"	28'- 4 "
2	19'- 9⅛"	27'- 9¼"	20'- 3¾"	28'- 5¾"
3	20'- 1⅛"	28'- 0 "	20'- 7⅜"	28'- 8⅝"
4	20'- 6¾"	28- 4⅛"	21'- 1 "	29'- ¾"
5	21'- 1½"	28'- 9¼"	21'- 8 "	29'- 6 "
6	21'- 9¾"	29'- 3 "	22'- 4⅜"	30'- 0 "
7	22'- 7⅛"	29'-10 "	23'- 2 "	30'- 7¼"
8	23'- 5¼"	30'- 5⅞"	24'- ⅜"	31'- 3¼"
9	24'- 4½"	31'- 2⅝"	25'- 0 "	32'- ¼"
10	25'- 4⅝"	32'- ¼"	26'- ⅜"	32'-10⅛"
11	26'- 5½"	32'-10¼"	27'- 1⅝"	33'- 8⅜"
12	27'- 7 "	33'- 9¼"	28'- 3⅜"	34'- 7⅝"
13	28'- 9¼"	34'- 8⅝"	29'- 6 "	35'- 7⅜"
14	29'-11⅝"	35'- 9 "	30'- 8⅞"	36'- 8 "

AMOUNT TO ADD TO COMMON RAFTER FOR 1 TO 11 INCHES IN BUILDING WIDTH

Rise	1	2	3	4	5	6	7	8	9	10	11
1 2 3	½	1	1½	2	2½	3⅛	3⅝	4⅛	4⅝	5⅛	5⅝
4	⅝	1⅛	1⅝	2⅛	2⅝	3¼	3¾	4¼	4¾	5¼	5⅞
5	⅝	1⅛	1⅝	2¼	2¾	3¼	3¾	4⅜	4⅞	5⅜	5⅞
6	⅝	1⅛	1⅝	2¼	2¾	3¼	3¾	4⅜	4⅞	5⅜	6
7	⅝	1⅛	1⅝	2⅜	3	3½	4	4⅝	5¼	5¾	6⅜
8	⅝	1¼	1¾	2⅜	3	3⅝	4⅛	4¾	5½	6	6⅝
9	⅝	1¼	1⅞	2½	3⅛	3¾	4⅜	5	5⅝	6¼	6⅞
10	⅝	1⅜	2	2⅝	3¼	3⅞	4½	5⅜	5⅞	6½	7⅛
11	¾	1⅜	2	2¾	3½	4⅛	4¾	5⅜	6⅛	6¾	7½
12	¾	1⅜	2⅛	2¾	3½	4¼	5	5⅝	6⅜	7	7¾
13	¾	1½	2¼	3	3⅝	4⅜	5⅛	6	6⅝	7⅜	8⅛
14	¾	1⅝	2⅜	3⅛	3⅞	4⅝	5⅜	6¼	6⅞	7¾	8½
15	¾	1⅝	2⅜	3¼	4	4¾	5⅝	6½	7¼	8	8¾
16	⅞	1¾	2½	3⅜	4⅛	5	5¾	6⅝	7½	8¼	9⅛
17	⅞	1¾	2½	3½	4¼	5⅛	6	7	7¾	8⅝	9½
18	⅞	1¾	2¾	3⅝	4½	5½	6⅜	7¼	8⅛	9	10
19	1	1⅞	2¾	3¾	4⅝	5½	6½	7¼	8⅜	9⅜	10¼
20	1	2	3	4	5	5⅞	6¾	7¾	8¾	9¾	10⅝
21	1	2	3	4	5	6	7	8	9	10⅛	11⅛
22	1	2	3⅛	4⅛	5⅛	6¼	7¼	8⅜	9⅜	10⅜	11½
23	1⅛	2⅛	3¼	4¼	5⅜	6½	7½	8⅝	9¾	10¾	11⅞
24	1⅛	2¼	3⅜	4½	5⅝	6¾	7⅞	9	10	11¼	12⅜
26	1¼	2⅜	3½	4¾	6	7⅛	8⅜	9½	10¾	11⅞	13⅛
28	1¼	2½	3⅞	5⅛	6⅜	7⅝	8⅞	10⅛	11½	12¾	14
30	1⅜	2⅝	4	5⅜	6¾	8	9½	10¾	12⅛	13½	14¾

TO FIGURE UNLISTED RISE TAKE ½ DIFFERENCE OF NUMBER OVER & NUMBER UNDER. EXAMPLE: 27" RISE 9" WIDTH. 10¾" TO 11½" = ⅜". ADDED TO SMALLER NUMBER = 11⅛".

AMOUNT TO ADD TO HIP-VAL RAFTER FOR 1 TO 11 INCHES IN BUILDING WIDTH

Rise	1	2	3	4	5	6	7	8	9	10	11
1	3/4	1 3/8	2 1/8	2 7/8	3 1/2	4 1/4	4 7/8	5 5/8	6 3/8	7	7 3/4
2	3/4	1 3/8	2 1/8	2 7/8	3 1/2	4 1/4	5	5 3/4	6 1/2	7 1/8	7 7/8
3	3/4	1 3/8	2 1/8	2 7/8	3 5/8	4 3/8	5	5 3/4	6 1/2	7 1/4	7 7/8
4	3/4	1 3/8	2 1/4	3	3 5/8	4 3/8	5 1/8	5 7/8	6 1/2	7 1/4	8
5	3/4	1 1/2	2 1/4	3	3 5/8	4 3/8	5 1/8	5 7/8	6 5/8	7 3/8	8 1/8
6	3/4	1 1/2	2 1/4	3	3 3/4	4 1/2	5 1/4	6	6 3/4	7 1/2	8 1/4
7	3/4	1 1/2	2 1/4	3	3 3/4	4 5/8	5 3/8	6 1/8	6 7/8	7 5/8	8 3/8
8	3/4	1 1/2	2 3/8	3 1/8	3 7/8	4 3/4	5 1/2	6 1/4	7	7 3/4	8 5/8
9	3/4	1 1/2	2 3/8	3 1/4	4	4 3/4	5 5/8	6 3/8	7 1/4	8	8 7/8
10	7/8	1 5/8	2 1/2	3 3/8	4 1/8	4 7/8	5 3/4	6 5/8	7 3/8	8 1/4	9
11	7/8	1 3/4	2 1/2	3 3/8	4 1/4	5	5 7/8	6 7/8	7 1/2	8 3/8	9 1/4
12	7/8	1 3/4	2 5/8	3 1/2	4 3/8	5 1/4	6	6 7/8	7 3/4	8 5/8	9 1/2
13	7/8	1 3/4	2 5/8	3 5/8	4 1/2	5 3/8	6 3/8	7 1/4	7 7/8	8 7/8	9 3/4
14	7/8	1 7/8	2 3/4	3 5/8	4 5/8	5 1/2	6 3/8	7 3/8	8 1/4	9 1/4	10 1/8
15	1	2	2 7/8	3 7/8	4 3/4	5 3/4	6 5/8	7 1/2	8 1/2	9 1/2	10 3/8
16	1	2	3	4	5	5 7/8	6 3/4	7 3/4	8 3/4	9 3/4	10 5/8
17	1	2	3	4	5	6	7	8	9	10	11
18	1	2	3	4	5 1/8	6 1/8	7 1/4	8 1/4	9 1/4	10 3/8	11 3/8
19	1	2 1/8	3 1/4	4 1/4	5 1/4	6 3/8	7 3/8	8 1/2	9 1/2	10 5/8	11 3/4
20	1 1/8	2 1/4	3 1/4	4 3/8	5 1/2	6 1/2	7 5/8	8 3/4	9 7/8	10 7/8	12
21	1 1/8	2 1/4	3 3/8	4 1/2	5 5/8	6 3/4	7 7/8	9	10 1/8	11 1/4	12 3/8
22	1 1/4	2 3/8	3 1/2	4 5/8	5 7/8	7	8 1/8	9 1/4	10 3/8	11 5/8	12 3/4
23	1 1/4	2 3/8	3 1/2	4 3/4	6	7 1/4	8 3/8	9 5/8	10 3/4	11 7/8	13 1/8
24	1 1/4	2 1/2	3 5/8	4 7/8	6 1/8	7 3/8	8 1/2	9 3/4	11	12 1/4	13 1/2
26	1 1/4	2 5/8	3 7/8	5 1/4	6 1/2	7 3/4	9	10 3/8	11 5/8	12 7/8	14 1/4
28	1 3/8	2 3/4	4 1/8	5 1/2	6 7/8	8 1/8	9 1/2	10 7/8	12 1/4	13 5/8	15
30	1 1/2	2 7/8	4 1/4	5 3/4	7 1/8	8 5/8	10	11 1/2	13	14 3/8	15 3/4

TO FIGURE UNLISTED RISE TAKE ½ DIFFERENCE OF NUMBER OVER & NUMBER UNDER. EXAMPLE: 25" RISE 7" WIDTH. 8½" TO 9" = ¼". ADDED TO SMALLER NUMBER = 8¾".

DIFFERENCE IN LENGTH OF JACK RAFTERS OF VAROUS SPACING

Rise	16"	18"	20"	24"
1	1'- 4 1/16"	1'- 6 1/8"	1'- 8 1/8"	2'- 1/8"
2	1'- 4 1/4 "	1'- 6 1/4"	1'- 8 1/4"	2'- 3/8"
3	1'- 4 1/2 "	1'- 6 1/2"	1'- 8 5/4"	2'- 3/4"
4	1'- 4 7/8 "	1'- 7 "	1'- 9 1/8"	2'- 1 3/8"
5	1'- 5 3/8 "	1'- 7 1/2"	1'- 9 5/8"	2'- 2 "
6	1'- 5 7/8 "	1'- 8 1/8"	1'-10 3/8"	2'- 2 7/8"
7	1'- 6 1/2 "	1'- 8 7/8"	1'-11 1/8"	2'- 3 7/8"
8	1'- 7 1/4 "	1'- 9 5/8"	2'- 0 "	2'- 4 7/8"
9	1'- 8 "	1'-10 1/2"	2'- 1 "	2'- 6 "
10	1'- 8 7/8 "	1'-11 3/8"	2'- 2 "	2'- 7 1/4"
11	1'- 9 3/4 "	2'- 3/8"	2'- 3 1/8"	2'- 8 5/8"
12	1'-10 5/8 "	2'- 1 1/2"	2'- 4 1/4"	2'-10 "
13	1'-11 5/8 "	2'- 2 1/2"	2'- 5 1/2"	2'-11 3/8"
14	2'- 1/2 "	2'- 3 5/8"	2'- 6 3/4"	3'- 7/8"
15	2'- 1 5/8 "	2'- 4 3/4"	2'- 8 "	3'- 2 3/8"
16	2'- 2 5/8 "	2'- 6 "	2'- 9 3/8"	3'- 4 "
17	2'- 3 3/4 "	2'- 7 1/4"	2'-10 3/4"	3'- 5 5/8"
18	2'- 4 7/8 "	2'- 8 1/2"	3'- 0 "	3'- 7 1/4"
19	2'- 6 "	2'- 9 3/4"	3'- 1 1/2"	3'- 9 "
20	2'- 7 1/8 "	2'-11 "	3'- 2 7/8"	3'-10 5/8"
21	2'- 8 1/4 "	3'- 1/4"	3'- 4 1/4"	4'- 3/8"
22	2'- 9 3/8 "	3'- 1 5/8"	3'- 5 3/4"	4'- 2 1/8"
23	2'-10 5/8 "	3'- 3 "	3'- 7 1/4"	4'- 3 7/8"
24	2'-11 3/4 "	3'- 4 1/4"	3'- 8 3/4"	4'- 5 5/8"
26	3'- 2 1/4 "	3'- 7 "	3'-11 7/8"	4'- 9 3/8"
28	3'- 4 1/2 "	3'- 9 3/4"	4'- 2 3/4"	5'- 7/8"
30	3'- 7 "	4'- 1/2"	4'- 5 7/8"	5'- 4 5/8"

Decimal Equivalents of 8ths, 16ths, 32nds, 64ths

Fraction	Decimal
1/64	0.015 625
1/32	0.031 25
3/64	0.046 875
1/16	0.062 5
5/64	0.078 125
3/32	0.093 75
7/64	0.109 375
1/8	0.125
9/64	0.140 625
5/32	0.156 25
11/64	0.171 875
3/16	0.187 5
13/64	0.203 125
7/32	0.218 75
15/64	0.234 375
1/4	0.250
17/64	0.265 625
9/32	0.281 25
19/64	0.296 875
5/16	0.312 5
21/64	0.328 125
11/32	0.343 75
23/64	0.359 375
3/8	0.375
25/64	0.390 625
13/32	0.406 25
27/64	0.421 875
7/16	0.437 5
29/64	0.453 125
15/32	0.468 75
31/64	0.484 375
1/2	0.500
33/64	0.515 625
17/32	0.531 25
35/64	0.546 875
9/16	0.562 5
37/64	0.578 125
19/32	0.593 75
39/64	0.609 375
5/8	0.625
41/64	0.640 625
21/32	0.656 25
43/64	0.671 875
11/16	0.687 5
45/64	0.703 125
23/32	0.718 75
47/64	0.734 375
3/4	0.750
49/64	0.765 625
25/32	0.781 25
51/64	0.796 875
13/16	0.812 5
53/64	0.828 125
27/32	0.843 75
55/64	0.859 375
7/8	0.875
57/64	0.890 625
29/32	0.906 25
59/64	0.921 875
15/16	0.937 5
61/64	0.953 125
31/32	0.968 75
63/64	0.984 375

Decimal Equivalents of 7ths, 14ths, and 28ths

7th	14th	28th	Decimal	7th	14th	28th	Decimal
		1	.035714			15	.535714
	1		.071429	4			.571429
		3	.107143			17	.607143
1			.142857		9		.642867
		5	.178571			19	.678571
	3		.214286	5			.714286
		7	.25			21	.75
2			.285714		11		.785714
		9	.321429			23	.821429
	5		.357143	6			.857143
		11	.392857			25	.892857
3			.428571		13		.928571
		13	.464286			27	.964286
	7		.5				

Decimal Equivalents of 6ths, 12ths, and 24ths

6th	12th	24th	Decimal	6th	12th	24th	Decimal
		1	.041667	3			.5
	1		.083333			13	.541666
		3	.125		7		.583333
1			.166666			15	.625
		5	.208333	4			.666666
	3		.25			17	.708333
		7	.291666		9		.75
2			.333333			19	.791666
		9	.375	5			.833333
	5		.416666			21	.875
		11	.458333		11		.916666
						23	.958333

The Metric System of Measurement

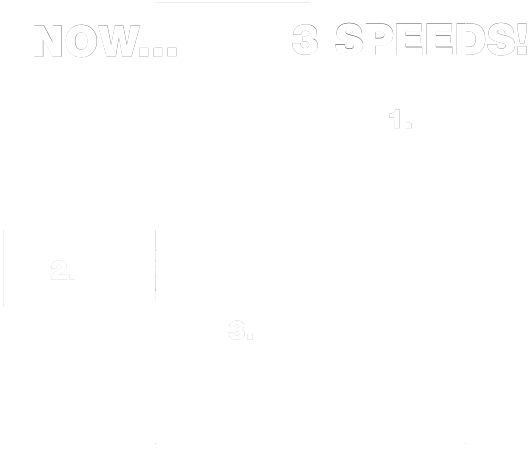
Measures of Length

1 Millimeter (mm.) = ... 0.03937079 inch, or about 1/25 inch
10 Millimeters = 1 Centimeter (cm.) = ... 0.3937079 inch
10 Centimeters = 1 Decimeter (dm.) = ... 3.937079 inch
10 Decimeters = 1 Meter (m.) = ... 39.37079 inches, 3.2808992 feet, or 1.09361 yards
10 Meters = 1 Decameter (Dm.) = ... 32.808992 feet
10 Decameters = 1 Hectometer (Hm.) = ... 19.927817 rods
10 Hectometers = 1 Kilometer (Km.) = ... 1093.61 yards, or 0.6213824 mile
10 Kilometers = 1 Myriameter (Mm.) = ... 6.213824 miles
1 inch = 2.54 cm., 1 foot = 0.3048 m., 1 yard = 0.9144 m., 1 rod = 0.5029 Dm.,
1 mile = 1.6093 Km.

When you know	*Multiply by*	*To Find*
inches	2.54	centimeters
feet	30.48	centimeters
yards	0.91	meters

On the other hand, if you know the metric measurement and want to know what it would be in the units that are familiar to you, you can multiply by the following conversion factors:

When you know	*Multiply by*	*To Find*
millimeters	0.04	inches
centimeters	0.39	inches
meters	3.28	feet
meters	1.09	yards
kilometers	0.62	miles



1. "BIG 12"® square: aluminum alloy, 5-in-1 tool for builder or hobbyist. Ideal for rafters, stairways and general layout. 12"x12"x17" fits in tool box. Adjusts to crooked corners. "Blue Book" included.
Item # S0107

2. SPEEDLITE® square: durable polypropylene, flexible to bend in back pocket. Center finder, ideal saw guide, raised wear rim: 8"x8"x11½" with all features of original Swanson Speed® square.
Item # T0112

3. SWANSON SPEED® square: aluminum alloy, 7"x7"x10" pocket sized wood-working square for professional or handyman. Ideal saw guide. Smooth, polished surface. "Blue Book" included.
Item # S0101

SWANSON MAG® SQUARE

- An "extra hand" for leveling, measuring or layout.
  Stick it to a stud.
  Hang a plumb line from it.
  Rest your level on it.
  Hook the end of your tape to it.
- Full 10-5/8 sq. in. magnetic surface holds on edge and face of material.
- Two *laser marks* for use with square on a stud or on the floor.
- Use it as a protractor, try, miter or framing square.
- Handles both wood and metal framing.
- Wide back marks both edge and face of material at once.
- Strong aluminum alloy 3/16" thick.

Item # S0114

SWANSON SPEED® SQUARE TOOL POUCH

Tools not included

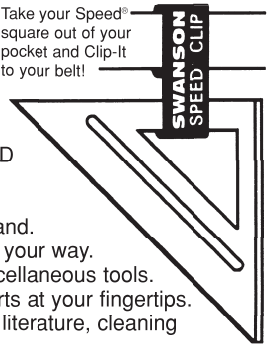
- Heavy 8 oz. Top Grain Cowhide Leather - All capped rivets.
- A pouch for the tools you always need, at your side.
- Pocket for Swanson Speed® square.
- Large hammer loop.
- Tape pocket for 25' x 1" tape.
- Ideal for home projects and tradesman on the job.

Item #T0104

SWANSON® SPEED® CLIP
for your Large & Small Squares!

Speed® Clip

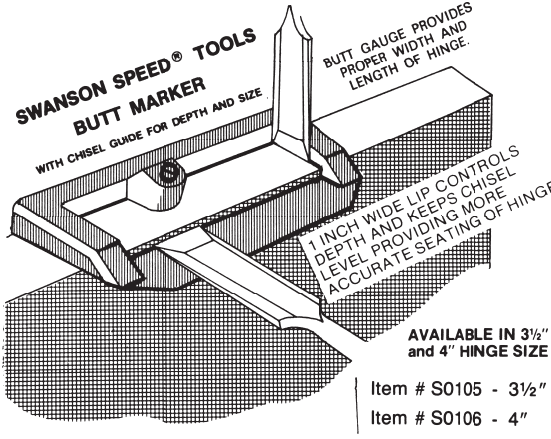
Take your Speed® square out of your pocket and Clip-It to your belt!



Item #T0120

4.625"H x 1"W x .75"D

- Keep Speed® Square at hand.
- Holds electric cords out of your way.
- Carry rope, cable and miscellaneous tools.
- Hold container of small parts at your fingertips.
- Attach plastic bag to carry literature, cleaning supplies, etc.



SWANSON TOOL CO., Inc.
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NOTES

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Item # P0110