Free Plans to Build a Picnic Table

Background: A friend built a picnic table for me around 25 years ago. It was now in horrible shape (picture below) so I had to replace it (… probably I had to replace it 5+years ago).

Online I saw plans for basically the same table, but it has you start with the legs. I wasn't sure I'd be getting the angles correctly, so I put it off. When I saw my friend again, I asked about how he assembled it. (He does construction work and also teaches at a vocational technical school. School projects included making this table.) He said he assembled it upside down starting with the top, then the legs, and finally the seat. That's what I did, and it worked just fine. The plans below are from what I did to create this:

Having just finished a deck, I had pressure treated wood available for the legs and cross pieces. I purchased non-pressure treated wood for the top and seats. If you are not using an opaque stain on the table, you may not want to have any pressure treated wood. Here's what mine looked like after a rain (since then I've clear-stained the top and seats, but I'm holding off on the rest as the recommendation is to wait a year before staining pressure treated wood). The pressure treated wood is obviously a different color.

Materials List:

Wood:

- 5 – 2 x 8 x 8' spruce, for the top and seats
- 1 – 5/4 x 6 x 8' for :
  - 3 – 5/4 x 6 x 32" pieces which are fastened under the table top, they hold the top 2 x 12s together
  - Note that there is zero excess with an 8' long board
- 4 – 2 x 6 x for:
  - 2 – 2 x 6 x 32" under top, directly above supports for seats
  - 2 – 2 x 6 x 64" supports for seats
  - 4 – 2 x 6 x 37¾" legs are 34" but cut on diagonal, 2 legs per 8' board
  - Note that there is zero excess when the 64" and 32" pieces are taken from one board
- 1 – 2 x 4 x 8' for:
  - 2 – 2 x 4 x 36" cross struts, these pieces are actually shorter – see discussion below

Hardware:

- 1 pound – 2" #8 screws (I purchased galvanized)
- 44 – 3" #10 screws (I had these screws left over after the deck)
- 16 – 3½" long 3/8" carriage bolts (the bolts, nuts and washers were all galvanized – it added about $5 to the price)
- 16 – 3/8" nuts
- 16 – 3/8" washers

Tools:

Tape measure
Drill, variable speed
Screw driver bit(s) (e.g., phillips, square, torx) for each type of screw
3/8" drill bit
9/16" wrench or socket
Clamps
Square
Saw (I used a circular saw)
Pencil
Sandpaper
Ear protection

Optional Tools:

Hammer (to knock bolts through holes – actually, if you use the 3/8" bit, this isn't optional)
7/16" drill bit (to create a slightly larger hole for the 3/8" bolts, see details below)
Quick Clamp
Eraser (for pencil marks)
Wire brush (small, to clean threads after bolt is knocked through 3/8" hole)
Rubber mallet (to align legs and, generally, to move pieces around)
Palm sander (I used 80 grit paper), or wood file, for the edges of the top and seat
Level
Music

Build Process – High Level Overview

1. Place three 2 x 12 x8' boards on your work surface. Since this is an upside-down build, what is to be the top side of the table is down.
2. Clamp the boards together, and attach the three 5/4 x 6 x 32" boards to the 2 x 12s using 2" screws. Start with the center piece.
3. Clamp the two 2 x 6 x 32" pieces to the underside of the top (which is the side of the top now exposed). Flip the top over and screw in those pieces with 3" screws.
4. Flip the top back again and attach the legs by bolting them in place.
5. Attach the two 2 x 6 x 64" seat supports by bolting them in place. (Use a 2 x 6 to ensure the correct spacing between the 32" and 64" pieces.)
6. Attach the two 2 x 4 cross members which stabilize the legs.
7. Put the table on the ground, right-side up.
8. Attach the seats.
9. Sand or file the edges of the top and seats.
10. Stain or paint as desired.

If you are at all handy, the above is probably all you need. I have some tips from my experience. I did make a mistake in the spacing between the 32" and 64" pieces my first time through due to not properly thinking through what I was doing. You'll see the extra holes in the photos below.

Pieces

These are the pieces I cut:

5 – 2 x 8 x 8' (spruce, for the top and seats)

Three of these will not be modified, two will have corners cut off. I cut them at 2 5/8" from the corner (45° angle). One plan I saw on the Internet cut the corners off the table top; you may want to do that.

Figure 1

3 – 5/4 x 6 x 32" (fastened under top, holds top 2 x 12s together)

This is the side view

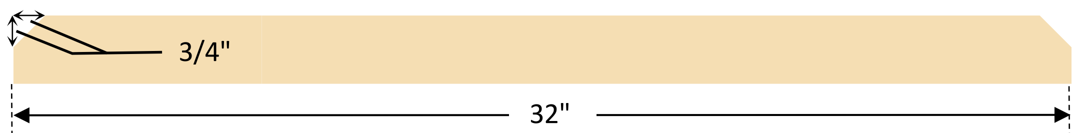


Figure 2

2 – 2 x 6 x 32" (under top, aligned directly above supports for seats)

As with the seat boards, these have one side which is cut 2 5/8" from the corner at a 45° angle.

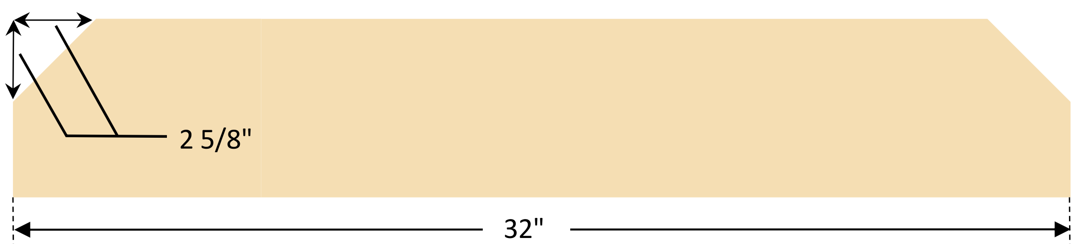


Figure 3

4 – 2 x 6 x 34" (legs)

I measured the old legs to come up with the dimensions. I did not have a tool to measure the angle, but using the triangle calculator found at calculator.net I computed the 56° angle shown in the figure.

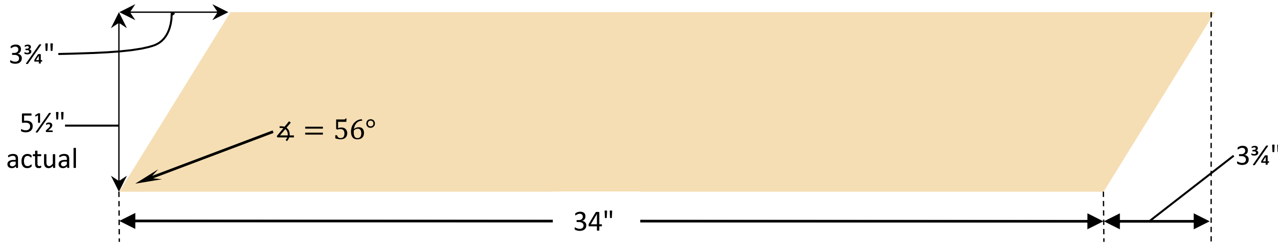


Figure 4

2 – 2 x 6 x 64" (supports for seats)

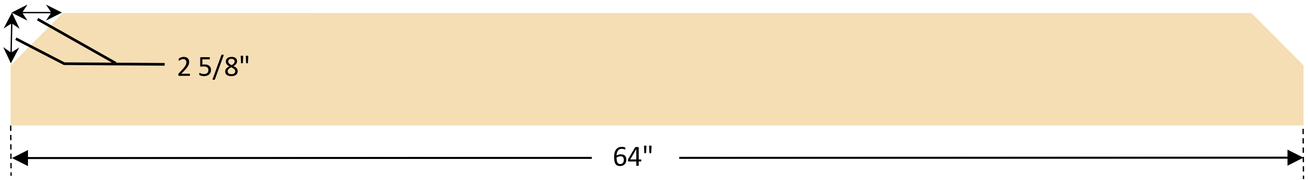


Figure 5

2 – 2 x 4 x 36" (cross struts, these pieces were actually shorter)

Here's where if I remembered high school geometry the job may have been easier. I describe in an appendix how I came up with the measurements for these pieces. They would have been identical if I were more precise in the build but they were not for me (it may not have mattered if I made them both the same). The measurements below are from one of the pieces and may work if your measurements are the same.

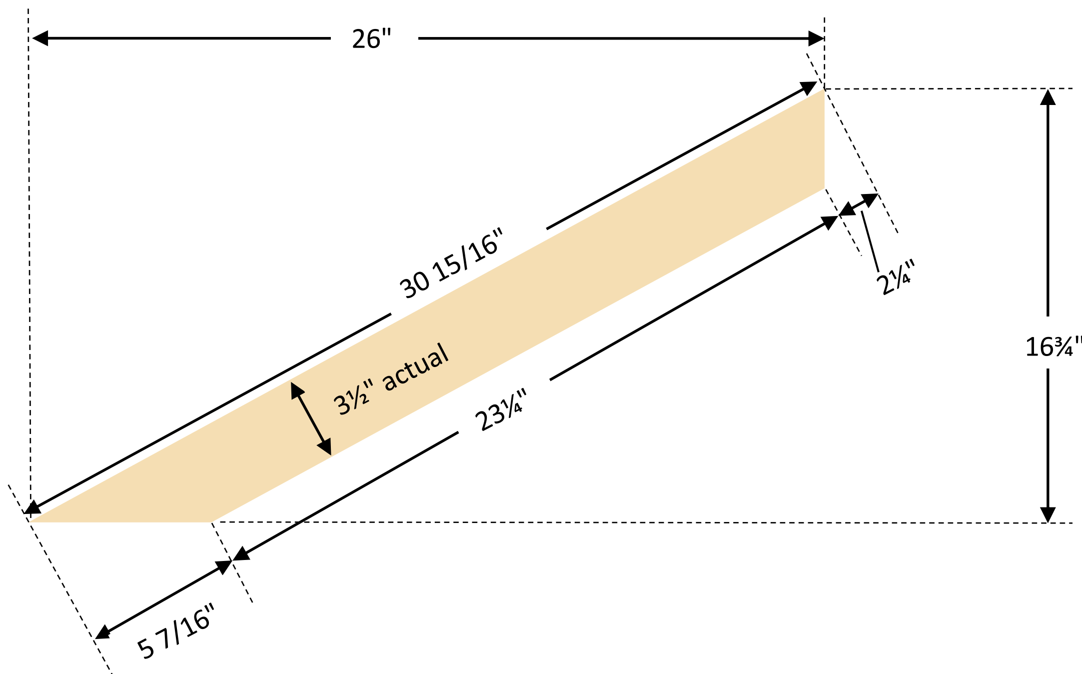
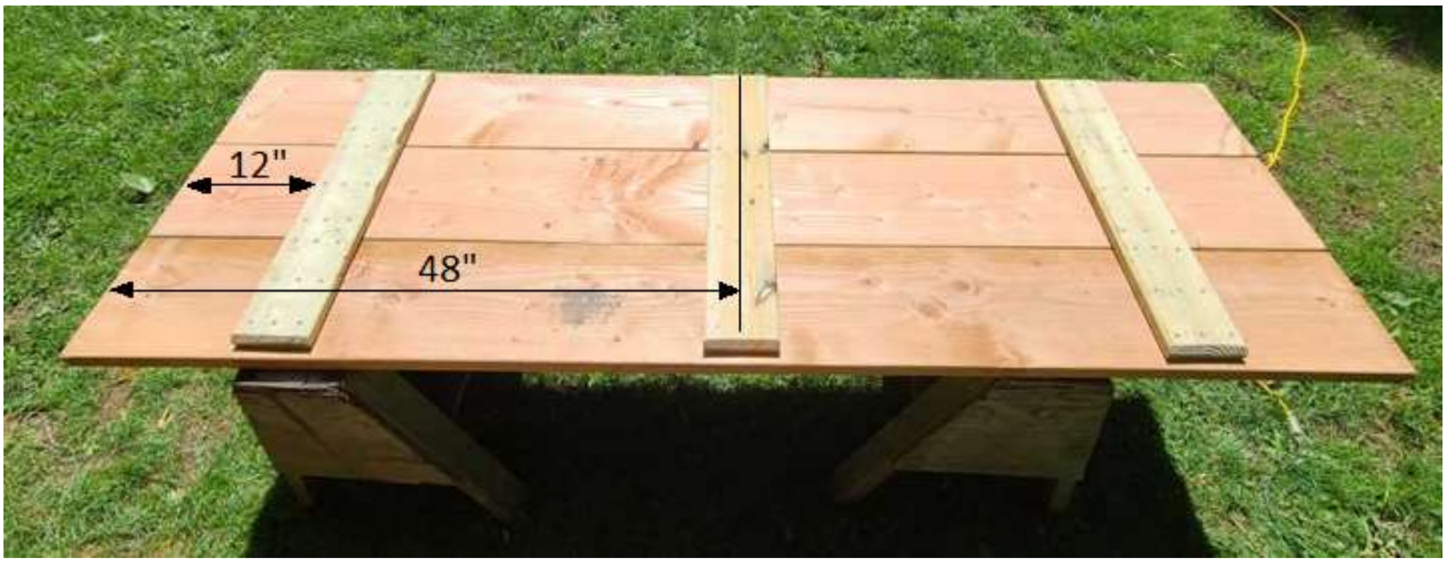


Figure 6

Detailed Assembly Process

1. *Place three 2 x 12 x8' boards on your work surface. Since this is an upside-down build, what is to be the top side of the table is down.*

2. *Clamp the boards together, and attach the three 5/4 x 6 x 32" boards to the 2 x 12s. Start with the center piece.*
   - The center piece is centered on the three boards. The end of the piece is about 7/8" from the long edge of the top.
   - Use 9 2" screws in a 3 x 3 grid to attach the 5/4 piece to EACH of the 2 x 12s. That's 27 screws per 5/4 piece.
   - Note that you only have ¼" extra thickness in the two pieces, so do not go too deep with the screws.
   - Attach the other pieces so that their outer edge is 12" from the edge of the table.



3. *Clamp the two 2 x 6 x 32" pieces to the underside of the top (which is the side of the top now exposed). Flip the top over and screw in those boards.*
   - These pieces go between the outer and center 5/4 pieces and are aligned with the 5/4 piece ends.
   - Clamp these in place. Two clamps per piece.
   - Flip the top over and screw in those boards using 3" screws. (I use the hammer to start the screws.)


   - Remember that each end of the piece being attached is about 1" recessed from the edge of the top. (In the above image, the outside screws have already been driven in.)

4. *Flip the top back again and attach the legs by bolting them in place.*

- Clamp one of the legs in position. I aligned the piece with the angled cut on the support piece.

(this is an enlargement from the picture below)

- Drill the holes with the 7/16" bit. Try to keep 1½" from the edge of the pieces being drilled. The holes should be staggered. I used the 7/16" bit to allow the legs to move a little.
- Clamp and drill the other leg.
- While I checked the level of the bottom of the table, I was mainly concerned that the legs will rest with full contact on a hard surface. The 64" cross support may be used to align the legs so they are flush. I don't think I would have had the ability to move the legs if I used a 3/8" bit.
- Once you are satisfied, tighten the bolts.

5. *Attach the two 2 x 6 x 64" seat supports by bolting them in place. (Use a 2 x 6 to ensure the correct spacing between the 32" and 64" pieces.)*

- Use a scrap piece of 2 x 6 as a spacer between the 32" and 64" pieces.
- Mark the center of the 32" piece and 64" piece. Make a vertical line on the spacer. Align the line on the spacer with the 32" piece and then center the 64" piece.

- Clamp the 64" piece to the legs.
- Drill holes with the 3/8" bit. Try to keep the holes about 1½" from the edge of each piece. The holes should be staggered.
- Insert the bolts and tighten.

6. Attach the two 2 x 4 cross members used to stabilize the legs.

- The cross struts abut the center 5/4 x 6 piece and the bottom cross piece
- Use the dimensions for the piece as shown in Figure 6, or calculate your own dimensions in accordance with the notes in Appendix – Cross Strut Calculations.
- Use a 2" screw and a 3" screw on each end to fasten the strut (shown in Figure 7).

7. Put the table on the ground, right-side up.

8. Attach the seats.

- The seat extends 1" from the end of the cross piece which supports it.
- To help getting it centered, measure from the upper cross piece to the end of the top and match that measurement for the seats (around 17½" in a perfect world).
- Use four 3" screws to attach the seats to the cross pieces (remember that the seat overhangs the support by 1").

9. Sand or file the edges of the top and seats.

10. Stain or paint as desired.

Appendix – Cross Strut Calculations

If I remembered how to do geometry, I may have been able to do this more easily. I used the triangle calculator at calculator.net for my calculations. The diagram below shows the positioning of the piece.

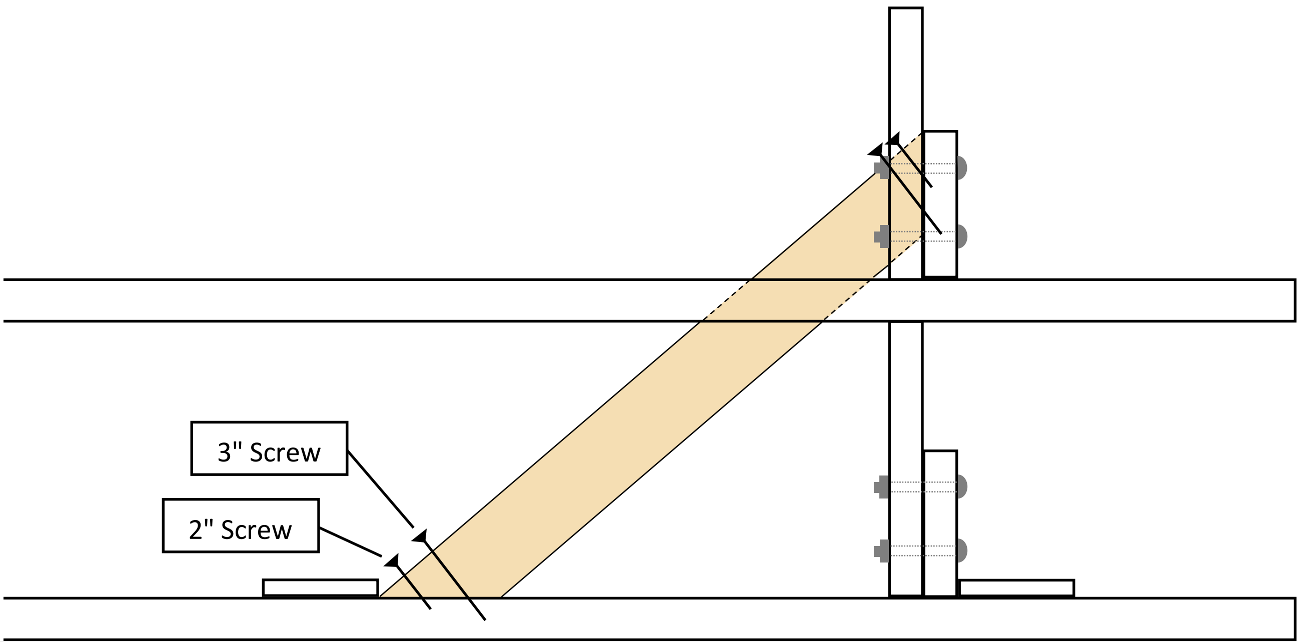
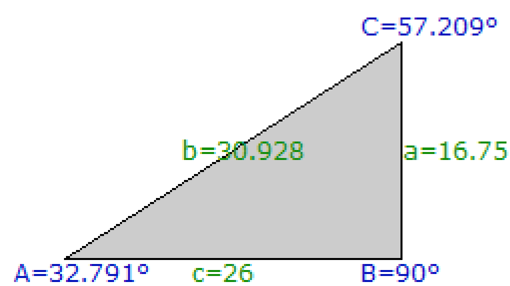


Figure 7

Using the triangle calculator, delete the pre-entered data using the "Clear" button, and enter these values:

Angle B = 90
Side A = 16.75
Side C = 26

The third side is calculated at 30.928". Using Appendix – Decimal Equivalents, the length is approximately 30 15/16".



Angles A and C are needed for the calculations relevant to the angled cuts (or if you have a device where you can set an angle, it will be quick enough to just draw the angles on a 30 15/16" piece of wood and make the cut).

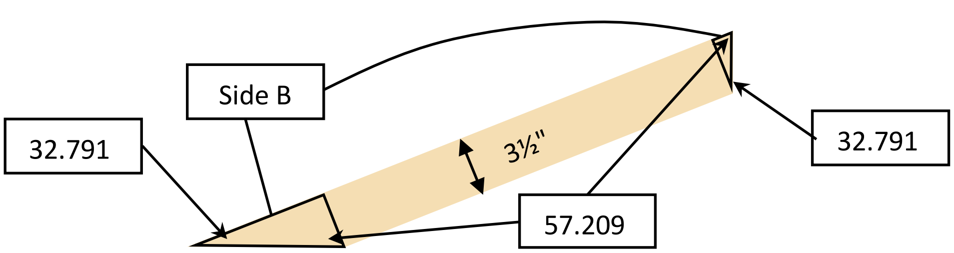


Figure 8

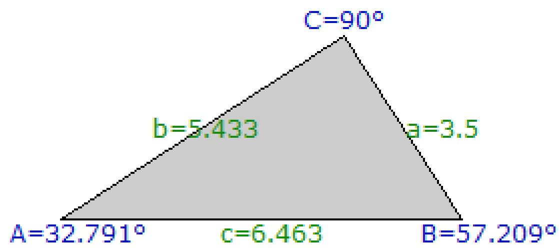
For the triangle on the left, enter these values:

Angle A = 32.791

Angle C = 90

Side A = 3.5

Side B is calculated at 5.433" which is approximately 5 7/16".



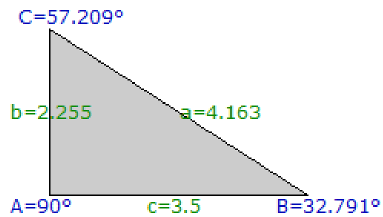
For the triangle on the right enter these values

Angle A = 90

Side C = 3.5

Angle B = 32.791

Side B is calculated at 2.255" which is approximately 2¼".



Replace the values in Figure 6 with what you calculate for the B sides. Draw a line and cut the angles.

Appendix – Decimal Equivalents

Decimal	Fraction
0.03125	1/32
0.0625	1/16
0.09375	3/32
0.125	1/8
0.15625	5/32
0.1875	3/16
0.21875	7/32
0.25	1/4
0.28125	9/32
0.3125	5/16
0.34375	11/32
0.375	3/8
0.40625	13/32
0.4375	7/16
0.46875	15/32
0.5	1/2
0.53125	17/32
0.5625	9/16
0.59375	19/32
0.625	5/8
0.65625	21/32
0.6875	11/16
0.71875	23/32
0.75	3/4
0.78125	25/32
0.8125	13/16
0.84375	27/32
0.875	7/8
0.90625	29/32
0.9375	15/16
0.96875	31/32