



CAD SKILLS



# CAD Tutorial 19: Birdhouse

Level of Difficulty



Time

Approximately 30–40 minutes

# By the end of this tutorial you will be able to...

- Link basic shapes
- Use the Arc tool
- Use the Follow Me tool to produce a rounded edge
- Use construction lines/points
- Colour/render your finished toy boat

# Skills to be used in this project...

Basic Skills	New and Higher Skills
Zoom tool	Construction lines and points
Orbit tool	Tape Measure tool
Pan tool	Arc tool
Line tool	Follow Me tool
Rectangle tool	Loading new toolbars
Circle tool	Paint Bucket tool
Eraser tool	
Push/Pull tool	

**Basic skills** are those required to do very basic drawings and are detailed as part of this presentation.

**New and higher skills** may be new to the novice and are the focus for learning in this presentation.

# Learning Styles

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**Visual : *Presentation***





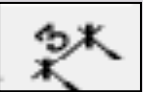





**Auditory: *Video***

**Kinaesthetic: *Demonstration***










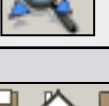
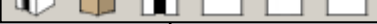
# Sketchup Help Guide:

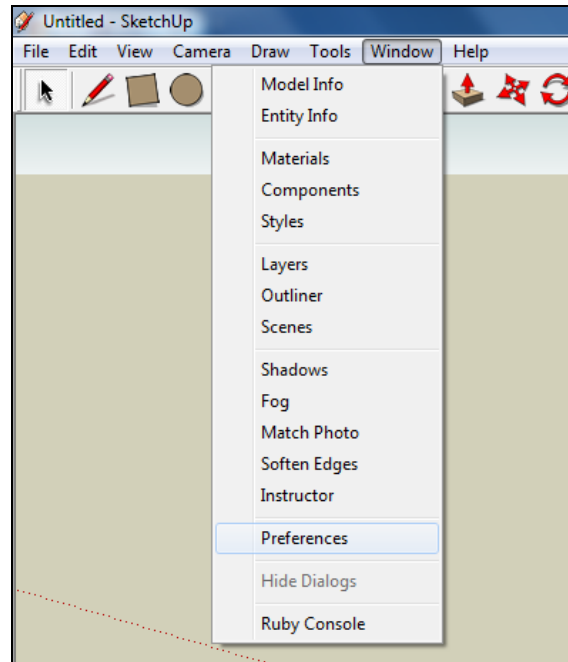
## Computer Aided Engineering: 15. Drawing and Modification Commands

Drawing and Modification Tools	image	Description	Advantages
Modifying Tool 1. <a href="#">Pencil tool</a>		used to draw lines in X, Y and Z direction. Can draw simple or complex shapes very quickly.	<b>Advantages:</b> Allows user to draw or modify shapes very quickly and can be used to construct 3D objects faster than traditional hand drawings
Modifying Tool 2. <a href="#">Trim tool</a>		allows the user to remove overlapping elements.	<b>Advantages:</b> Allows user to erase overlapping lines and edges to draw complex 3D shapes very quickly.
Modifying Tool 3. <a href="#">Push/pull</a>		tool used to turn solid objects into 3D objects instantaneously. Typing a size allows a user to extrude or pull an object to a certain size or height	<b>Advantages:</b> Allows user to draw or modify 3D shapes very quickly faster than traditional hand drawings. You can click on a face (plane) and adjust. Can be used to extrude shapes on 3D objects already drawn.
Modifying Tool 4. <a href="#">Move Tool</a>		used to move entire shapes or pull lines on a drawing.	<b>Advantages:</b> Allows user to draw or modify shapes very quickly and can be used to construct unusual 3D shapes quickly
Modifying Tool 5. <a href="#">Dimensions tool</a>		used to show sizes and radius of drawn objects	<b>Advantages:</b> Allows user to draw or modify 3D shapes very quickly faster than traditional hand drawings to correct size if drawn incorrectly. Drawing can be transferred onto the CNC machines directly
Modifying Tool 6 <a href="#">Extrusion Tool (follow me)</a>		allows the user to highlight a path that turns blue. A chosen shape will then follow the chosen path	<b>Advantages:</b> Allows user to draw profiles of shapes and follow the path to draw complex 3D shapes very quickly.
Modifying Tool 7. <a href="#">Arch tool</a>		You can use the <b>arch</b> tool to draw a radius from two given points. Can be used to draw corners etc..	<b>Advantages:</b> Allows user to rotate and position shapes quickly to draw complex 3D shapes very quickly.
Modifying Tool 8. <a href="#">Circle tool</a>		allows the user to draw different sized radius circles and chamfered corners	<b>Advantages:</b> Allows user to draw profiles of shapes and follow the path to draw complex 3D shapes very quickly.
Modifying Tool 9. <a href="#">Orbit tool</a>		You can use the <b>Orbit</b> tool to change the angle that you are viewing your design from. You can do the same by pressing the middle wheel of your mouse	<b>Advantages:</b> Allows user to rotate and see all angles of their design quickly
Modifying Tool 10. <a href="#">Tape measure tool</a>		allows the user to draw guide lines to given sizes and mark out radius etc.	<b>Advantages:</b> Allows user to draw guides of shapes and draw complex 3D shapes very quickly.

# Sketchup Help Guide:

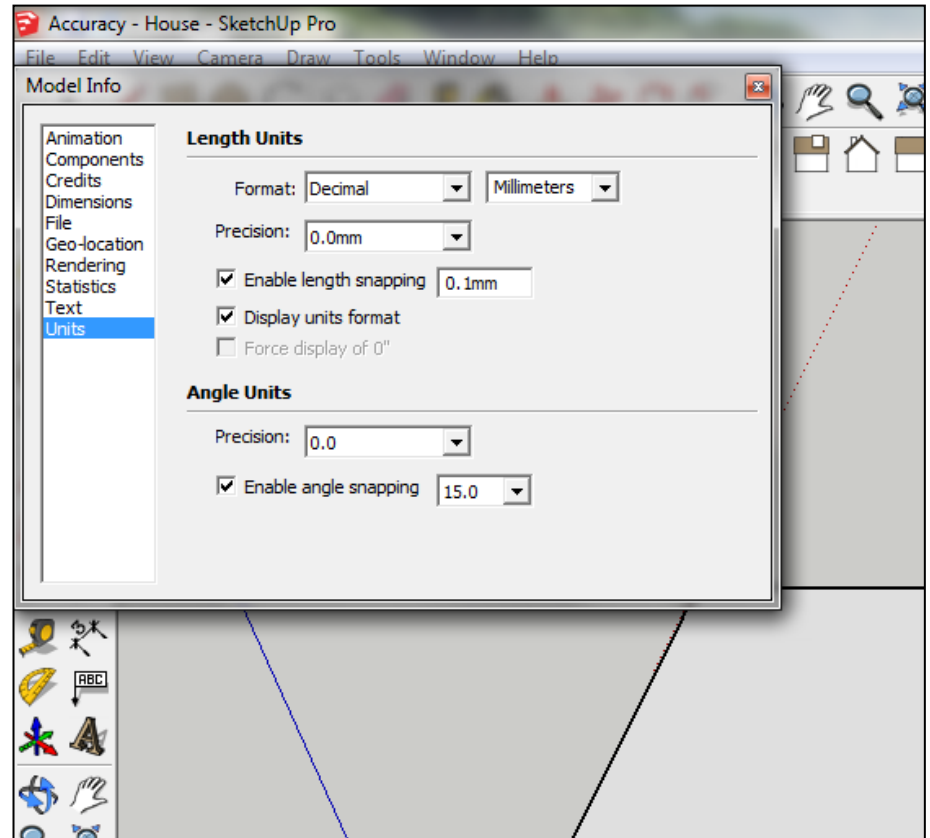
## Computer Aided Engineering: 15. Drawing and Modification Commands

Drawing and Modification Tools	image	Description	Advantages
Modifying Tool 11. <a href="#">Square tool</a>		used to draw squares and rectangles.	<b>Advantages:</b> Allows user to draw guides of shapes and draw complex 3D shapes very quickly.
Modifying Tool 12. <a href="#">Offset tool</a>		You can use the <b>contour</b> tool to draw parallel lines or lines within lines.	<b>Advantages:</b> Allows user to draw duplicate lines and position them within shapes quickly to draw complex 3D shapes very quickly.
Modifying Tool 14. <a href="#">Rotate Tool</a>		used to move rotate parts of a shape or entire shapes on x, y and Z co-ordinates.	<b>Advantages:</b> Allows user to draw or modify shapes very quickly and can be used to construct unusual 3D shapes quickly
Modifying Tool 15 <a href="#">Scale Tool</a>		allows the user to select an object or part of an object and increase its size from the base point.	<b>Advantages:</b> Allows user to quickly resize objects to draw complex 3D shapes very quickly.
Modifying Tool 16 <a href="#">Paint Bucket Tool</a>		allows the user to select a colour or materials to produce photo-realistic drawing of their object. Shadows etc. can be added.	<b>Advantages:</b> Allows user to quickly draw objects like using materials, textures etc...
Modifying Tool 17 <a href="#">Pan Tool</a>		You can use the <b>Pan</b> tool to grab and move your object around the screen. Alternatively, you can pan by pressing the <b>Shift</b> key <b>and</b> holding down the mouse's middle wheel.	<b>Advantages:</b> Allows user to move and position their object quickly
Modifying Tool 18 <a href="#">Text Tool</a>		You can use the <b>text</b> tool to add text to your object.	<b>Advantages:</b> Allows user to add 3D text by clicking on the extrude button or 2D text
Modifying Tool 19 <a href="#">Zoom Extents Tool</a>		You can use this tool to automatically zoom into your entire project.	<b>Advantages:</b> Allows user to quickly navigate to the entire drawing if they get lost.
Modifying Tool 20 <a href="#">View Tool</a>		You can use the <b>view</b> tool to quickly look at front side and top views as well as 3D views	<b>Advantages:</b> Allows user to complete working drawings quickly as well as enabling them to show a top view for exporting onto the laser cutter.



1. Open Library /Designoutthebox.com/ CAD Skills/ Lesson 10 / Toy Boat

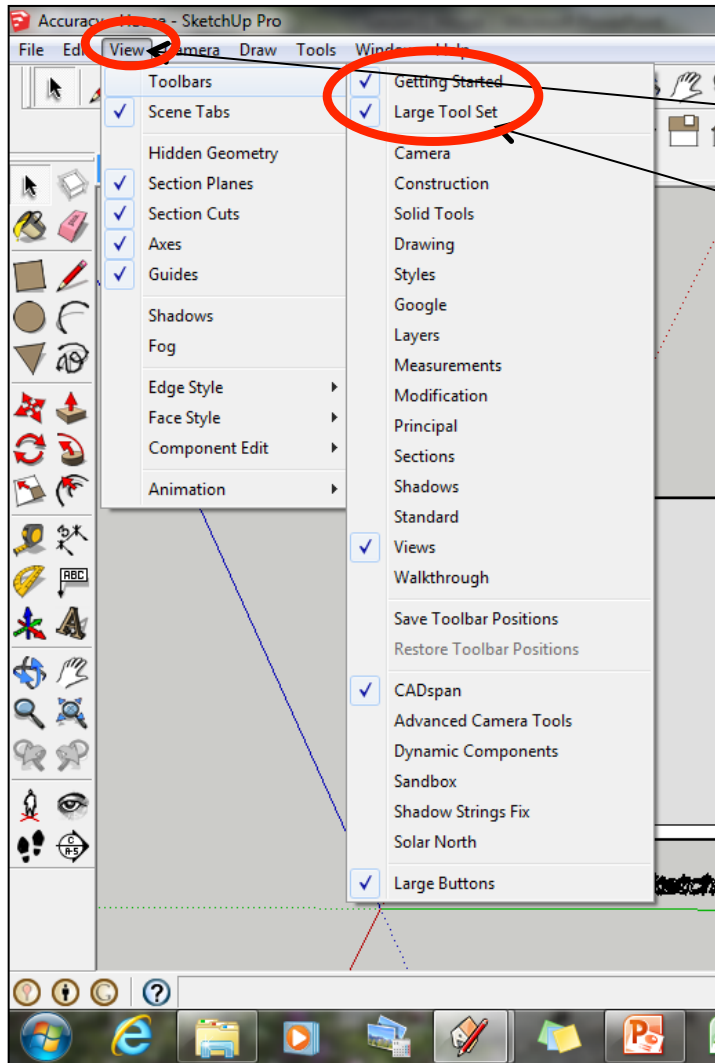
Open the sketch up drawing. Once you have opened SketchUp, go to **Window** and select **Model Info**



2. Select **Units** and choose **Decimal Millimetres**. We are using this template because we are doing a product design.

**Note:** It is often necessary to start a new file to use the new template. Go to **File** then **New**.

3. Now select the **View** then **toolbars** and ensure **Getting Started** and **Large Tool Set** are ticked



3a Select **View**

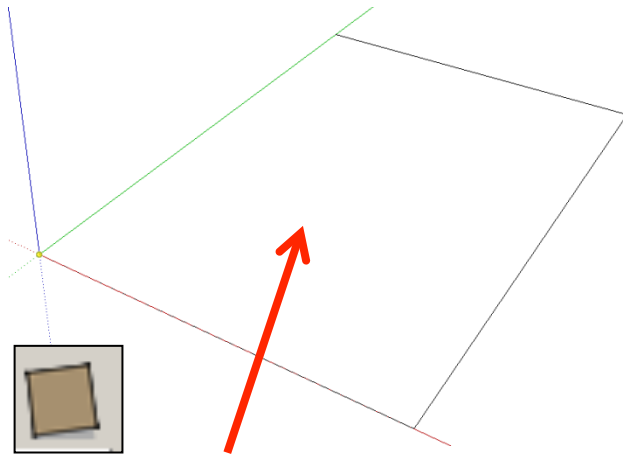
3b Tick Getting Started  
3c Tick Large Tool Set

**Note:** this will place a tool bar across the top (**getting started**) and the side (**Large Tool Set**)

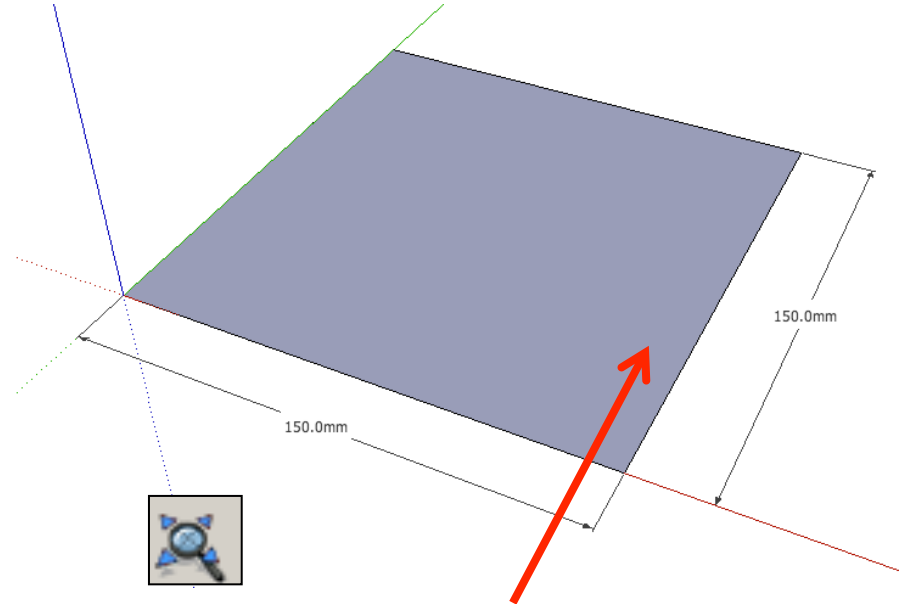


## CAD Tutorial 19: Birdhouse

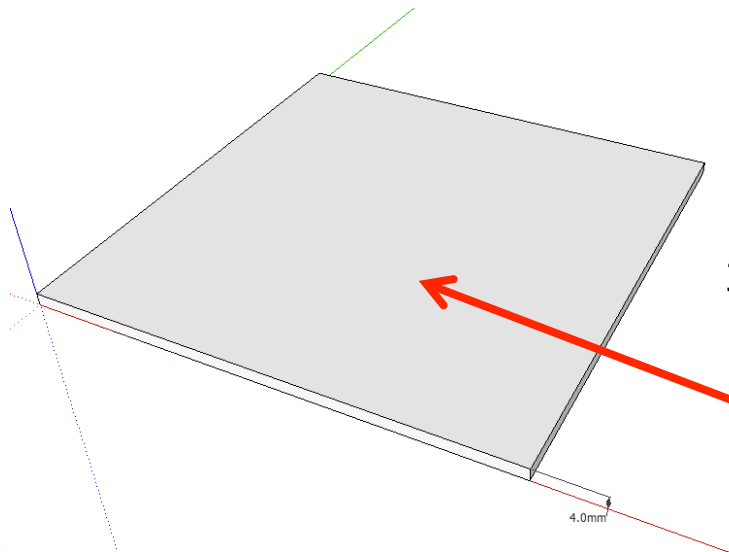
Flat Packed Wall Construction



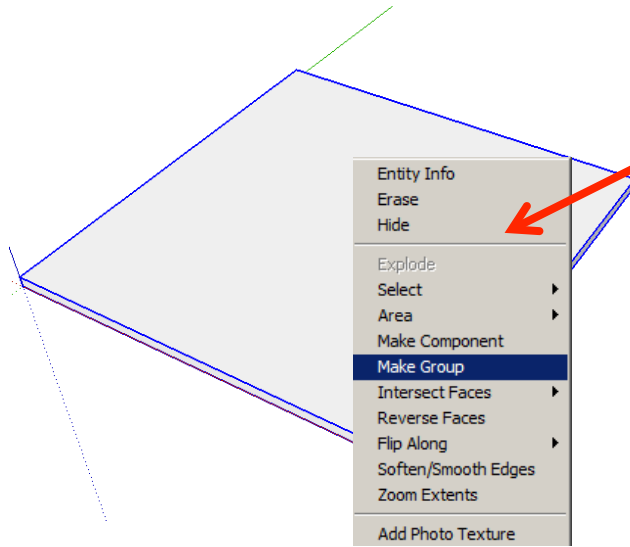
1. **Click on the rectangle tool** . Start drawing a square and type **150, 150**.



2. Press **Enter** . Click on the **zoom extents symbol**.



3. Using the **push pull tool**. Hover over the shape indicated. It will go **dotted** as you hover over it. Pull the shape up. Type in **4 and press enter**.

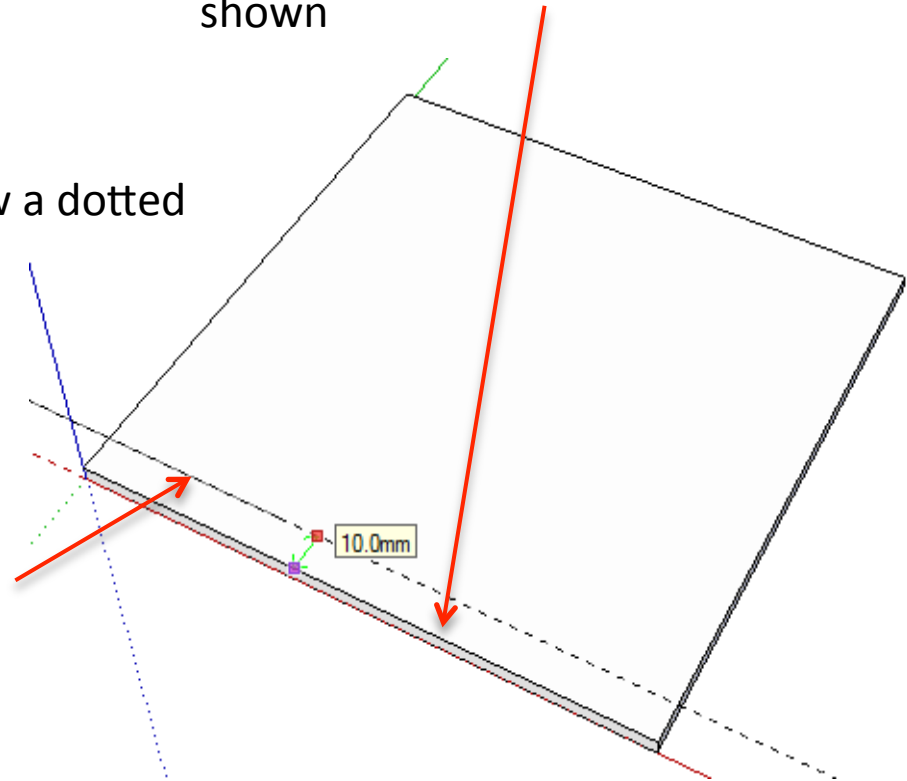


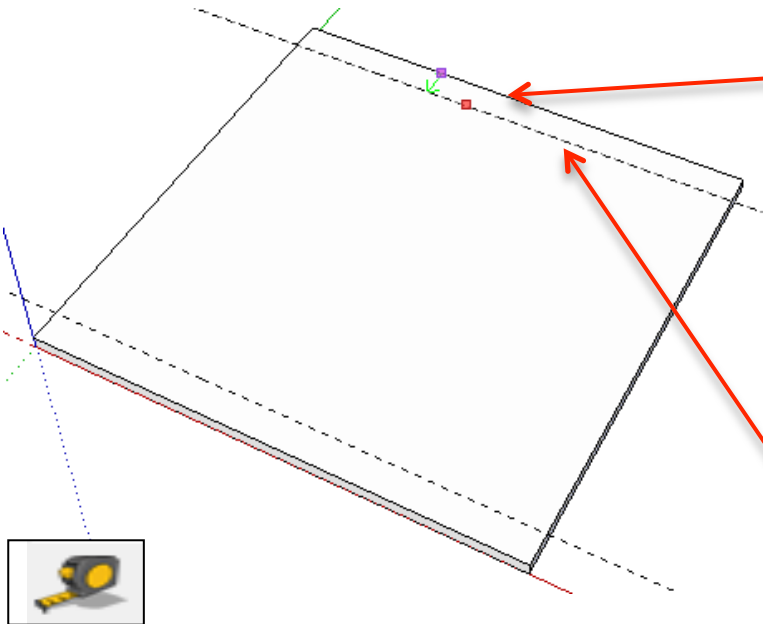
- Using the **select tool**, **click** on the base piece three times and right click on the mouse and **press make group**




- Select the **Tape measure tool** and snap to the **bottom edge** as shown

- Click once** and it will draw a dotted guide line from the edge
- Click a second time** to set the guide line and **type 10 and enter**. You will have a guide line **10mm** in from the **bottom edge**





8. Select the **Tape measure tool** and snap to the **top edge** as shown 

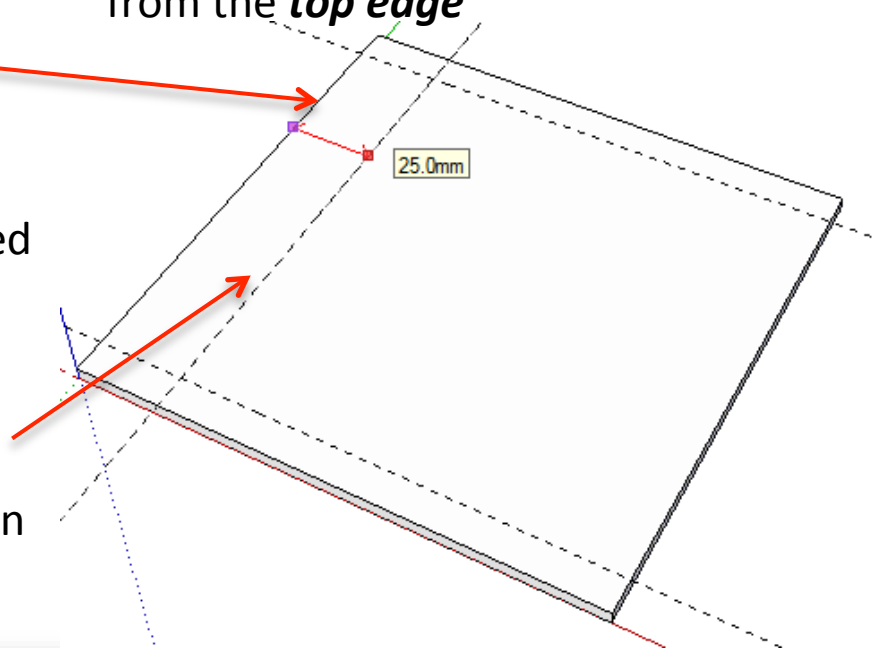
9. **Click once** and it will draw a dotted guide line from the edge

10. **Click a second time** to set the guide line and **type 10 and enter**. You will have a guide line **10mm** in from the **top edge**

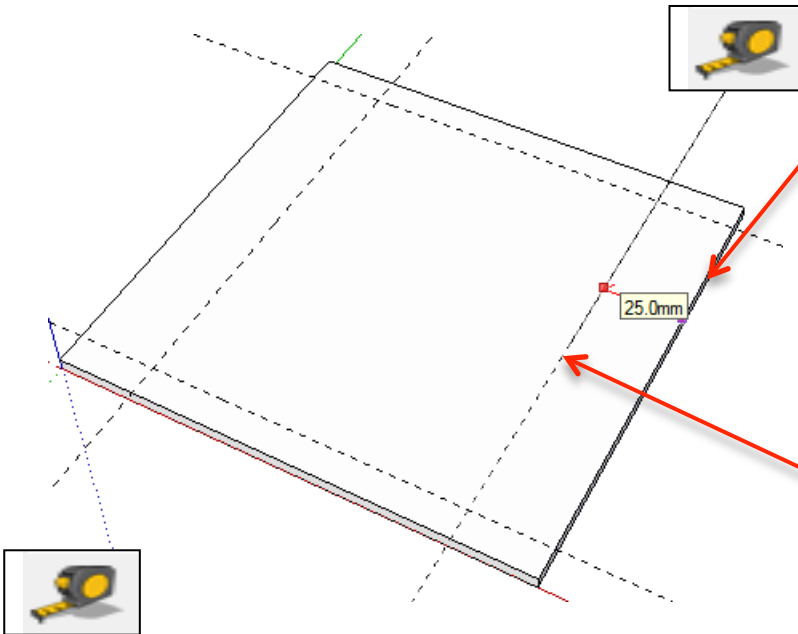
11. Select the **Tape measure tool** and snap to the **side edge** as shown

12. **Click once** and it will draw a dotted guide line from the edge

13. **Click a second time** to set the guide line and **type 25 and enter**. You will have a guide line **25mm** in from the **side edge**





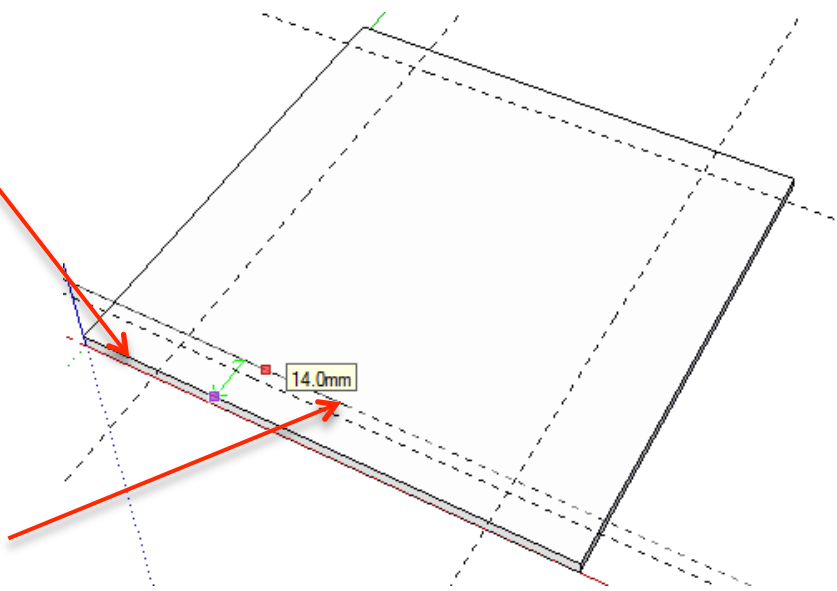


14. Select the **Tape measure tool** and snap to the **side edge** as shown

15. **Click once** and it will draw a dotted guide line from the edge

16. **Click a second time** to set the guide line and **type 25 and enter**. You will have a guide line **25mm** in from the **side edge**

17. Select the **Tape measure tool** and snap to the **bottom edge** as shown
18. **Click once** and it will draw a dotted guide line from the edge
19. **Click a second time** to set the guide line and **type 14 and enter**. You will have a guide line **14mm** in from the **bottom edge**

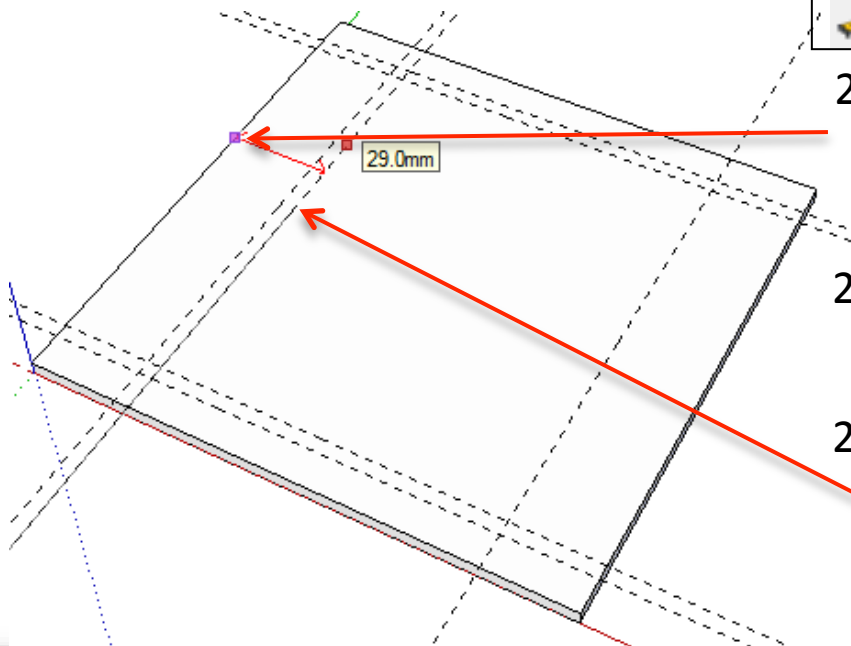
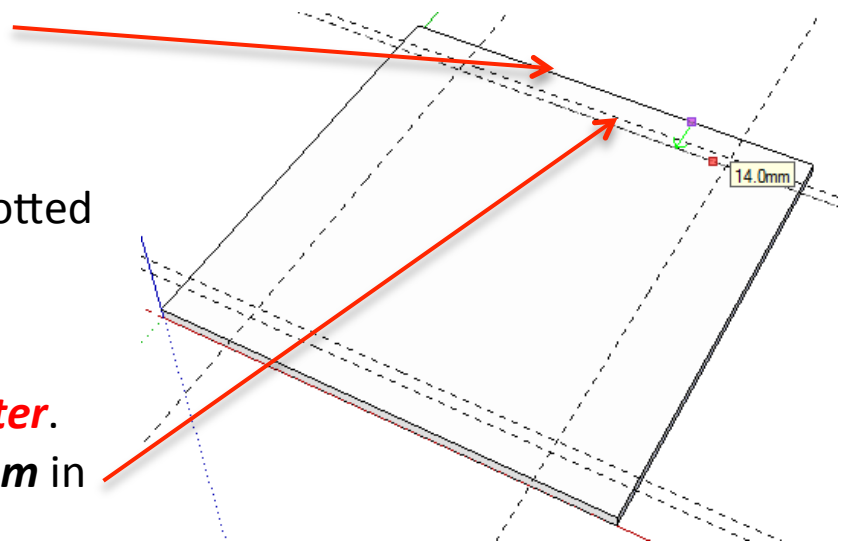




20. Select the **Tape measure tool** and snap to the **top edge** as shown

21. **Click once** and it will draw a dotted guide line from the edge

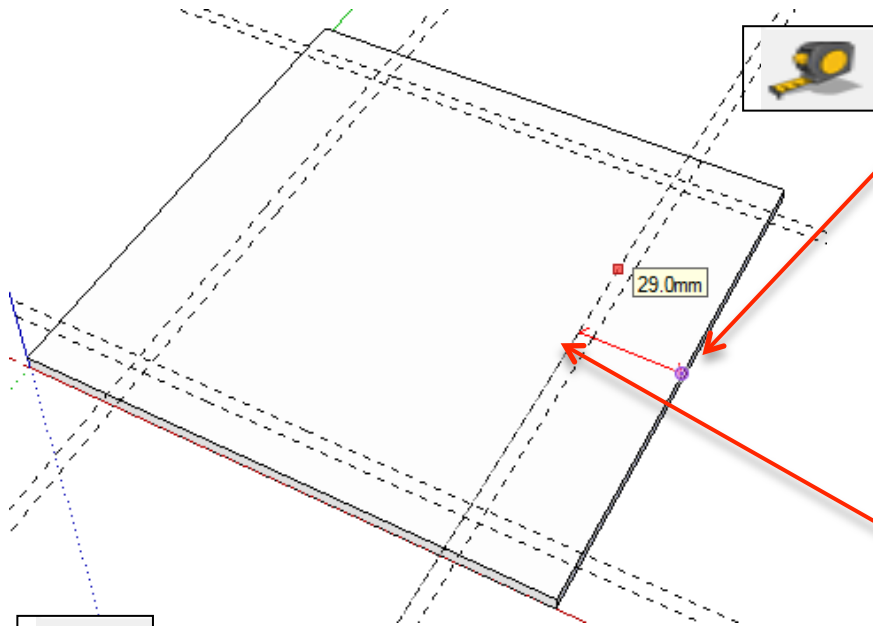
22. **Click a second time** to set the guide line and **type 14 and enter**. You will have a guide line **14mm** in from the **top edge**



23. Select the **Tape measure tool** and snap to the **side edge** as shown

24. **Click once** and it will draw a dotted guide line from the edge

25. **Click a second time** to set the guide line and **type 29 and enter**. You will have a guide line **29mm** in from the **side edge**



26. Select the **Tape measure tool** and snap to the **side edge** as shown

27. **Click once** and it will draw a dotted guide line from the edge

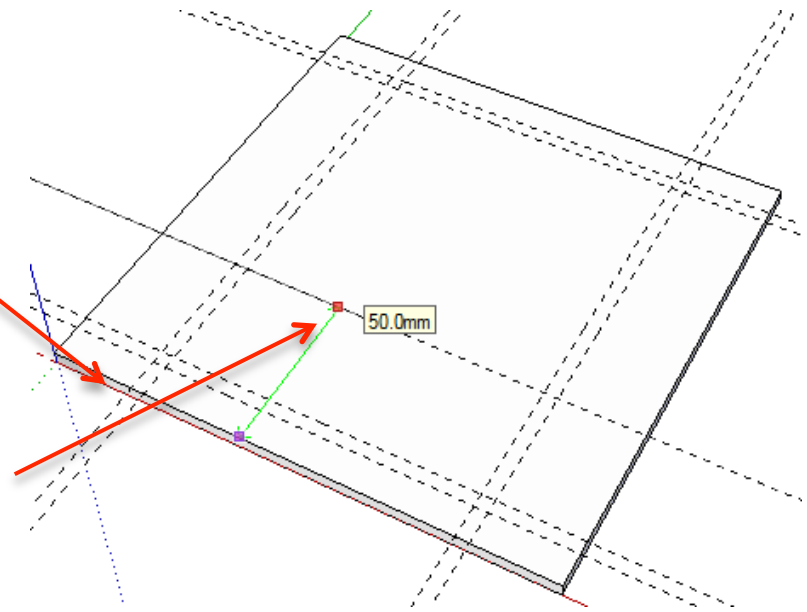
28. **Click a second time** to set the guide line and **type 29 and enter**. You will have a guide line **29mm** in from the **side edge**

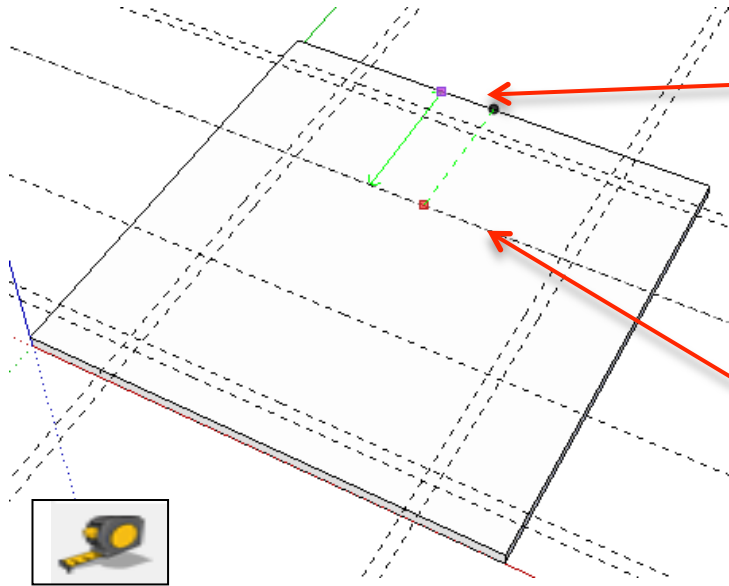



29. Select the **Tape measure tool** and snap to the **bottom edge** as shown

30. **Click once** and it will draw a dotted guide line from the edge

31 **Click a second time** to set the guide line and **type 50 and enter**. You will have a guide line **50mm** in from the **bottom edge**





32. Select the **Tape measure tool** and snap to the **top edge** as shown 

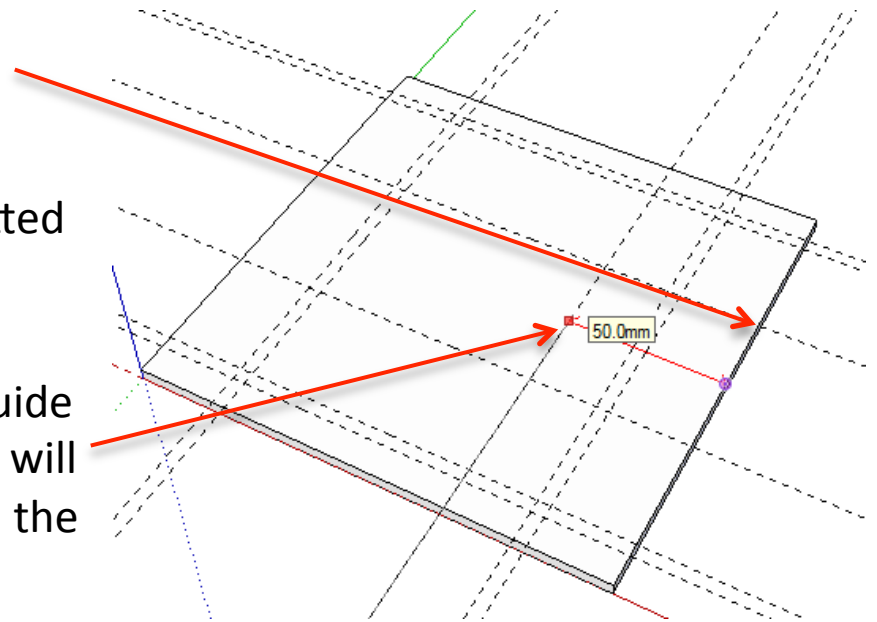
33. **Click once** and it will draw a dotted guide line from the edge

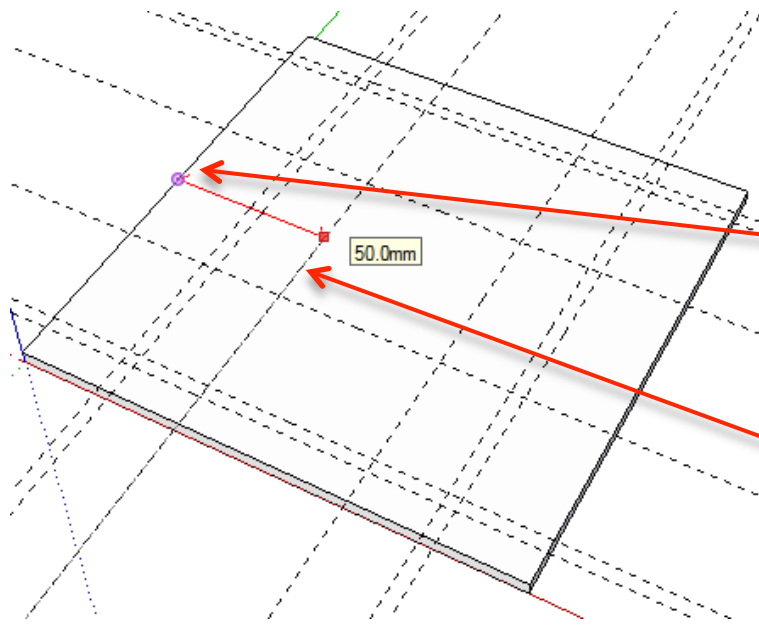
34 **Click a second time** to set the guide line and **type 50 and enter**. You will have a guide line **50mm** in from the **top edge**

35. Select the **Tape measure tool** and snap to the **side edge** as shown

37. **Click once** and it will draw a dotted guide line from the edge

38 **Click a second time** to set the guide line and **type 50 and enter**. You will have a guide line **50mm** in from the **side edge**

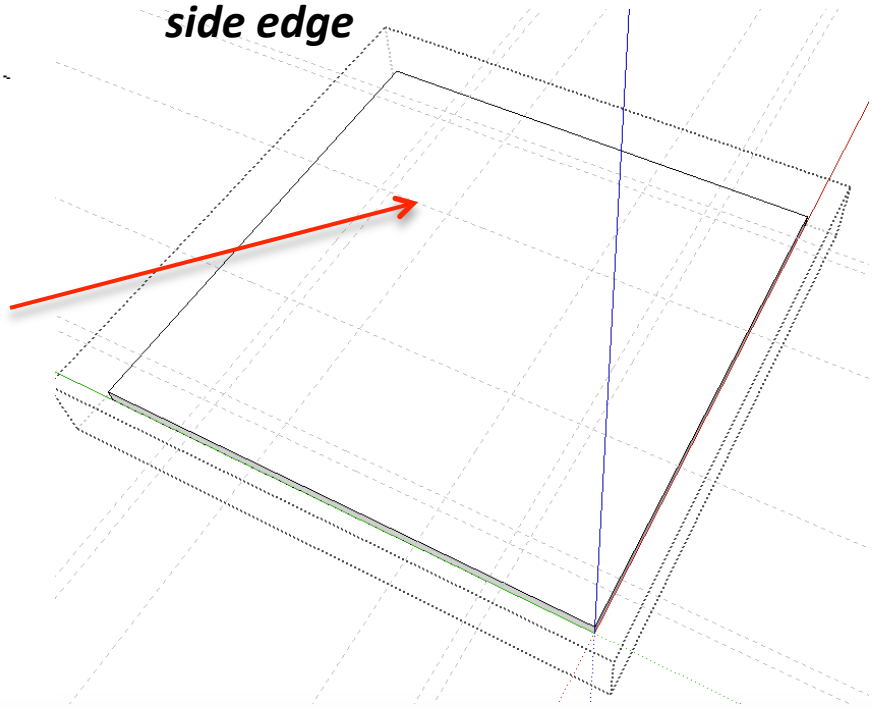




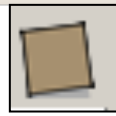
39. Select the **Tape measure tool** and snap to the **side edge** as shown 

40. **Click once** and it will draw a dotted guide line from the edge

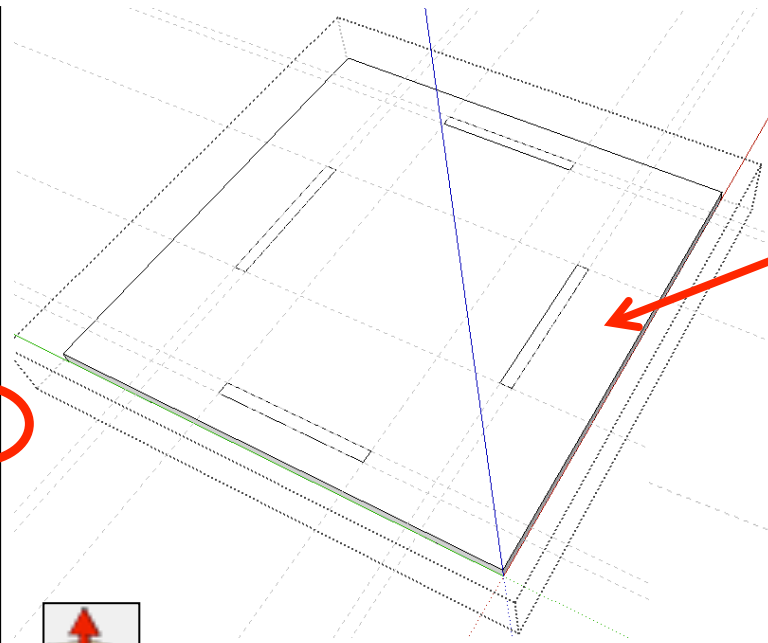
41 **Click a second time** to set the guide line and **type 50 and enter**. You will have a guide line **50mm** in from the **side edge**



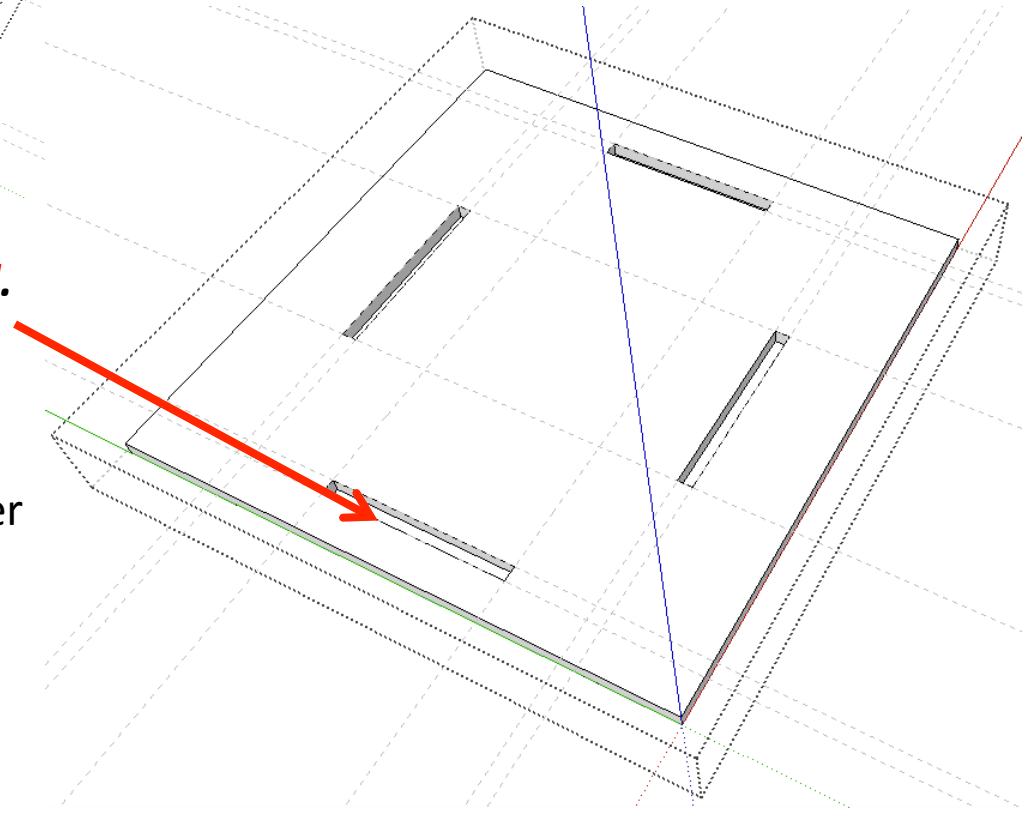
42. Using the **select tool**, **double click** on the piece shown to edit it. All the other pieces should be greyed out. Then click on the edge shown to highlight it in **blue**.



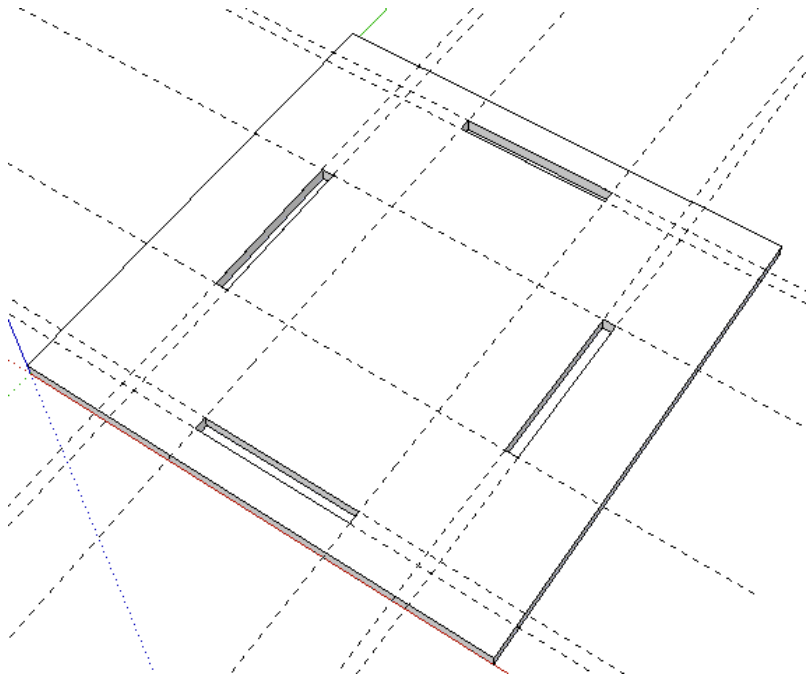
43. **Click** on the **rectangle tool** .  
Using the guide lines you have drawn previously. Draw the rectangles shown. **They will say intersections**



44. Using the **push pull tool**.  
Hover over the each of the rectangles you have just drawn. They will go **dotted** as you hover over them in turn. Push the shape down. Type in **4** and press enter.



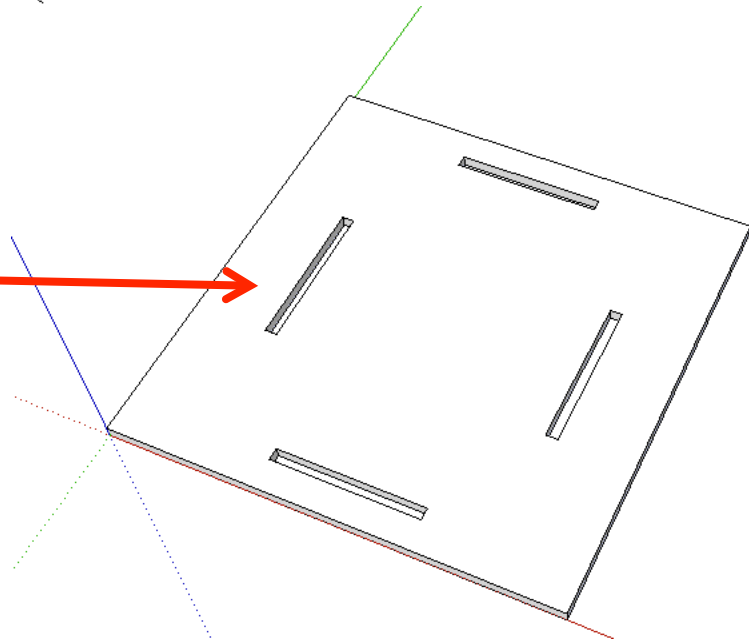


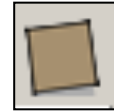
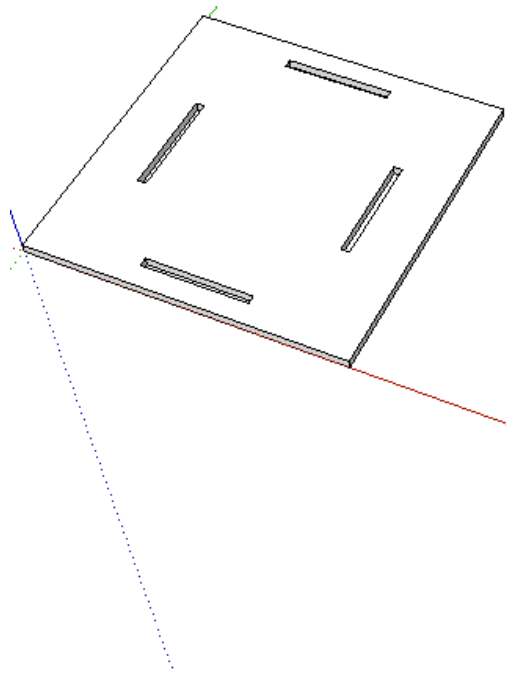


45. Using the ***select tool***, ***click*** on the side of the piece shown to un-edit.

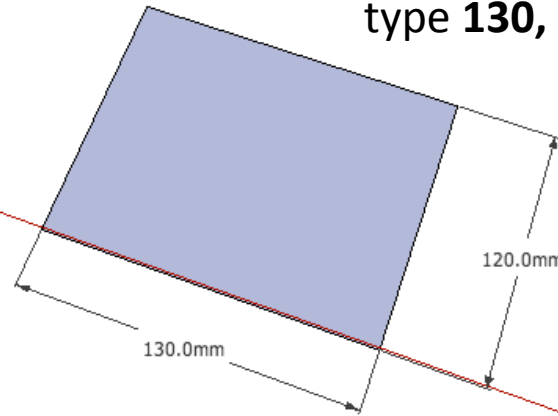


46. Use the ***rubber tool*** to erase the guidelines.

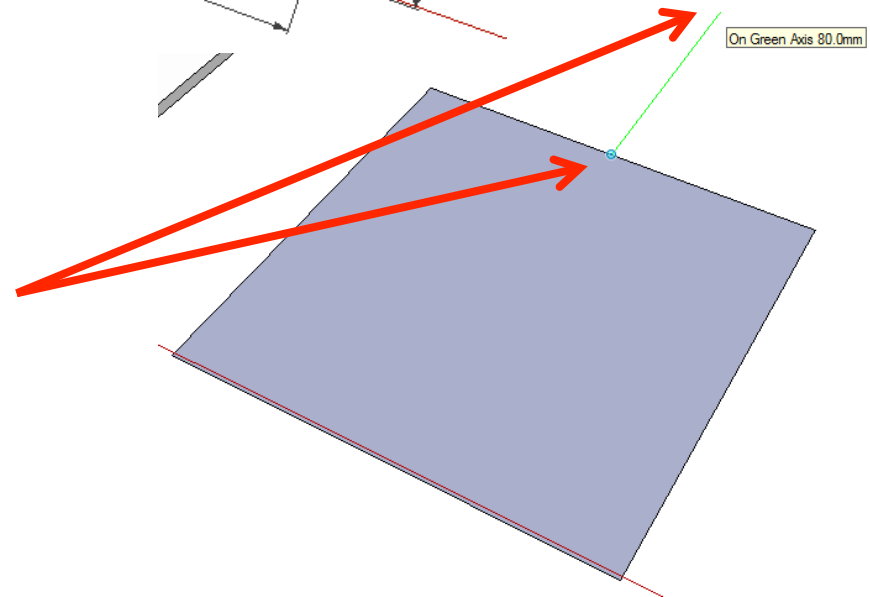




47. **Click** on the **rectangle tool**. Start drawing a square and type **130, 120**.



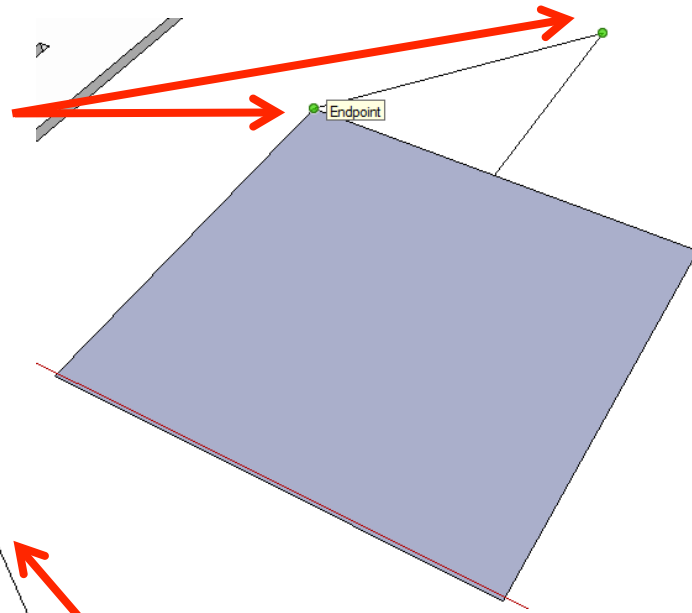
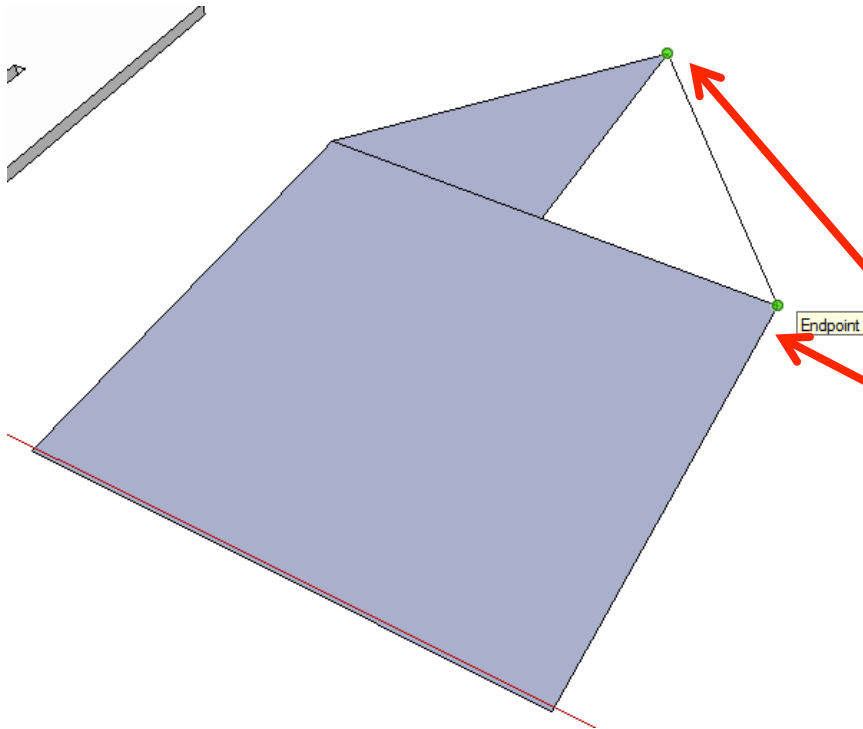
48. Using the **line tool**. Snap to the midpoint on the top edge of the square. Draw a line up on the **green** axis. **Type in 80 and press enter**.



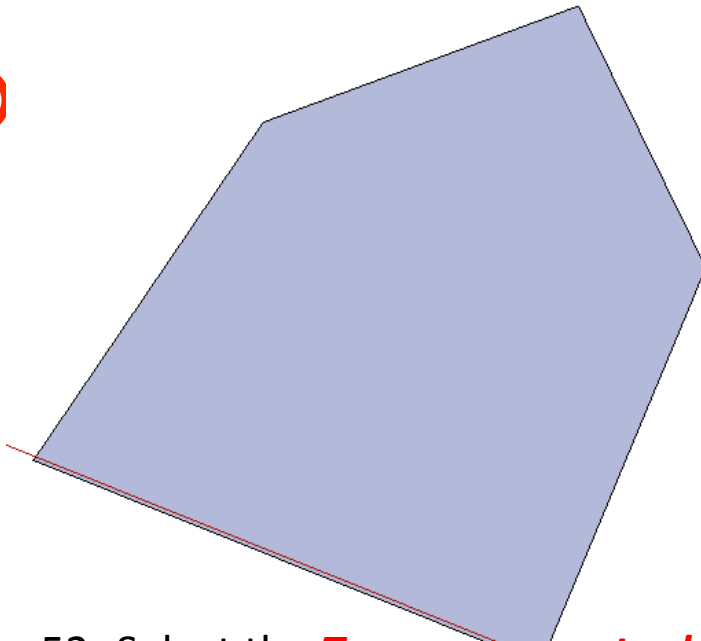




49. Using the **line tool**.  
Snap to the endpoints  
shown to draw the  
triangle. It should fill  
in grey if drawn  
correctly.



50. Using the **line tool**.  
Snap to the endpoints  
shown to draw the  
triangle on the  
opposite side. It  
should fill in grey  
if drawn correctly.



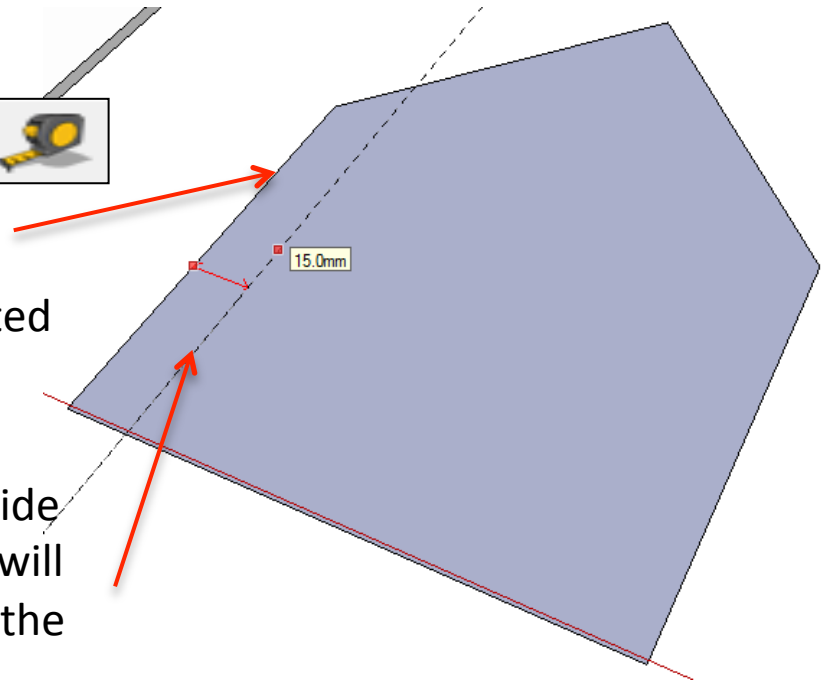
51. Use the **rubber tool** to erase the lines so you end up with a house shape.

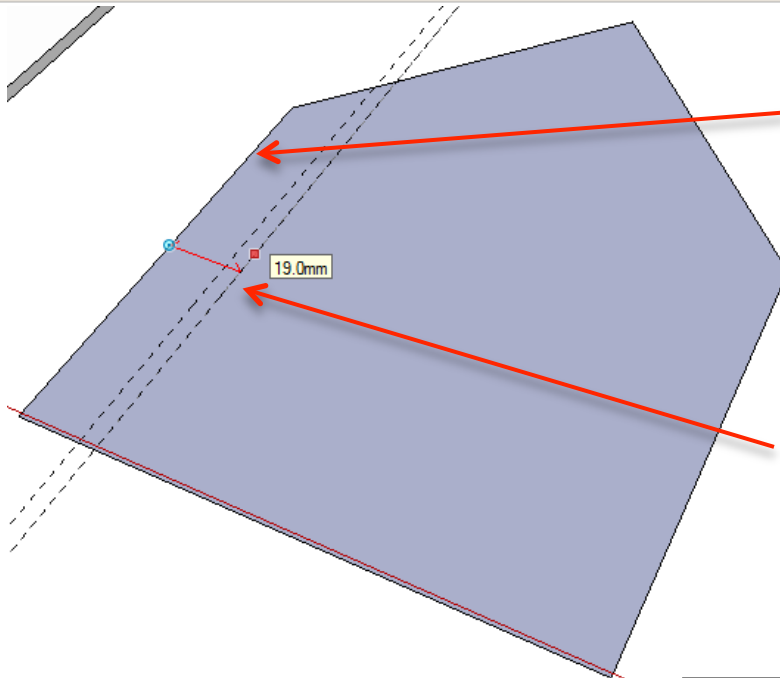
52. Select the **Tape measure tool** and snap to the **side edge** as shown



53. **Click once** and it will draw a dotted guide line from the edge

54 **Click a second time** to set the guide line and **type 15 and enter**. You will have a guide line **15mm** in from the **side edge**





55. Select the **Tape measure tool** and snap to the **side edge** as shown



56. **Click once** and it will draw a dotted guide line from the edge

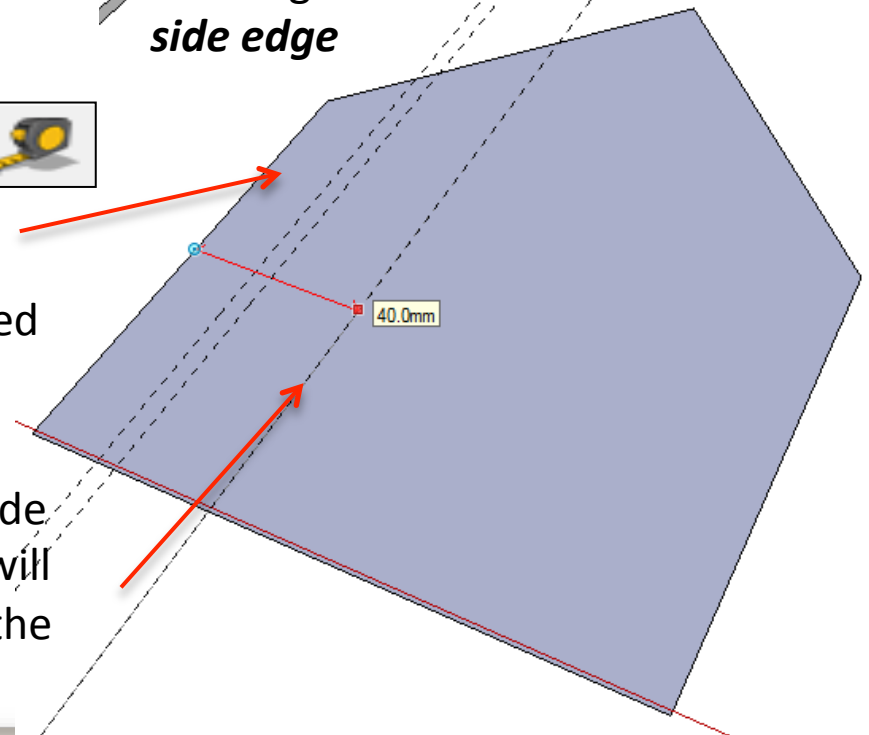
57 **Click a second time** to set the guide line and **type 19 and enter**. You will have a guide line **19mm** in from the **side edge**

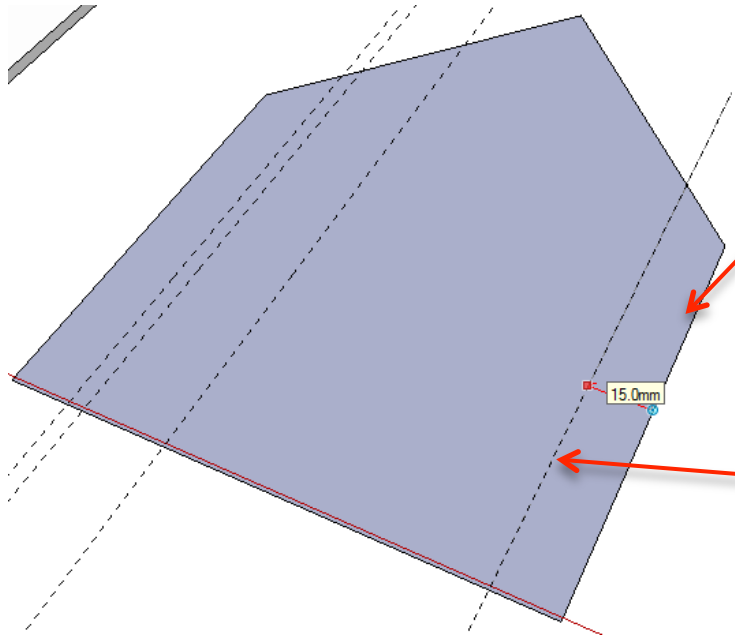
58. Select the **Tape measure tool** and snap to the **side edge** as shown



59. **Click once** and it will draw a dotted guide line from the edge

60 **Click a second time** to set the guide line and **type 40 and enter**. You will have a guide line **40mm** in from the **side edge**





61. Select the ***Tape measure tool*** and snap to the ***side edge*** as shown



62. ***Click once*** and it will draw a dotted guide line from the edge

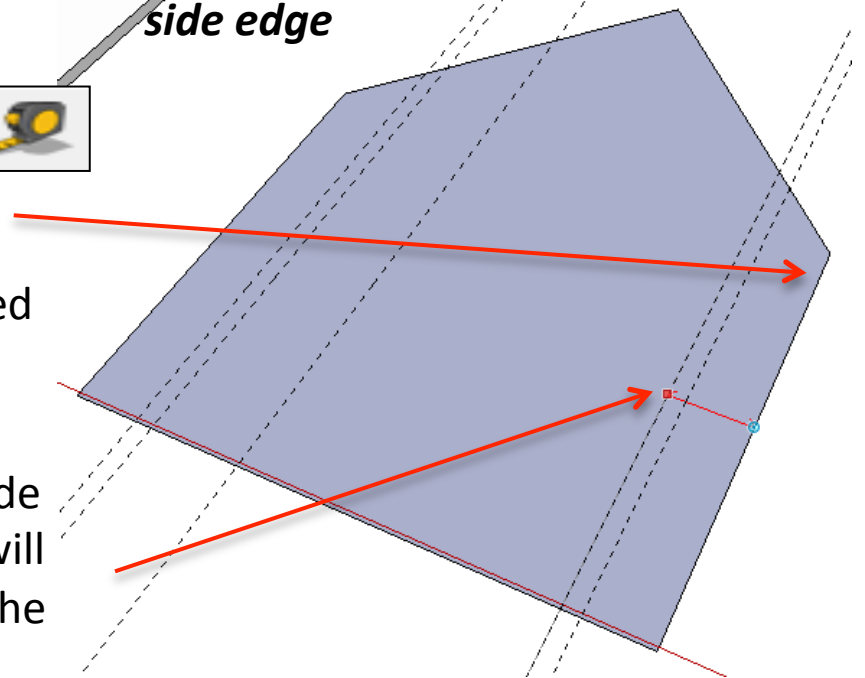
63 ***Click a second time*** to set the guide line and ***type 15 and enter***. You will have a guide line ***15mm*** in from the ***side edge***

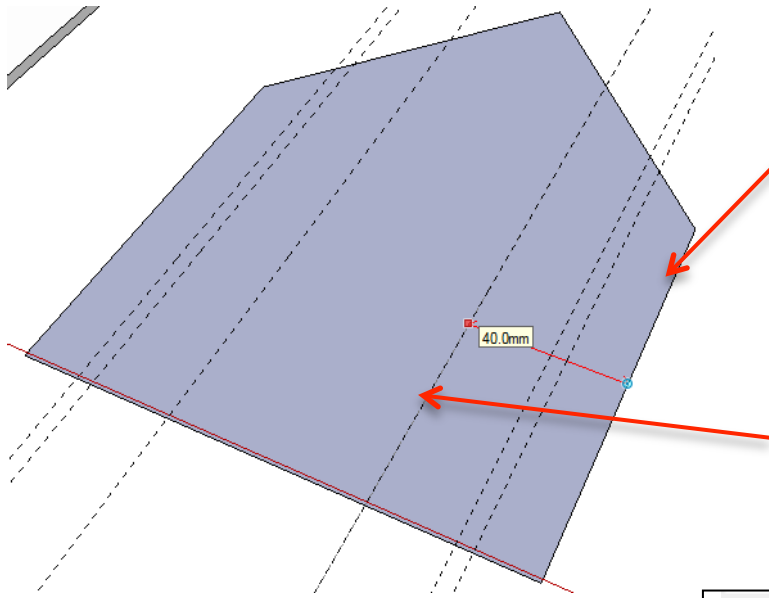
64. Select the ***Tape measure tool*** and snap to the ***side edge*** as shown





65. ***Click once*** and it will draw a dotted guide line from the edge

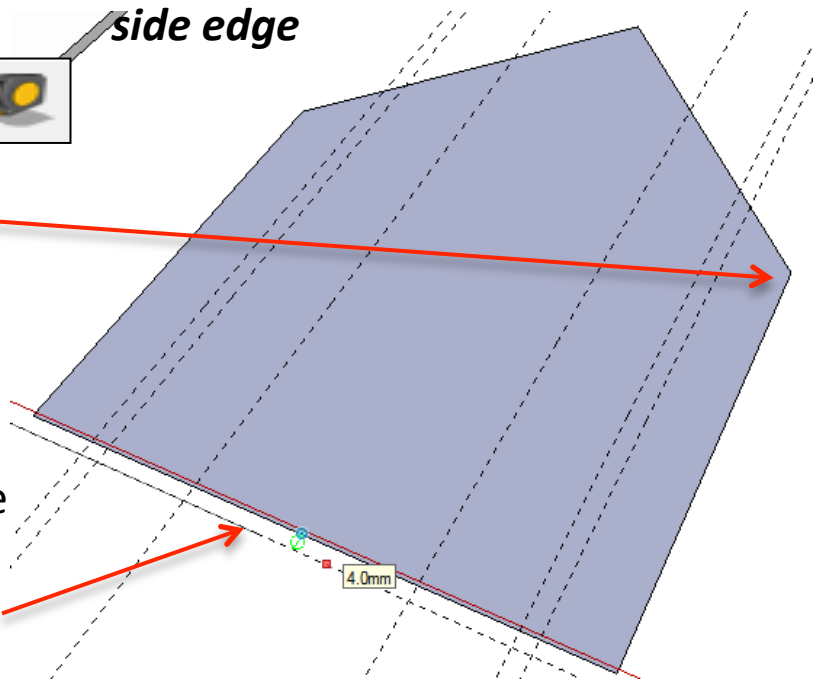
66 ***Click a second time*** to set the guide line and ***type 19 and enter***. You will have a guide line ***19mm*** in from the ***side edge***

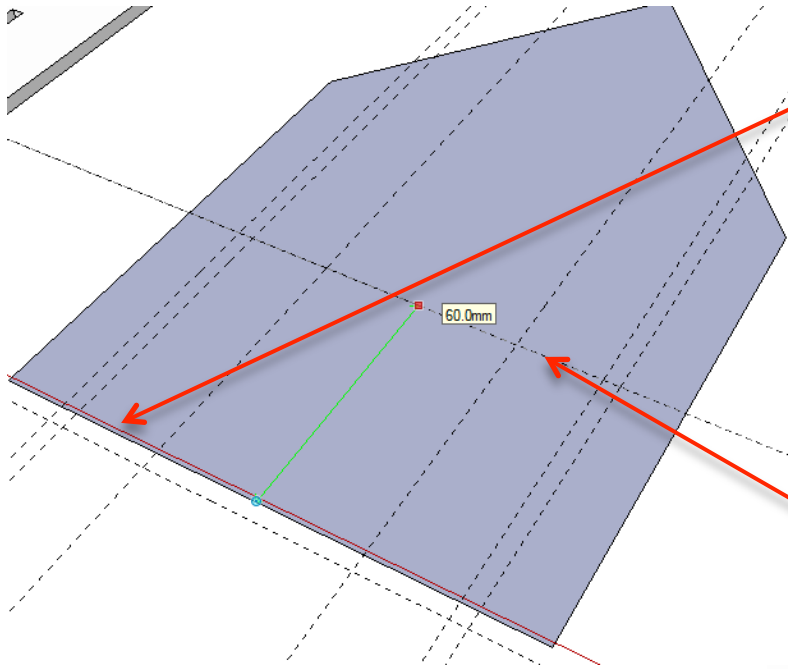




- 67. Select the **Tape measure tool** and snap to the **side edge** as shown 
- 68. **Click once** and it will draw a dotted guide line from the edge
- 69 **Click a second time** to set the guide line and **type 40 and enter**. You will have a guide line **40mm** in from the **side edge**

- 70. Select the **Tape measure tool** and snap to the **bottom edge** as shown 
- 71. **Click once** and it will draw a dotted guide line down from the edge
- 72 **Click a second time** to set the guide line and **type 4 and enter**. You will have a guide line **4mm** down from the **bottom edge**.



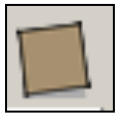
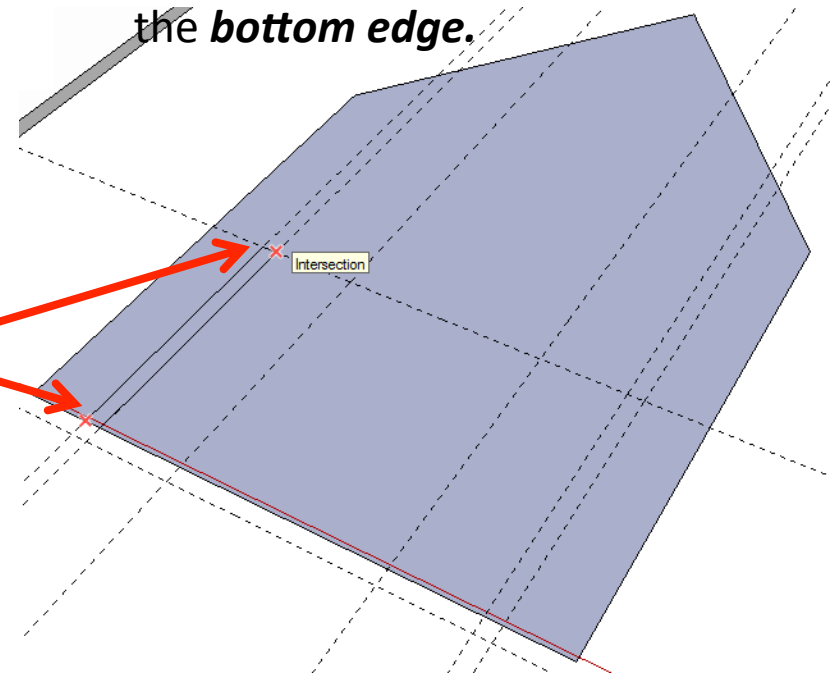


73. Select the **Tape measure tool** and snap to the **bottom edge** as shown

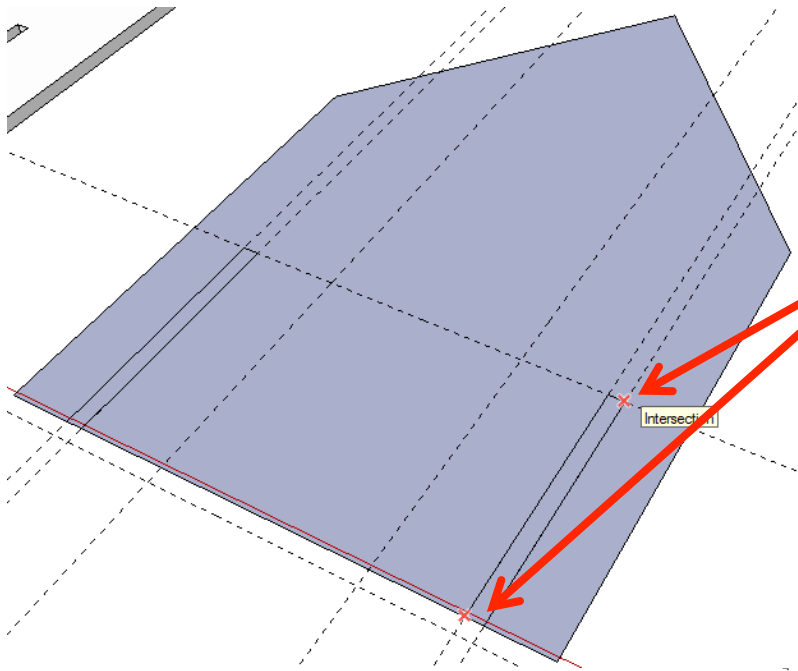


74. **Click once** and it will draw a dotted guide line down from the edge

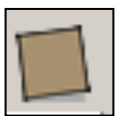
75 **Click a second time** to set the guide line and **type 4 and enter**. You will have a guide line **4mm** down from the **bottom edge**.



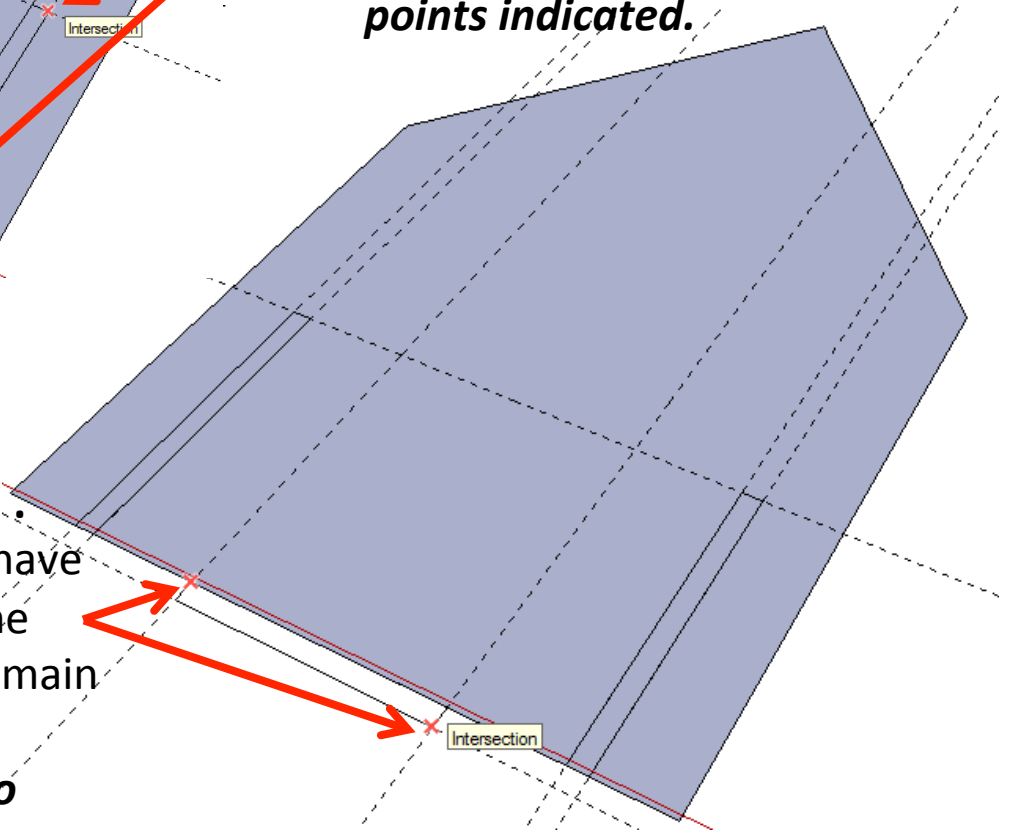
76. **Click** on the **rectangle tool**. Using the guide lines you have drawn preciously. Draw the rectangle shown. **It will say intersections from the two points indicated.**



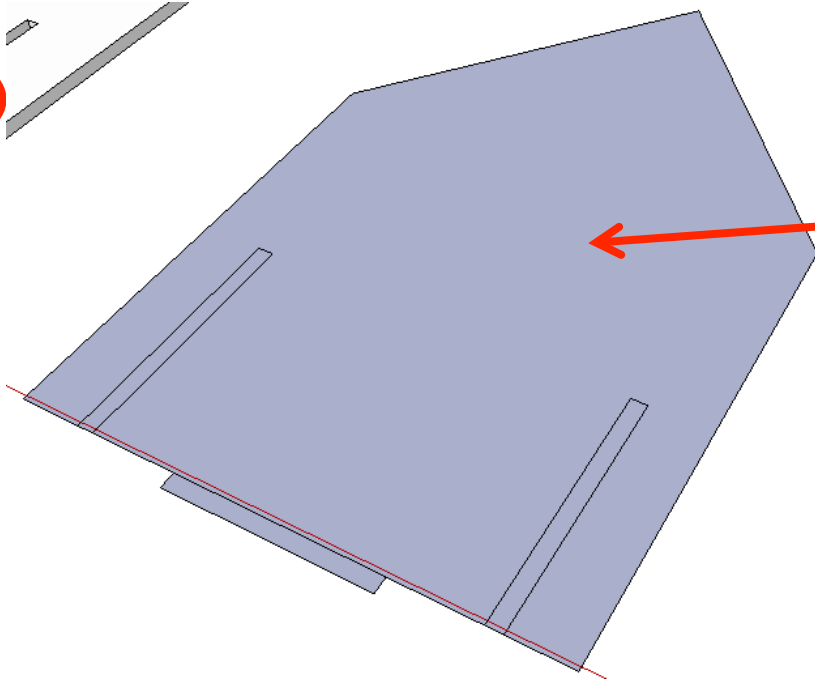
77. **Click** on the **rectangle tool** . Using the guide lines you have drawn previously. Draw the rectangle shown. ***It will say intersections from the two points indicated.***



78. **Click** on the **rectangle tool** . Using the guide lines you have drawn previously. Draw the rectangle underneath the main shape shown. ***It will say intersections from the two points indicated.***



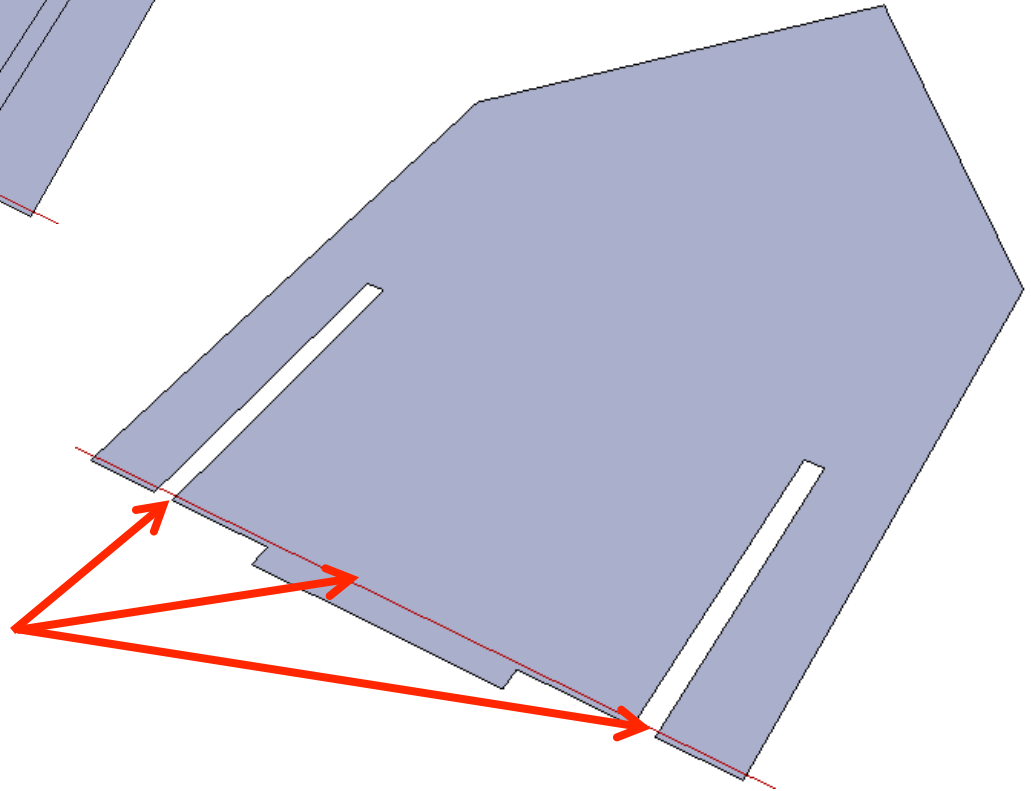




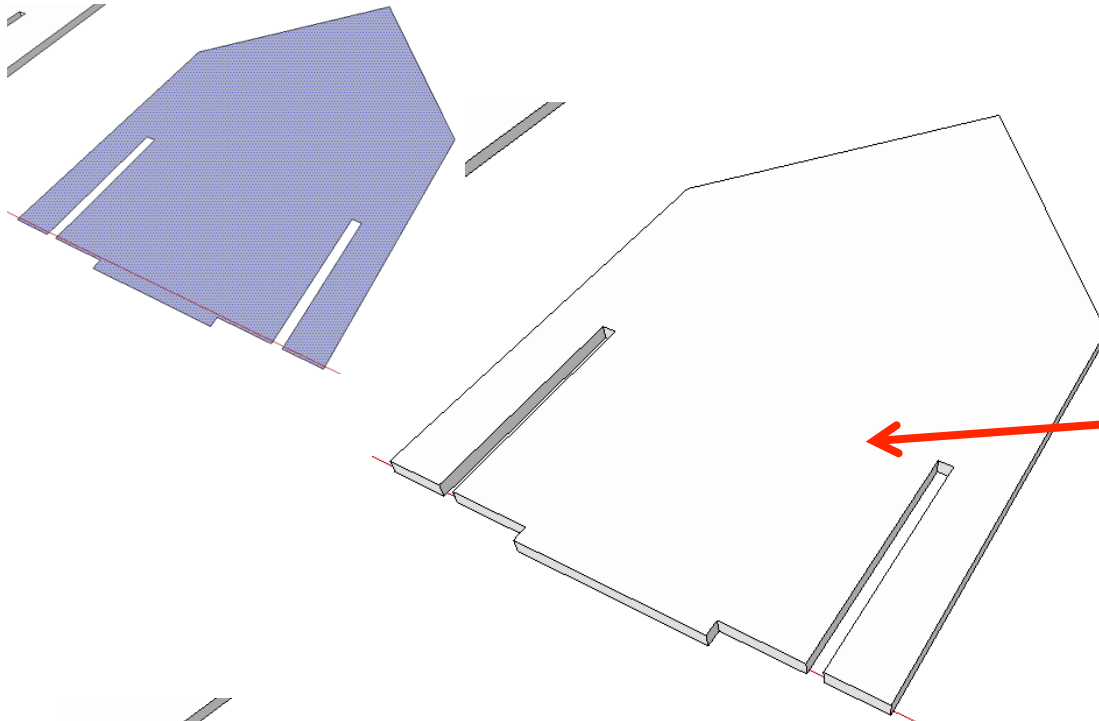
79. Use the **rubber tool** to erase the guidelines.



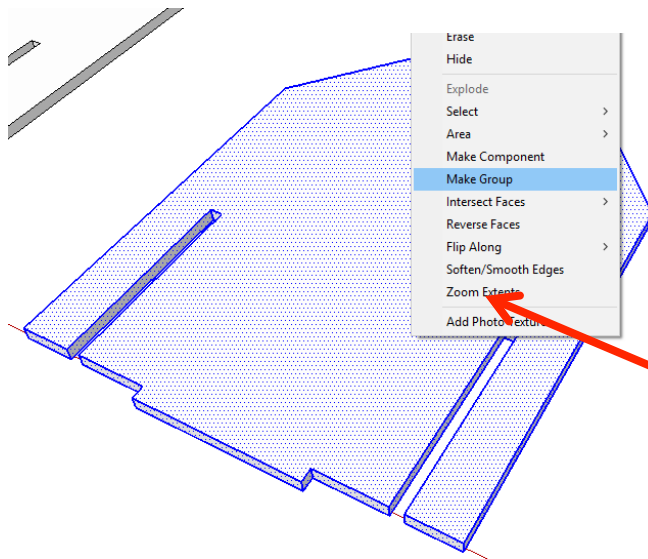
80. Use the **rubber tool** to erase the lines shown to be left with the following shape.



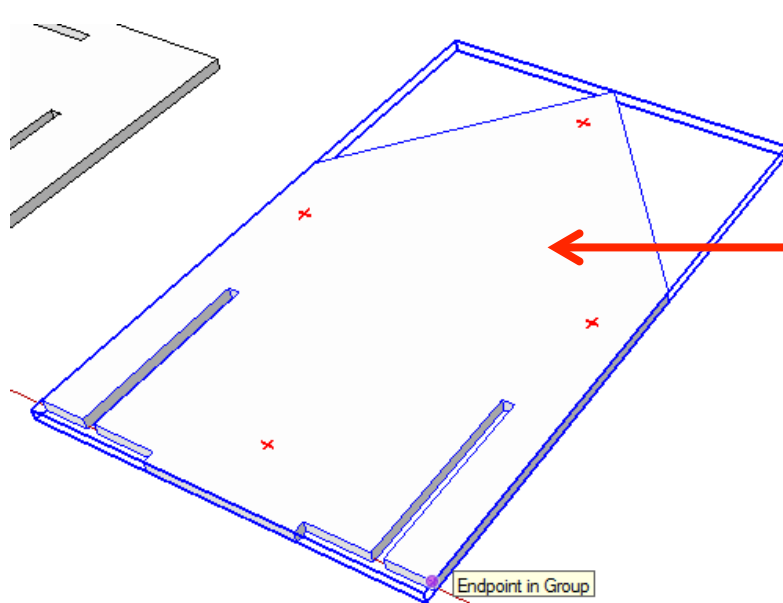




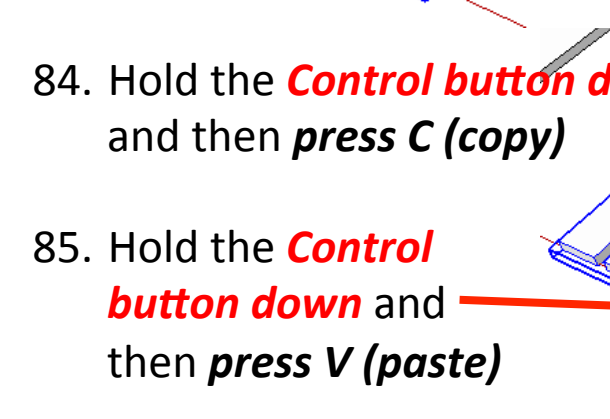
81. Using the **push pull tool**. Hover over the shape you have just drawn. They will go **dotted** as you hover over them in turn. Pull the shape up. Type in **4** and **press enter**.



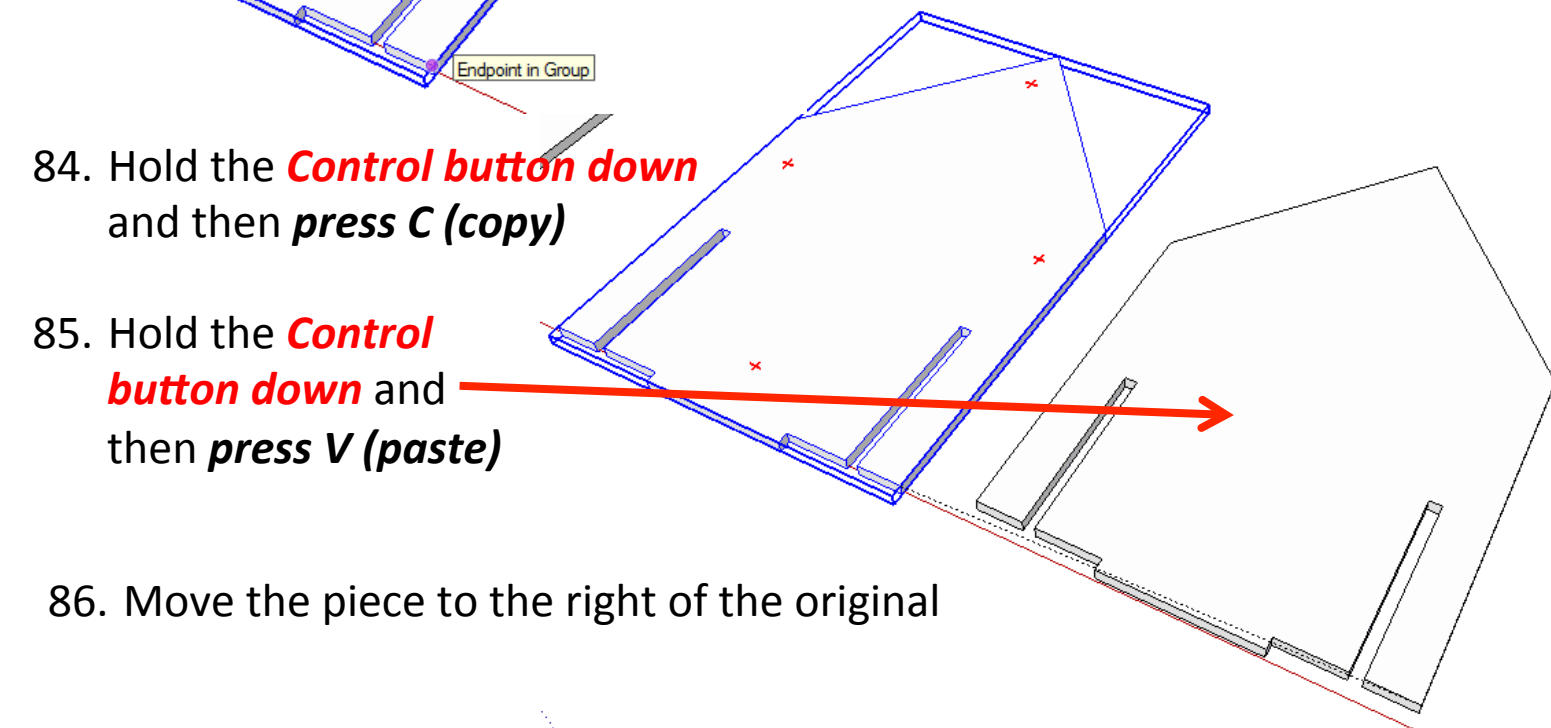
82. Use the **select tool** and keep clicking on the piece until it is all selected and highlighted in blue. **Right click** on the mouse to produce the menu shown above and **click** on **make group**.



83. Use the **select tool** and click on the shape to select the entire object.

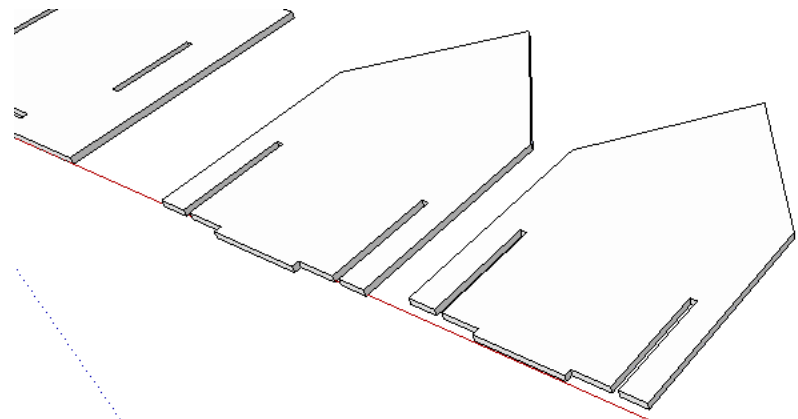


84. Hold the **Control button down** and then **press C (copy)**

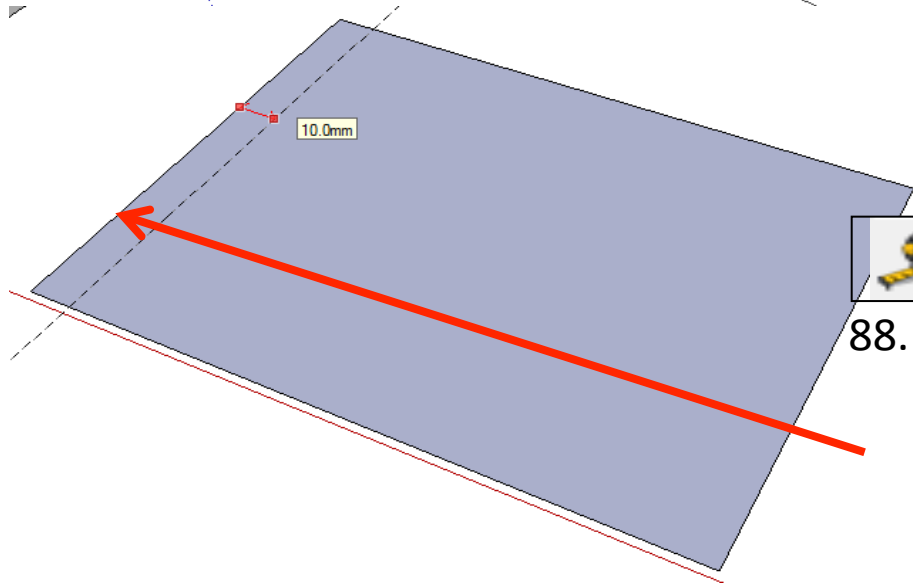
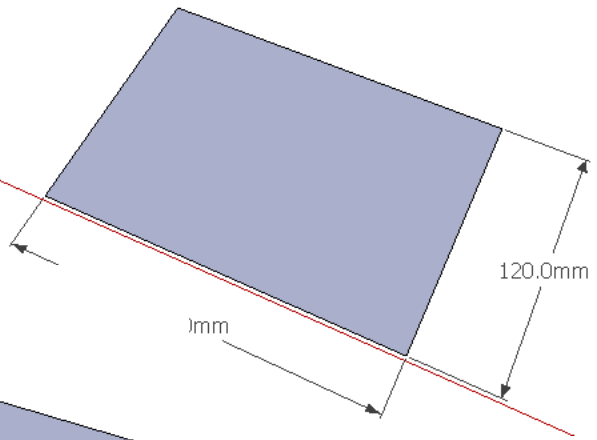


85. Hold the **Control button down** and then **press V (paste)**

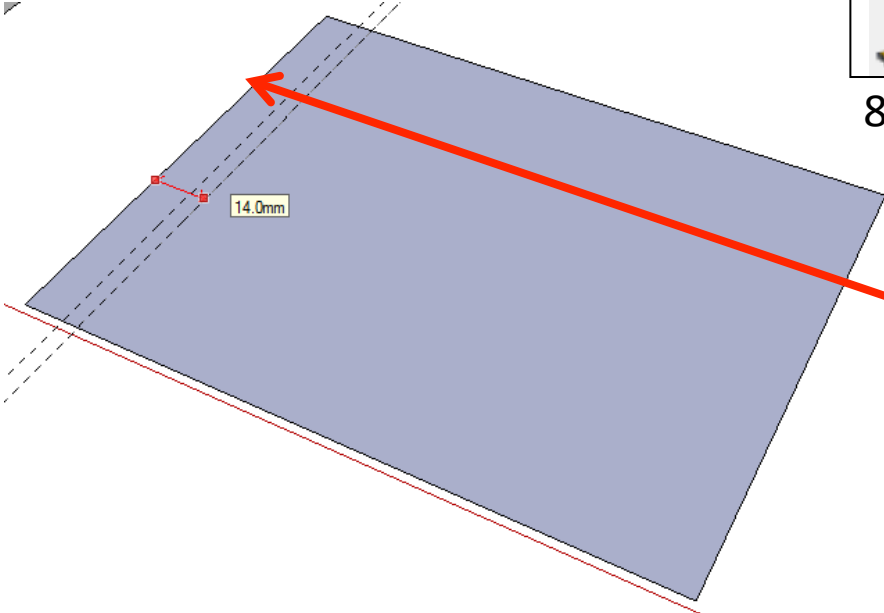
86. Move the piece to the right of the original



87. **Click** on the **rectangle tool** .  
Start drawing a square and  
type **150, 120**.



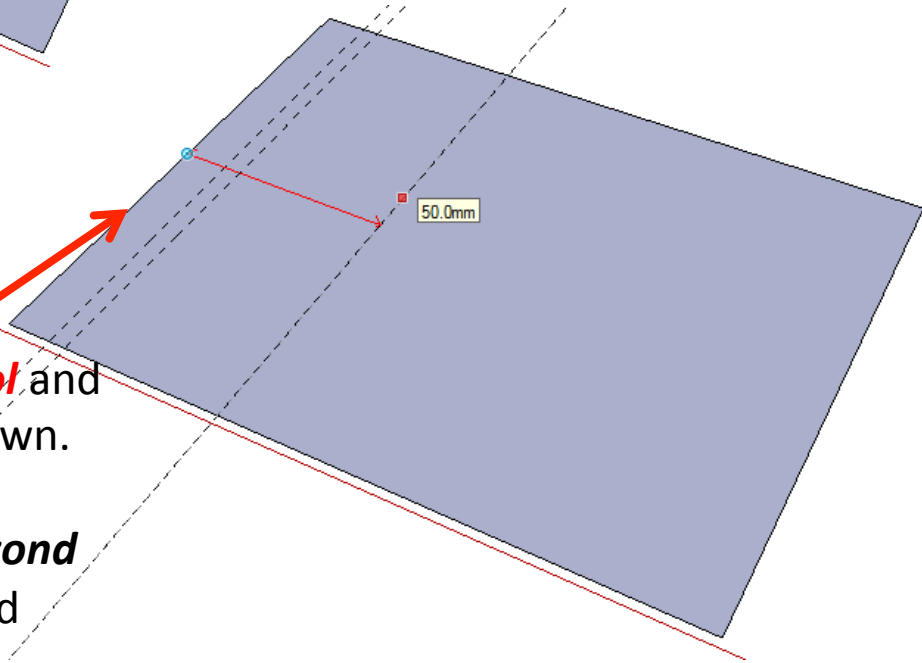
88. Select the **Tape measure tool** and  
snap to the **side edge** as shown.  
**Click once** and it will draw a  
dotted guide line. **Click a second  
time** to set the guide line and  
**type 10 and enter**

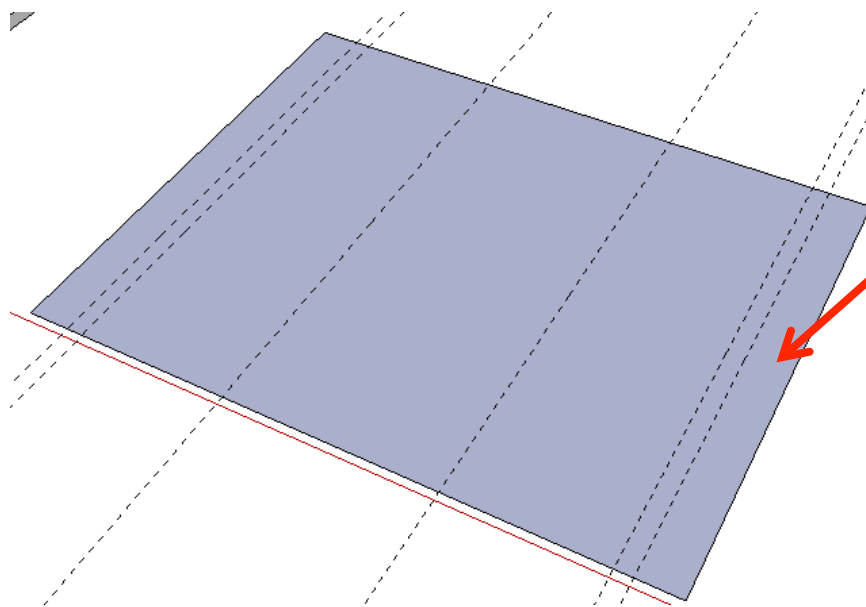


89. Select the ***Tape measure tool*** and snap to the ***side edge*** as shown. ***Click once*** and it will draw a dotted guide line. ***Click a second time*** to set the guide line and ***type 14 and enter***



90. Select the ***Tape measure tool*** and snap to the ***side edge*** as shown. ***Click once*** and it will draw a dotted guide line. ***Click a second time*** to set the guide line and ***type 50 and enter***

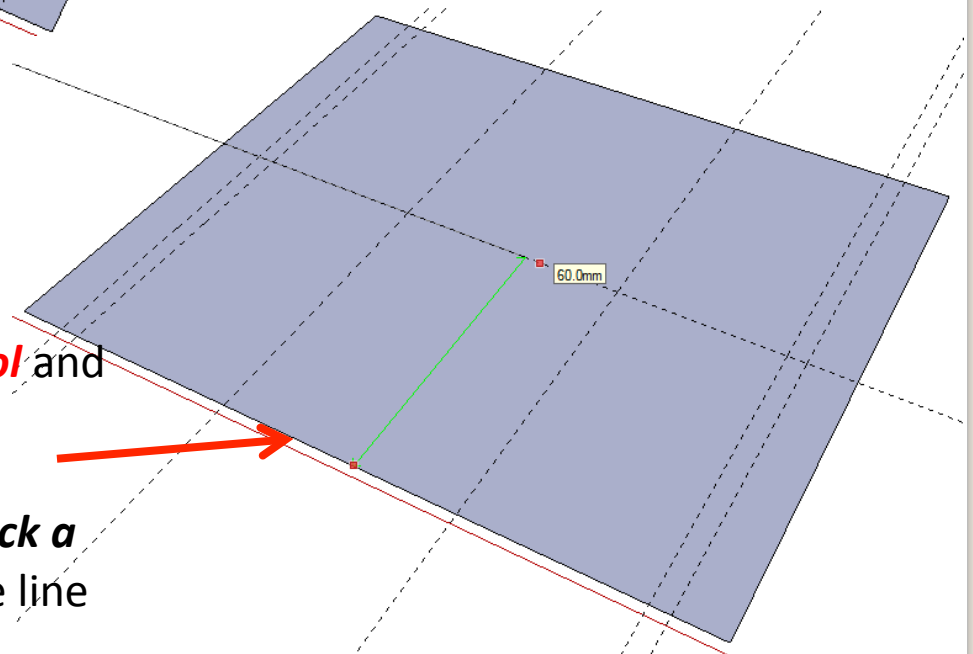


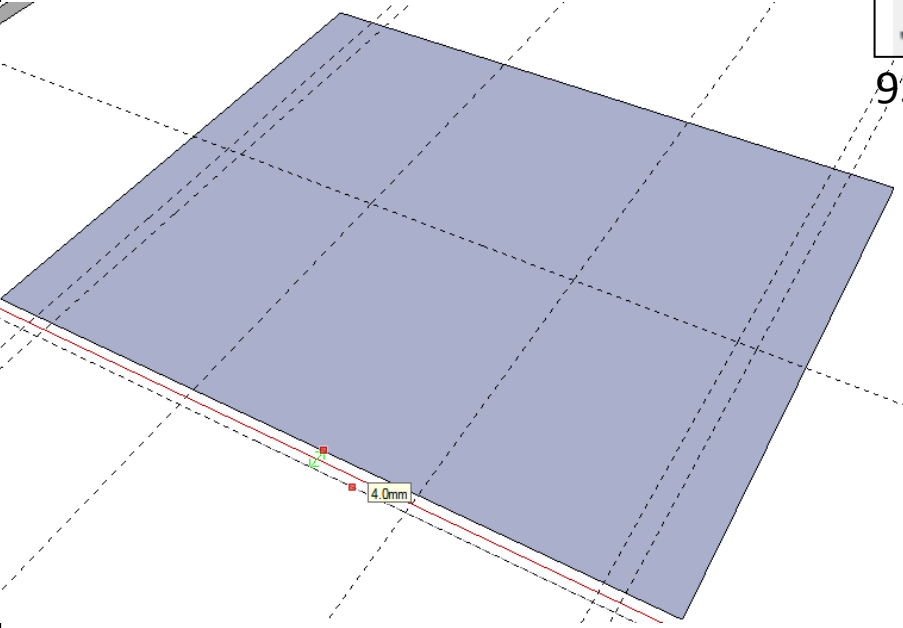


91. Repeat steps **88, 89 and 90** on the opposite side. The guide lines **should measure 10, 14 and 50**.



92. Select the **Tape measure tool** and snap to the **bottom edge** as shown. **Click once** and it will draw a dotted guide line. **Click a second time** to set the guide line and **type 60 and enter**

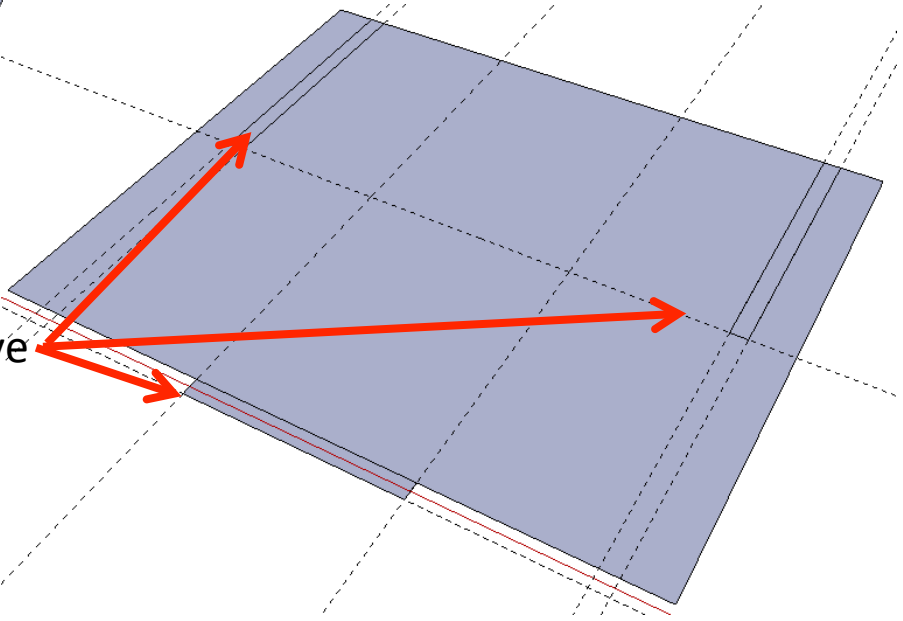




93. Select the **Tape measure tool** and snap to the **bottom edge** as shown. **Click once** and it will draw a dotted guide line below the main shape. **Click a second time** to set the guide line and **type 4 and enter**

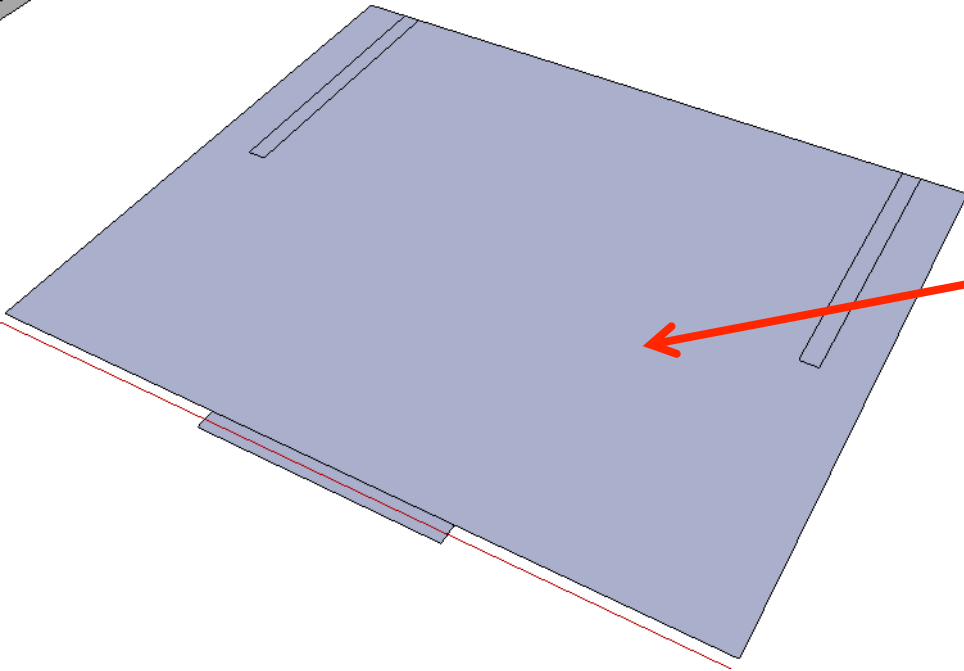


94. **Click** on the **rectangle tool**. Using the guide lines you have drawn previously. Draw the rectangles shown.

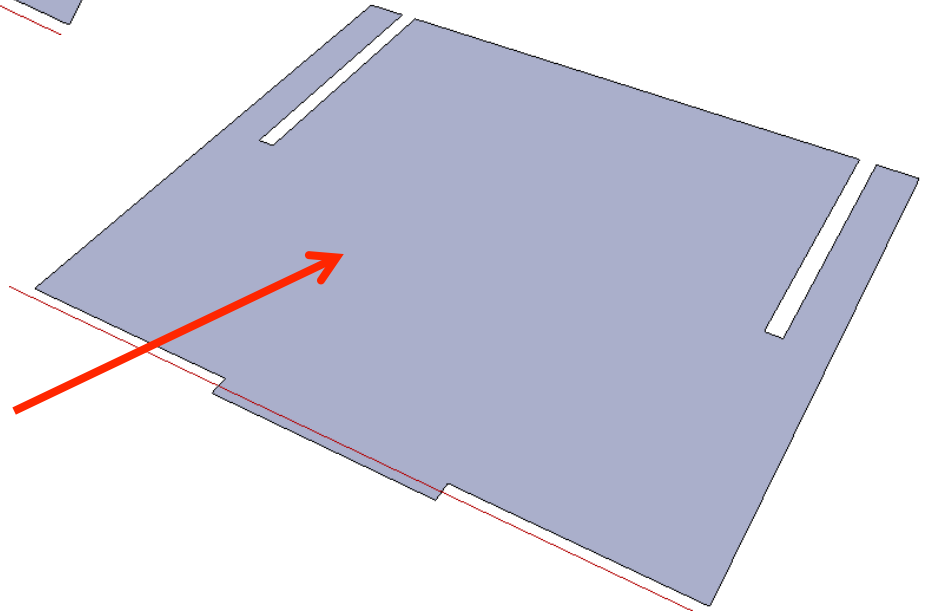


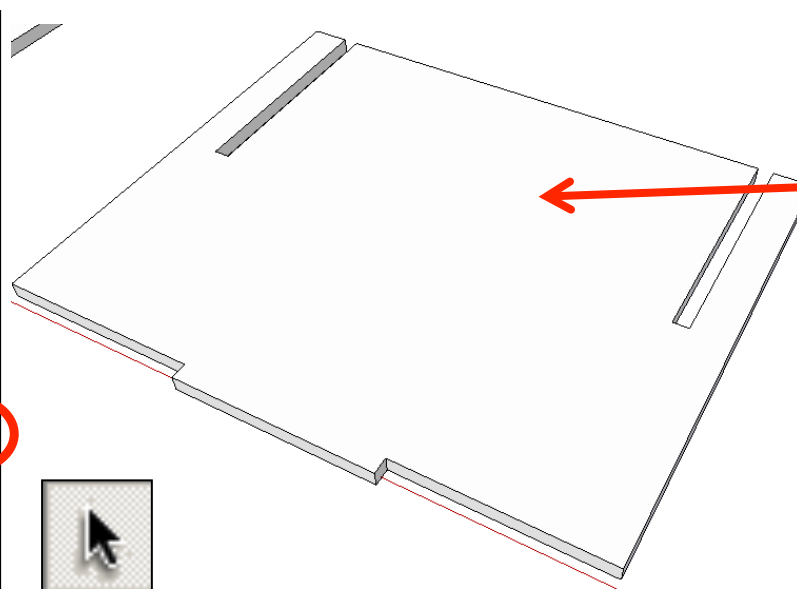


95. Use the **rubber tool** to erase the guidelines.



96. Use the **rubber tool** to erase the lines shown to be left with the following shape.

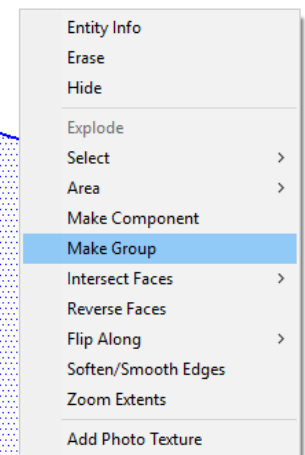
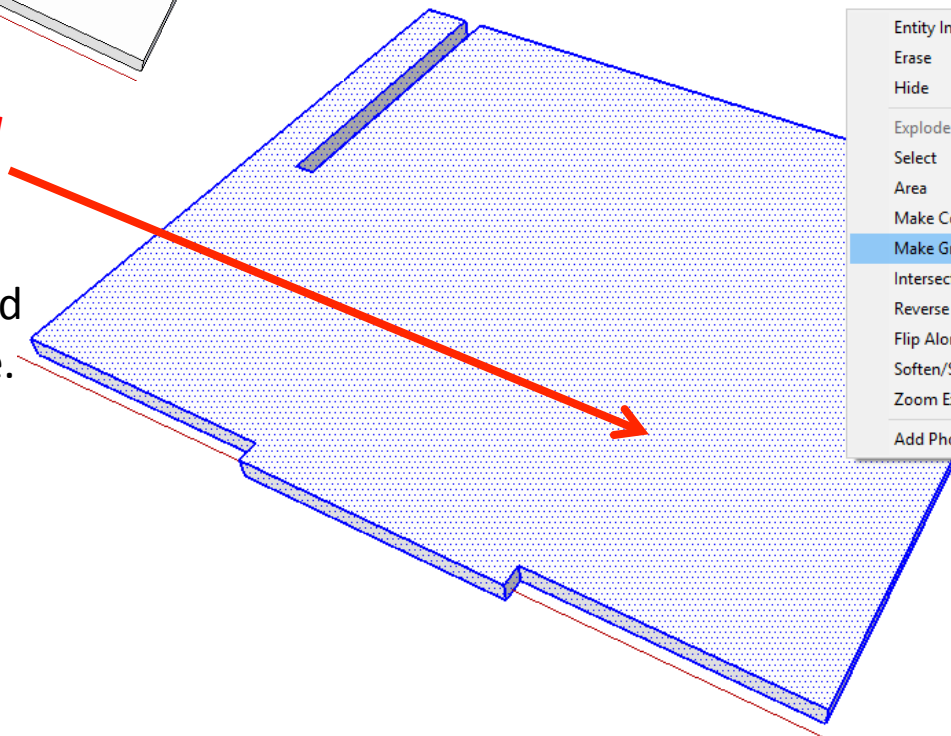




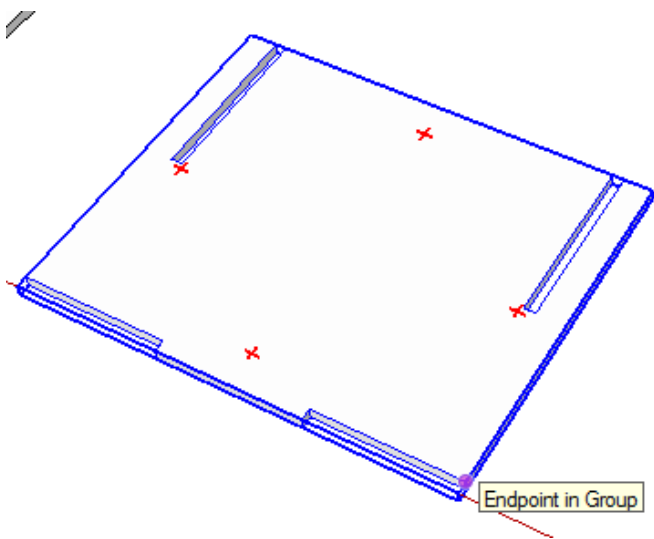
97. Using the **push pull tool**. Hover over the shape you have just drawn. They will go **dotted** as you hover over them in turn. Pull the shape up. Type in **4** and **press enter**.



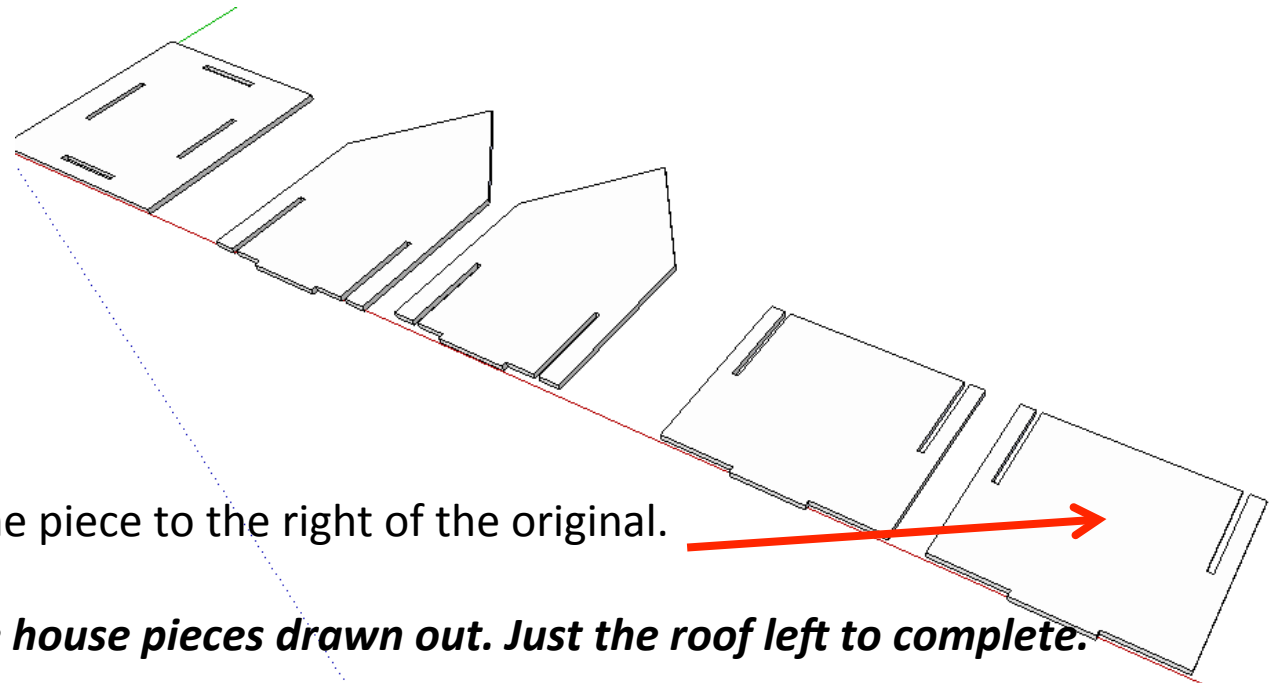
98. Use the **select tool** and keep clicking on the piece until it is all selected and highlighted in blue. **Right click** on the mouse to produce the menu shown above and **click** on **make group**.







99. Use the ***select tool*** and click on the shape to select the entire object. Hold the ***Control button down*** and then ***press C (copy)***. Hold the ***Control button down*** and then ***press V (paste)***



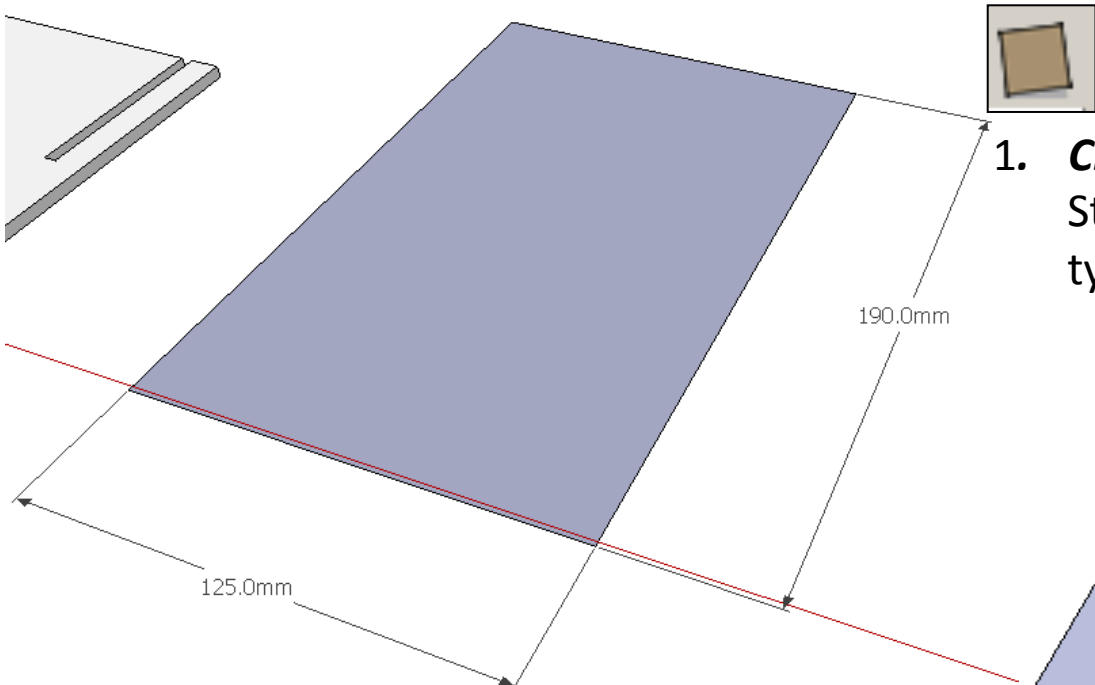
100. Move the piece to the right of the original.

***That is all the house pieces drawn out. Just the roof left to complete.***



# CAD Tutorial 19: Birdhouse

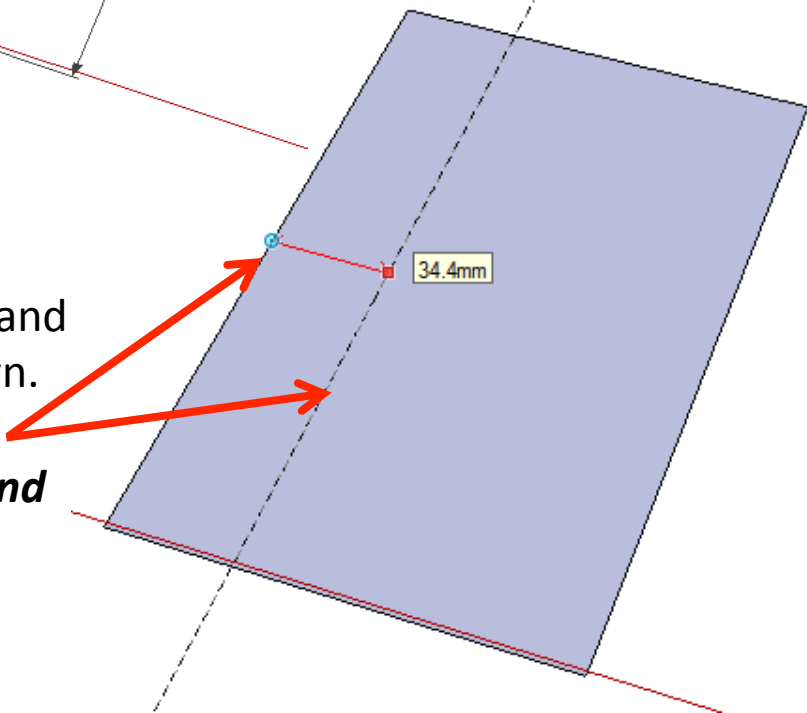
## Roof Construction

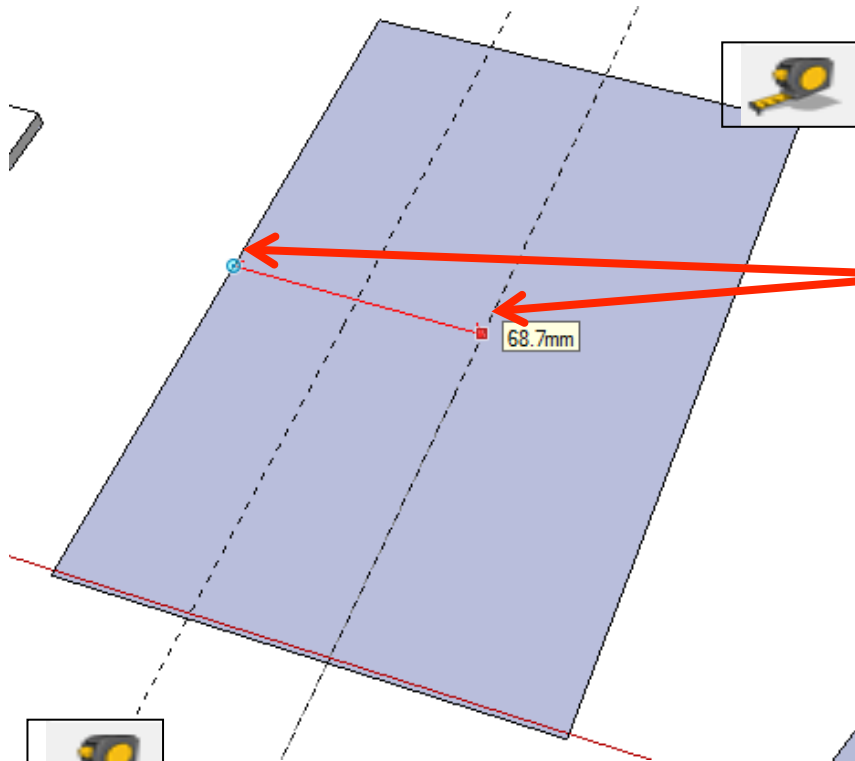


1. **Click** on the **rectangle tool** . Start drawing a square and type **150, 120**.



2. Select the **Tape measure tool** and snap to the **side edge** as shown. **Click once** and it will draw a dotted guide line. **Click a second time** to set the guide line and **type 34.4 and enter**

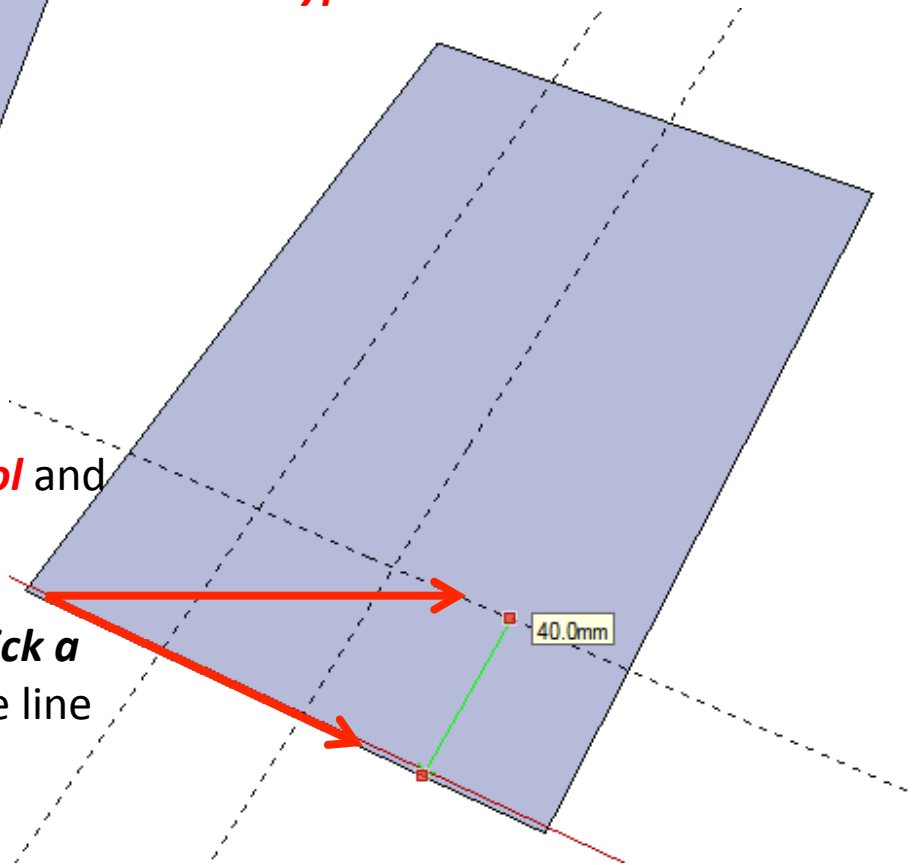


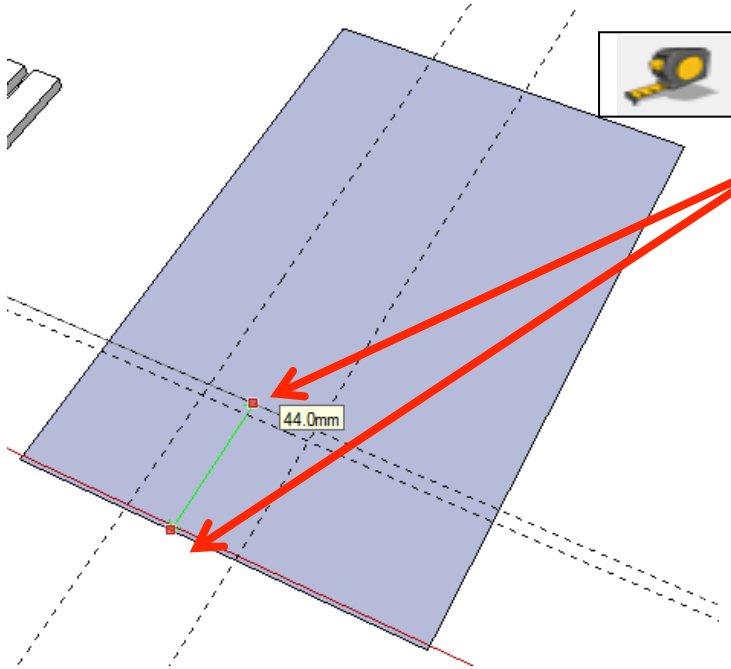


3. Select the **Tape measure tool** and snap to the **side edge** as shown. **Click once** and it will draw a dotted guide line. **Click a second time** to set the guide line and **type 68.7 and enter**



4. Select the **Tape measure tool** and snap to the **bottom edge** as shown. **Click once** and it will draw a dotted guide line. **Click a second time** to set the guide line and **type 40 and enter**

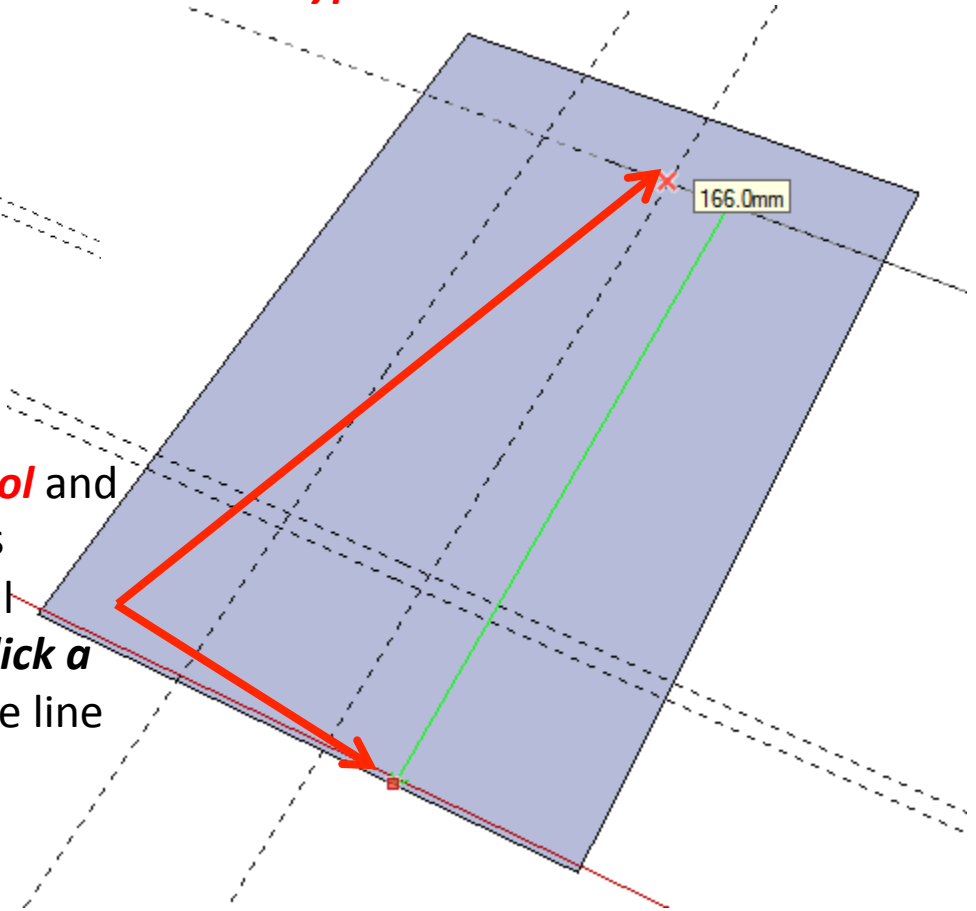


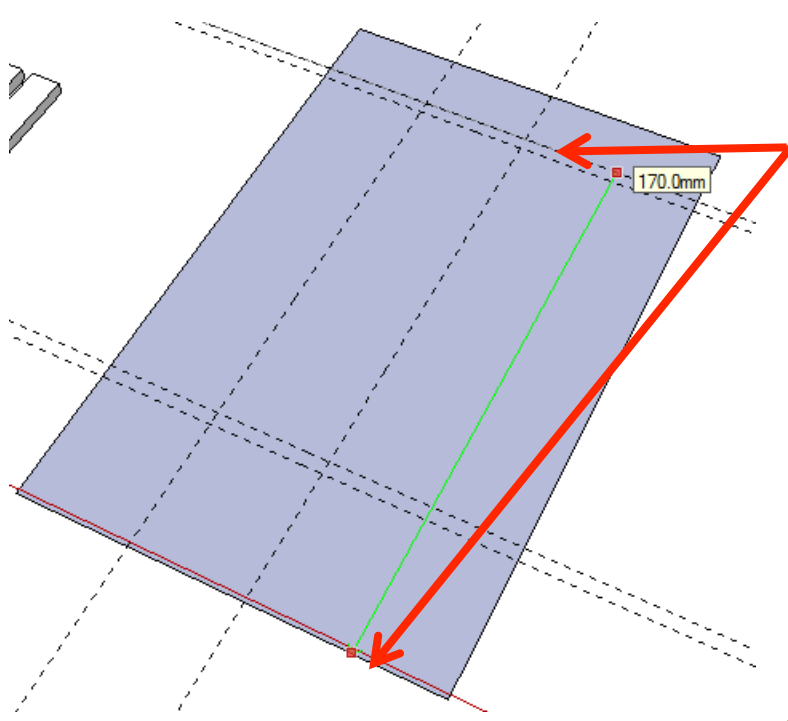


5. Select the **Tape measure tool** and snap to the **bottom edge** as shown. **Click once** and it will draw a dotted guide line. **Click a second time** to set the guide line and **type 44 and enter**

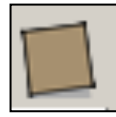


6. Select the **Tape measure tool** and snap to the **bottom edge** as shown. **Click once** and it will draw a dotted guide line. **Click a second time** to set the guide line and **type 166 and enter**

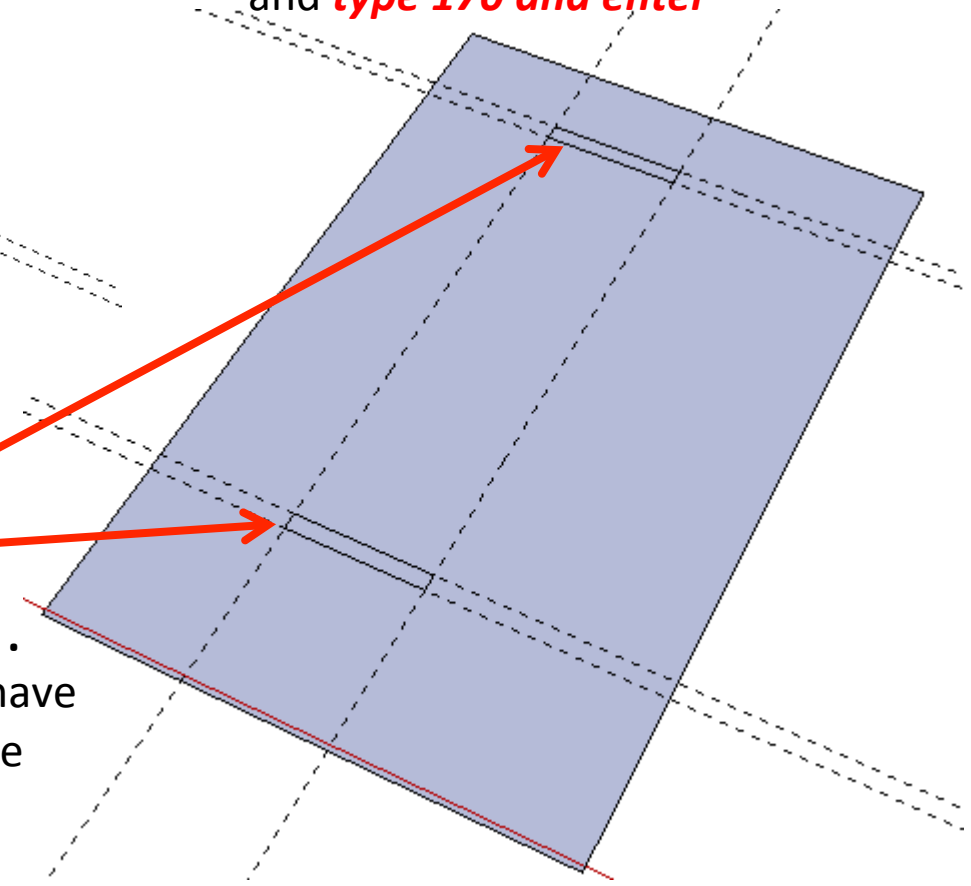




7. Select the **Tape measure tool** and snap to the **bottom edge** as shown. **Click once** and it will draw a dotted guide line. **Click a second time** to set the guide line and **type 170 and enter**

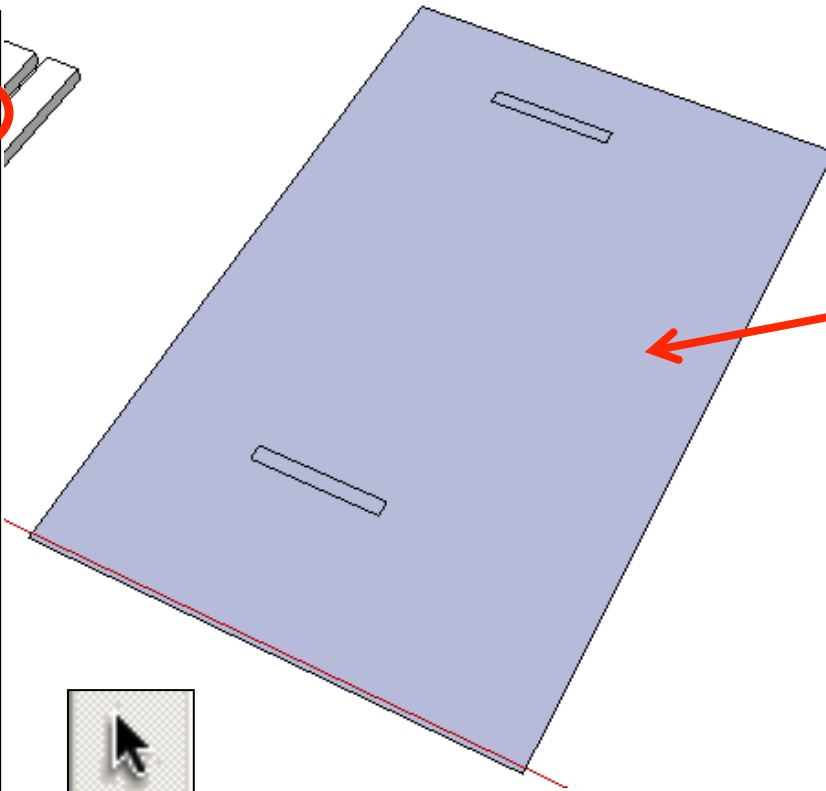


8. **Click** on the **rectangle tool**. Using the guide lines you have drawn previously. Draw the rectangles shown.

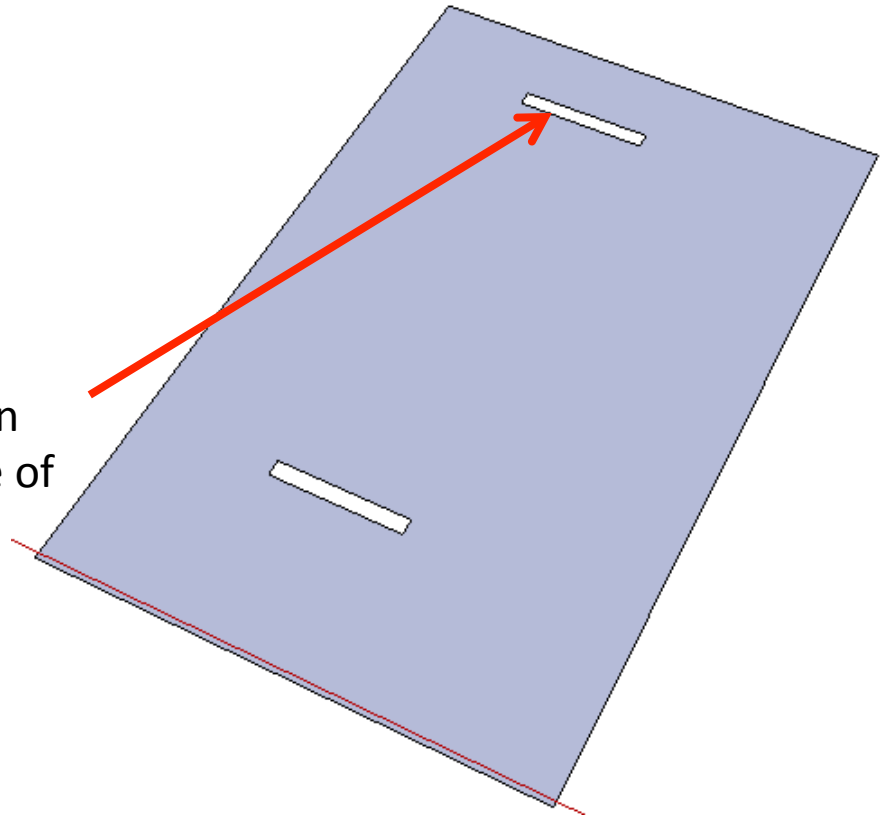


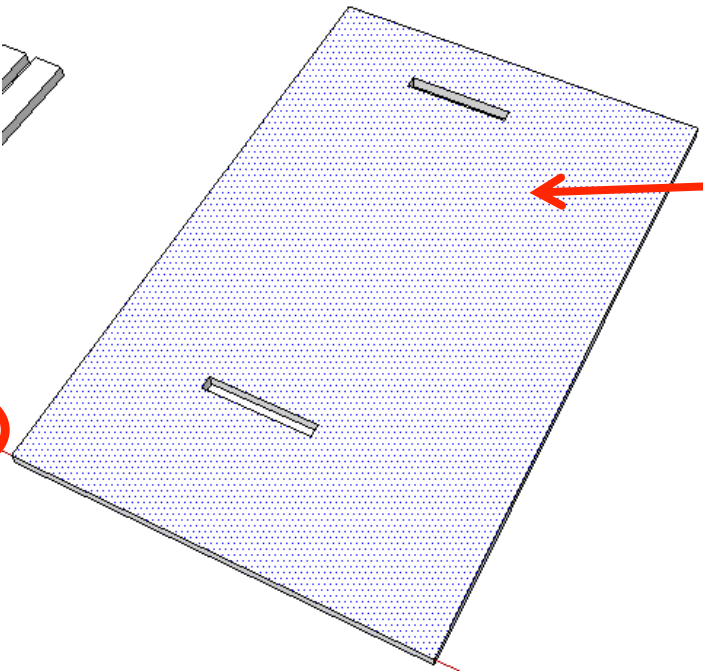


9. Use the **rubber tool** to erase the guidelines.



10. Use the **select tool** and click on the shape to select the middle of the rectangles. They will go dotted. **Press delete on the keyboard** to erase them as shown.

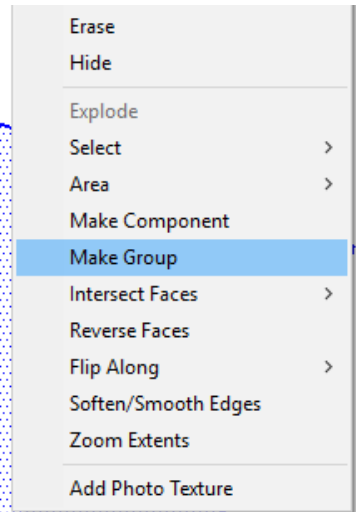
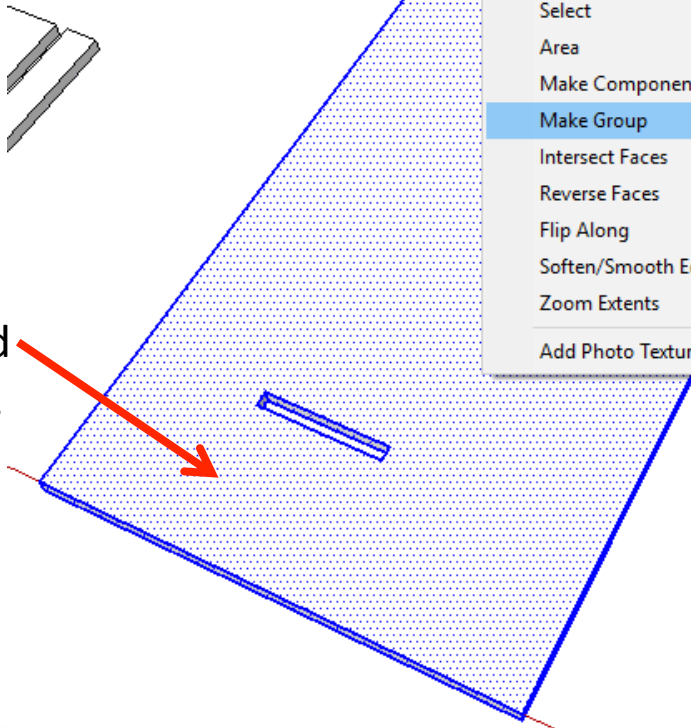




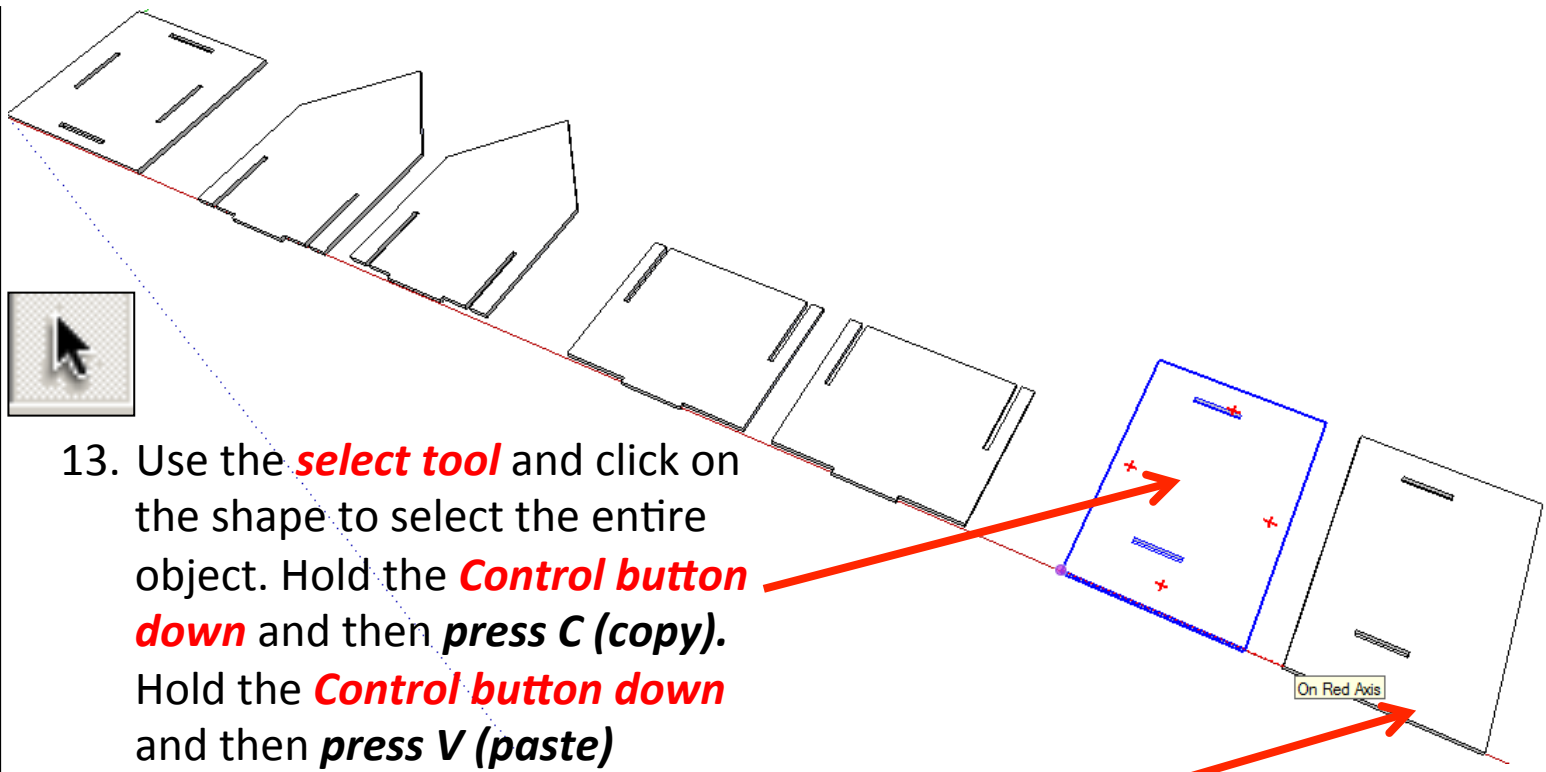
11. Using the **push pull tool**. Hover over the shape you have just drawn. They will go **dotted** as you hover over them in turn. Pull the shape up. Type in **4** and **press enter**.



12. Use the **select tool** and keep clicking on the roof until it is all selected and highlighted in blue. **Right click** on the mouse to produce the menu shown above and **click** on **make group**.





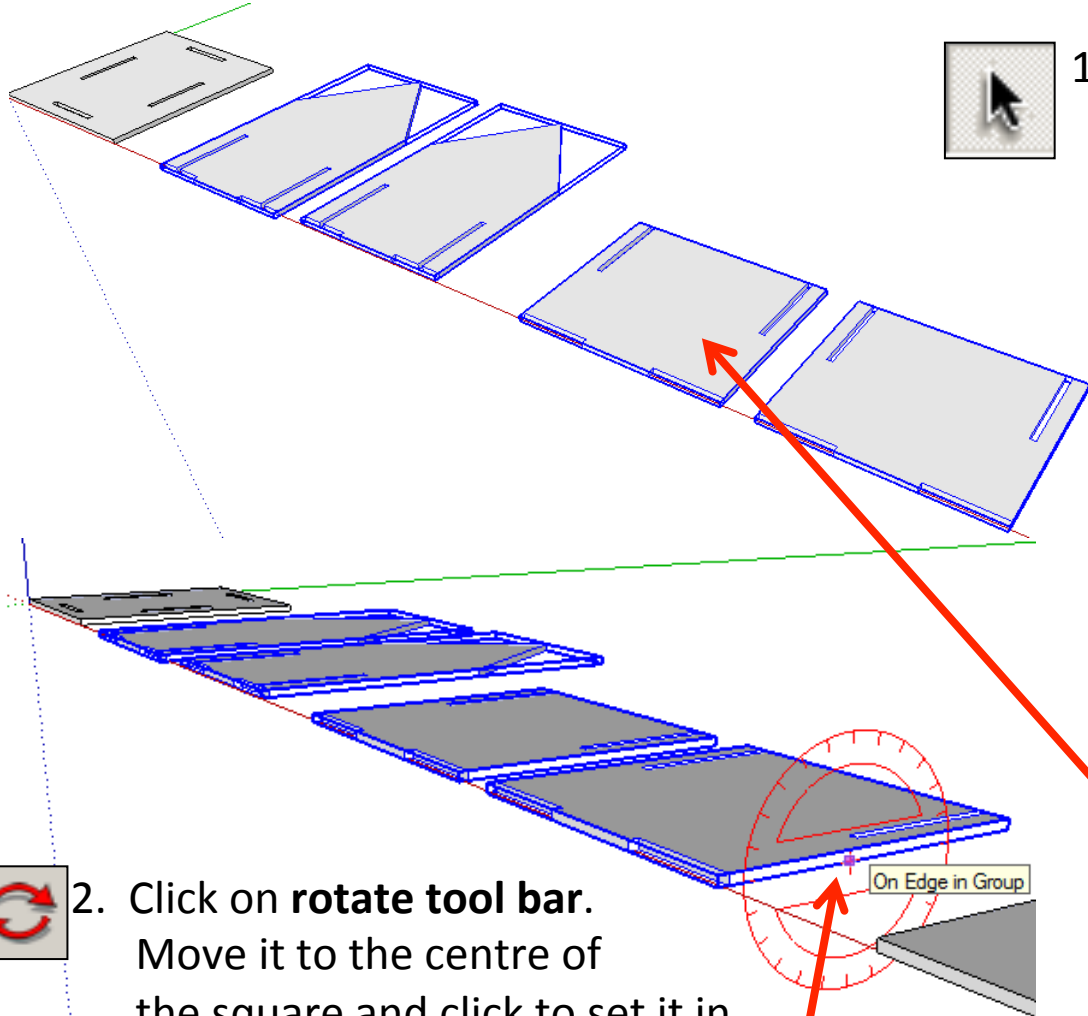


13. Use the ***select tool*** and click on the shape to select the entire object. Hold the ***Control button down*** and then ***press C (copy)***. Hold the ***Control button down*** and then ***press V (paste)***

14. Move the piece to the right of the original.



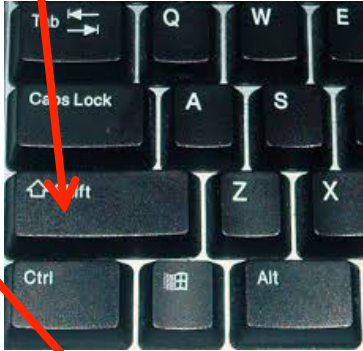
# CAD Tutorial 19: Birdhouse Final Assembly



1. Using the **select tool**, click on one of the side pieces

Hold the shift key down

*(arrow pointing up found under caps lock)*



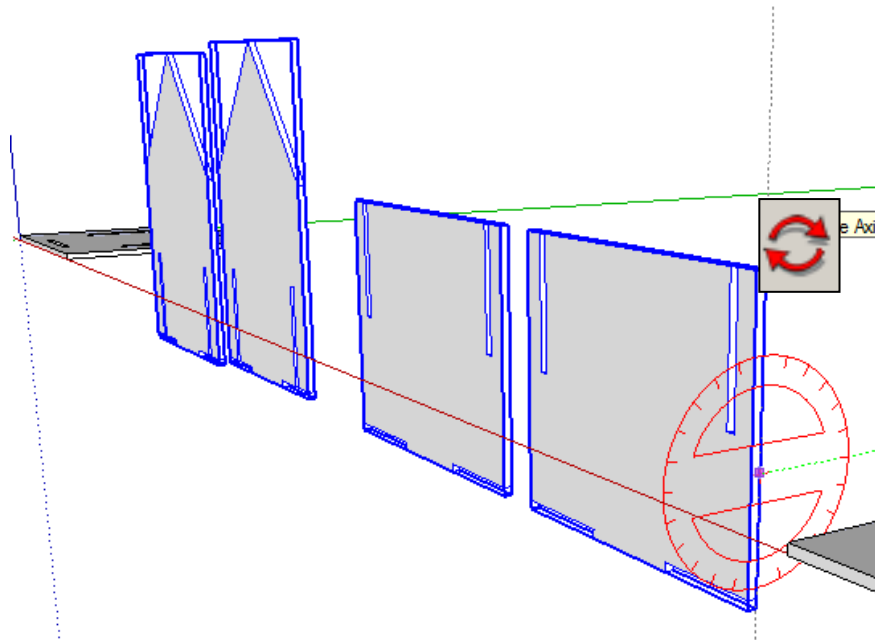
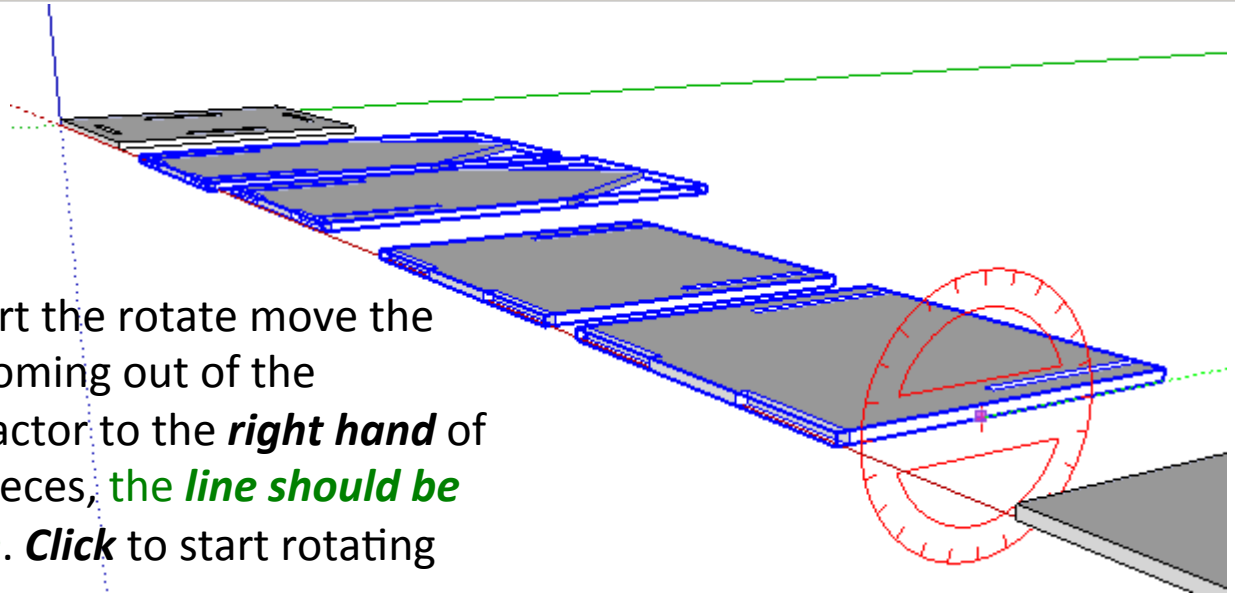
Click on the other three pieces so they are highlighted as shown.



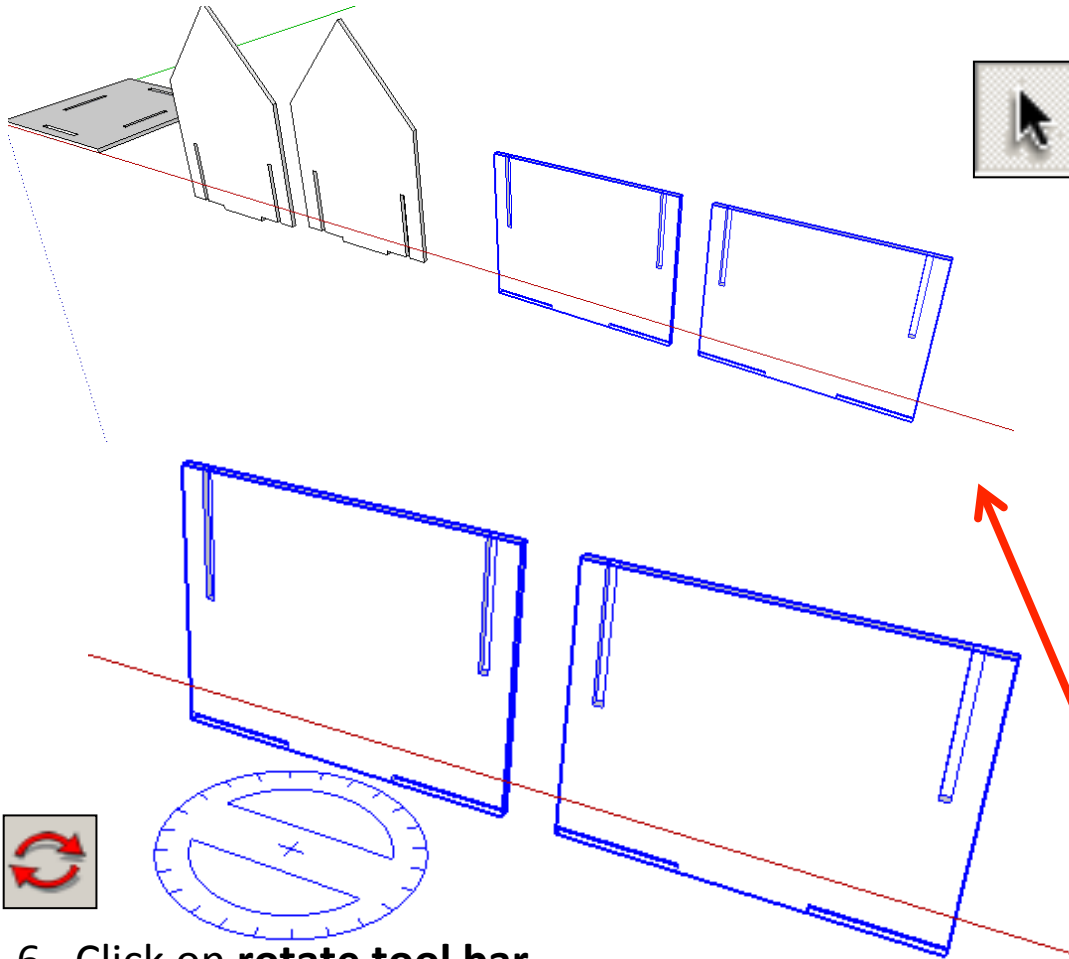
2. Click on **rotate tool bar**. Move it to the centre of the square and click to set it in place on the edge or endpoint of one of the pieces. The rotate protractor must be **RED when you click it into place.**



3. To start the rotate move the line coming out of the protractor to the **right hand** of the pieces, **the line should be green**. **Click** to start rotating



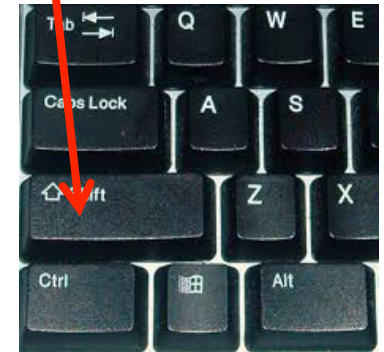
4. Rotate the square until the number in the bottom right hand-side says **'90'** or type **'90'** and **enter**. **Alternatively rotate until the line goes blue.**



5. Using the ***select tool***, click on one of the side pieces

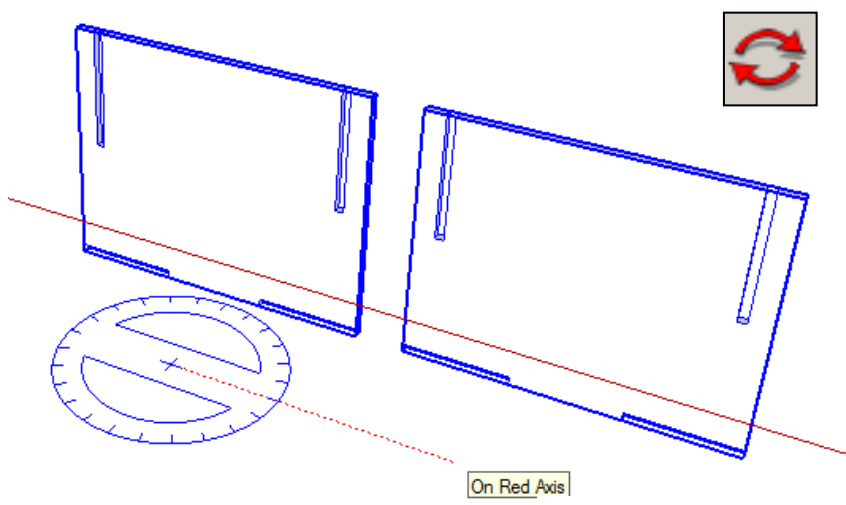
Hold the shift key down

*(arrow pointing up found under caps lock)*



6. Click on **rotate tool bar**. Move it to the front of the pieces and click to set it in place as shown. The rotate protractor must be **Blue when you click it into place.**

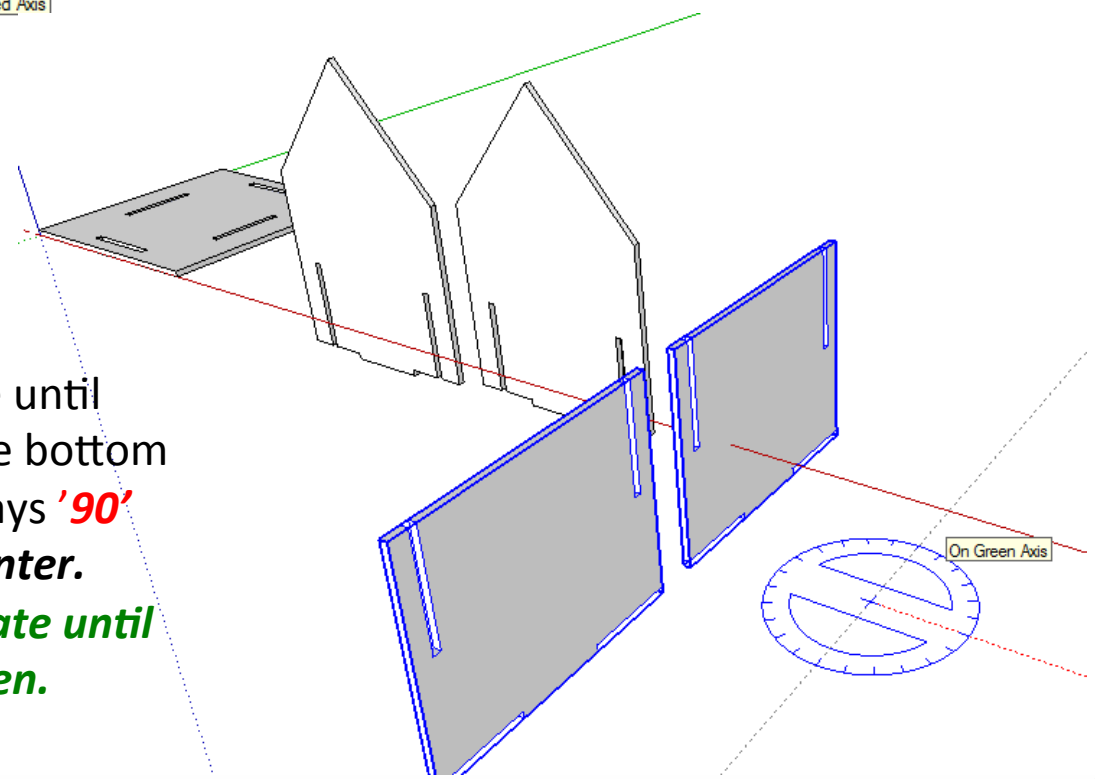
Click on the other piece so they are highlighted as shown.

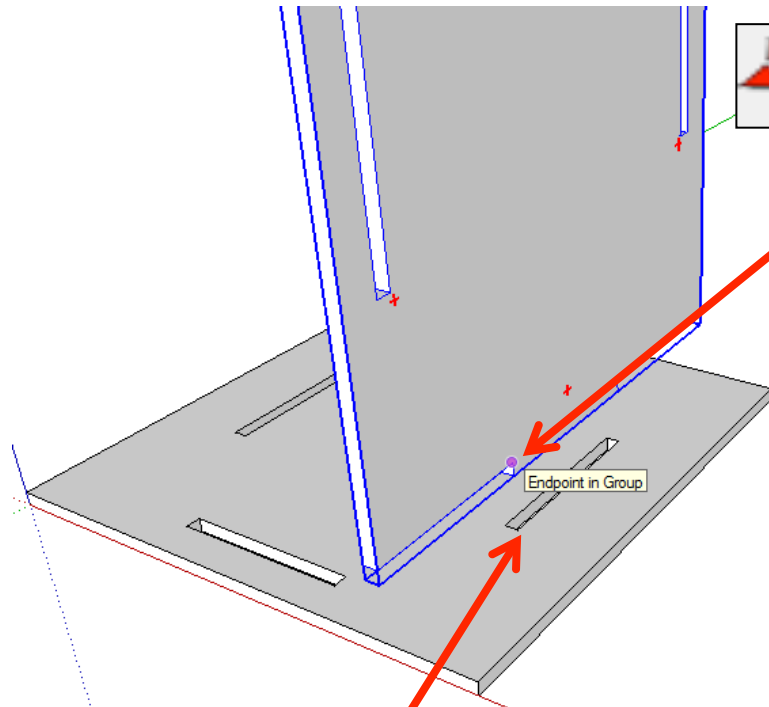


7. To start the rotate move the line coming out of the protractor to the **right hand** of the pieces, **the line should be red**. **Click** to start rotating



8. Rotate the square until the number in the bottom right hand-side says **'90'** or type **'90'** and **enter**. **Alternatively rotate until the line goes green.**

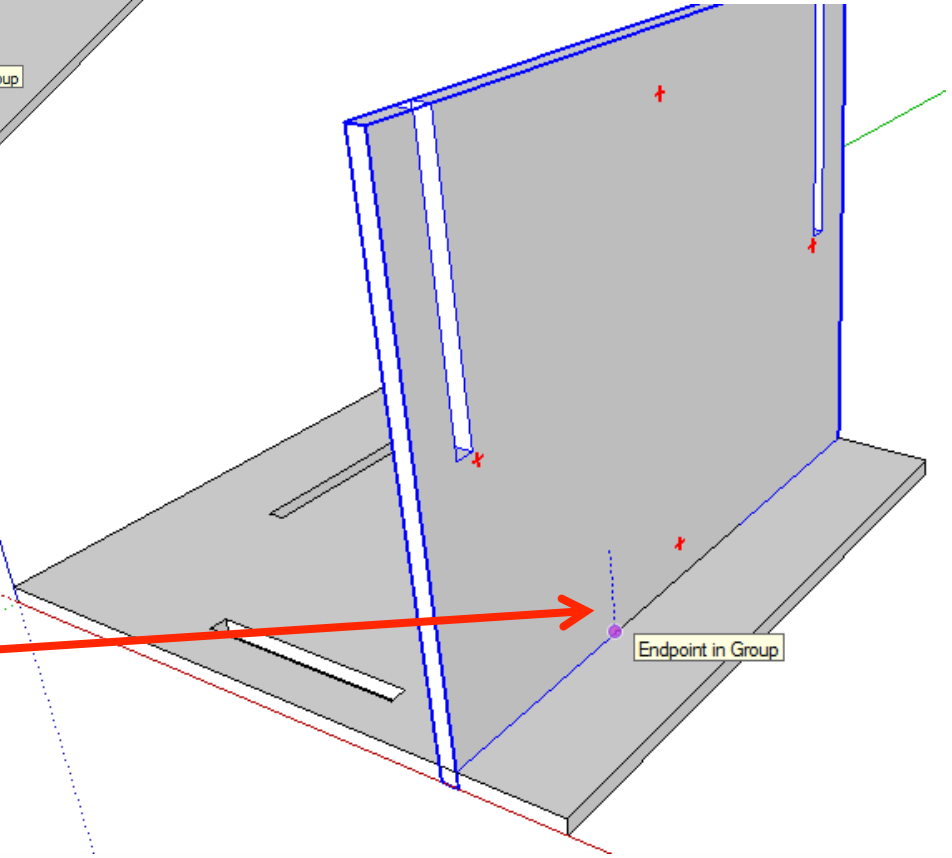


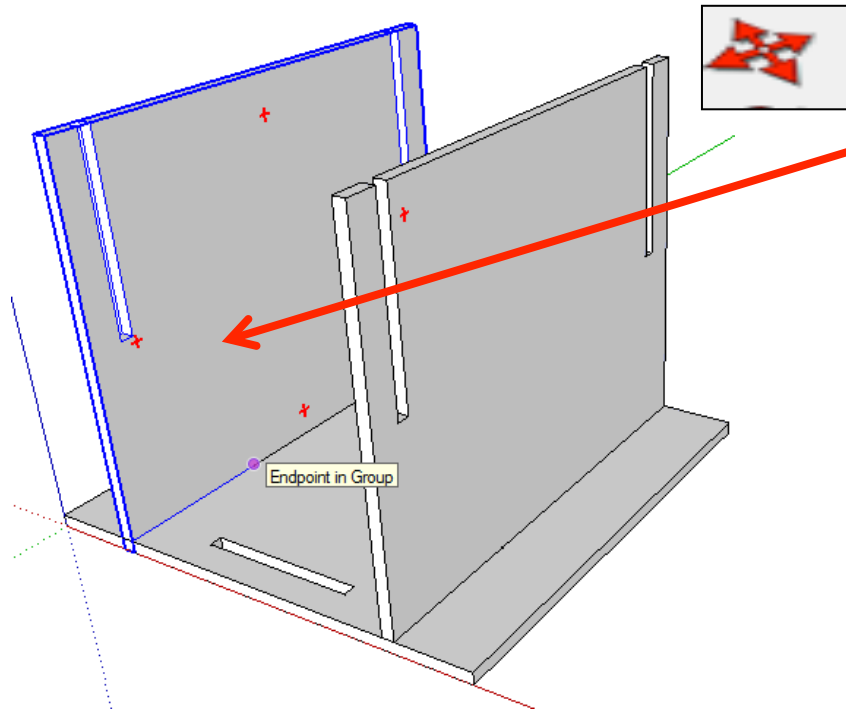


9. Using the **move tool**, click on the **end point** on one of the pieces shown. Move it over the base piece



10. Using the **move tool**, snap it into place with the endpoint of the rectangle below.

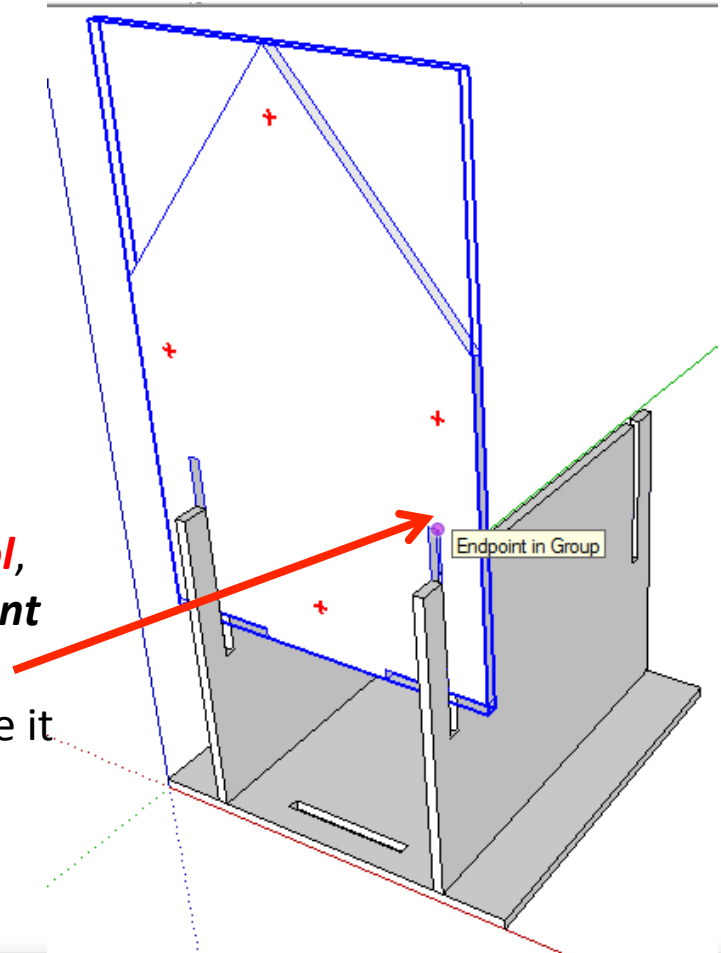




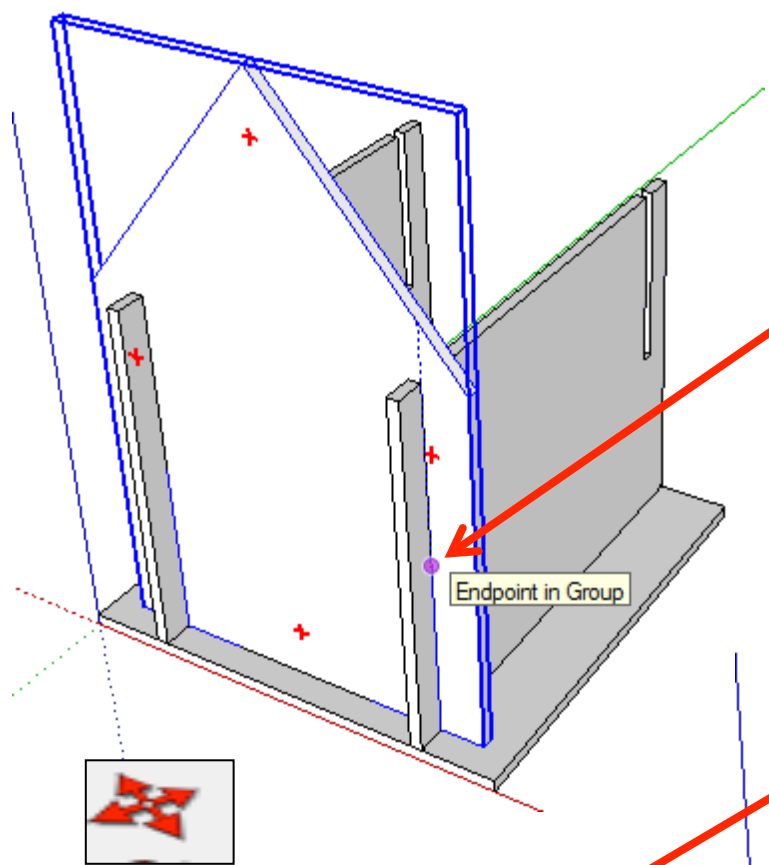
11. Using the **move tool**, repeat steps 9 and 10 on the opposite side as shown.



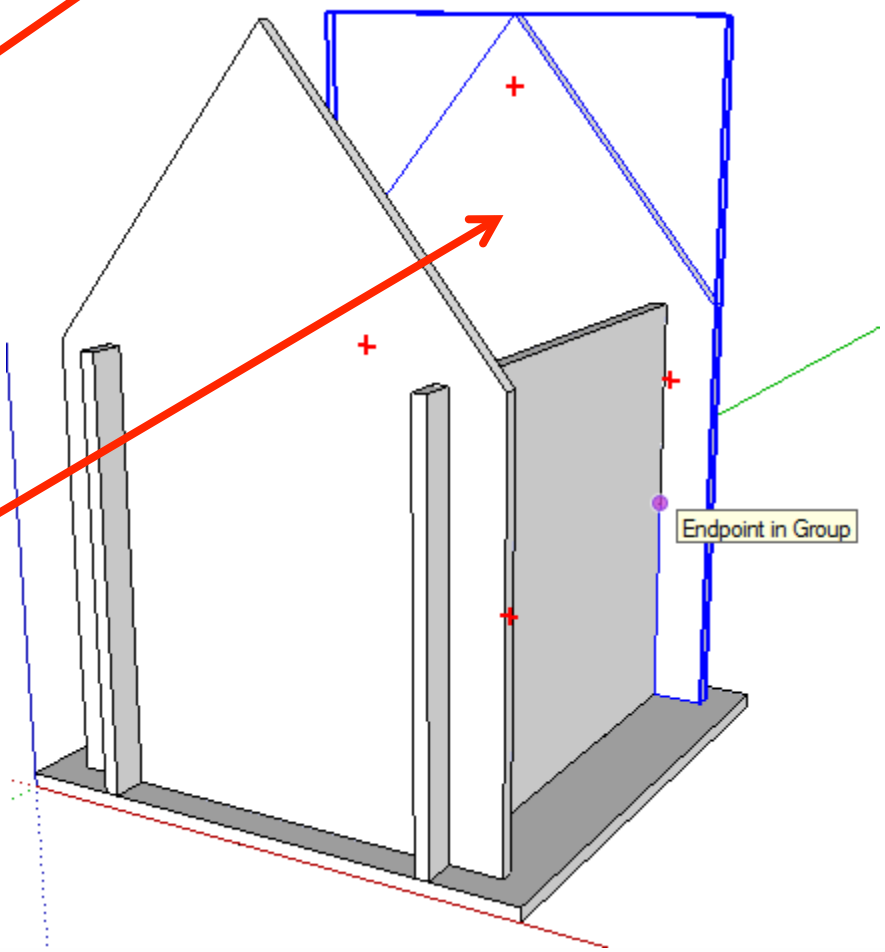
12. Using the **move tool**, click on the **end point on one of the front pieces** shown. Move it over the base piece and the slots of the side piece.



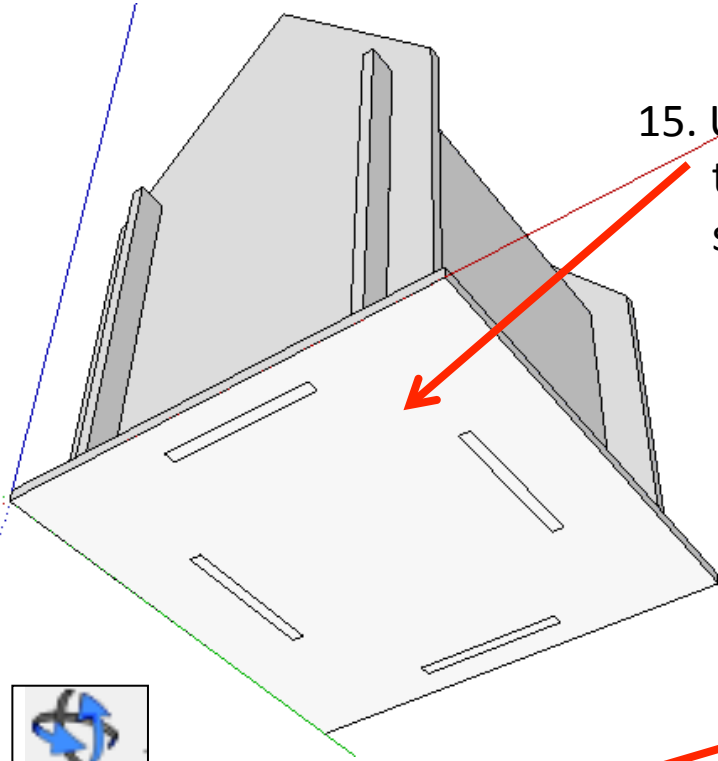




13. Using the **move tool**, snap it into place with the endpoint of the rectangle below.



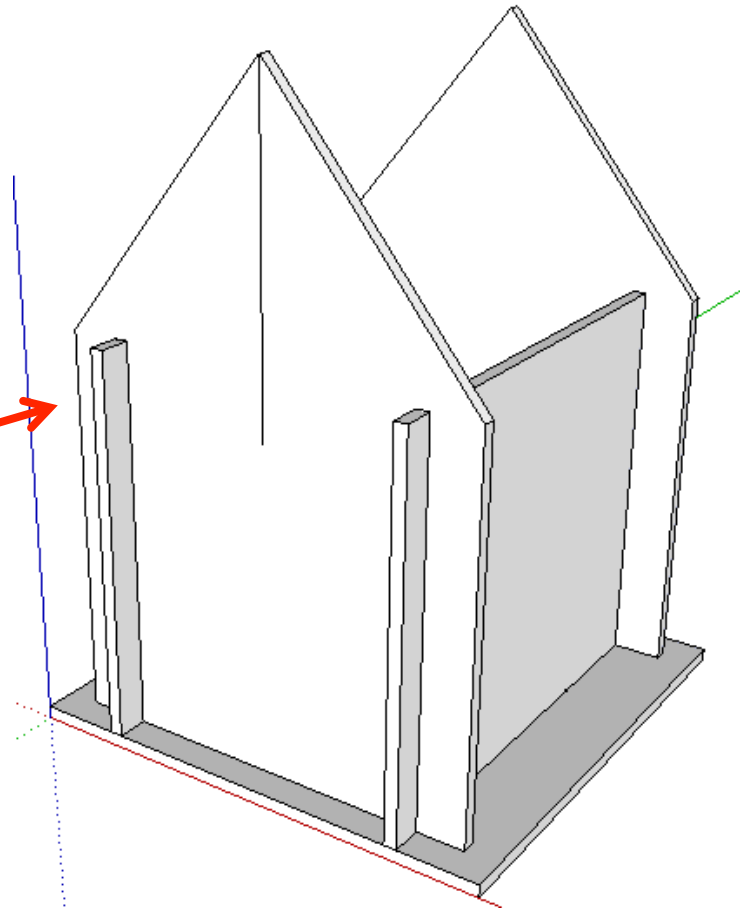
14. Using the **move tool**, repeat steps 12 and 13 on the opposite side as shown.



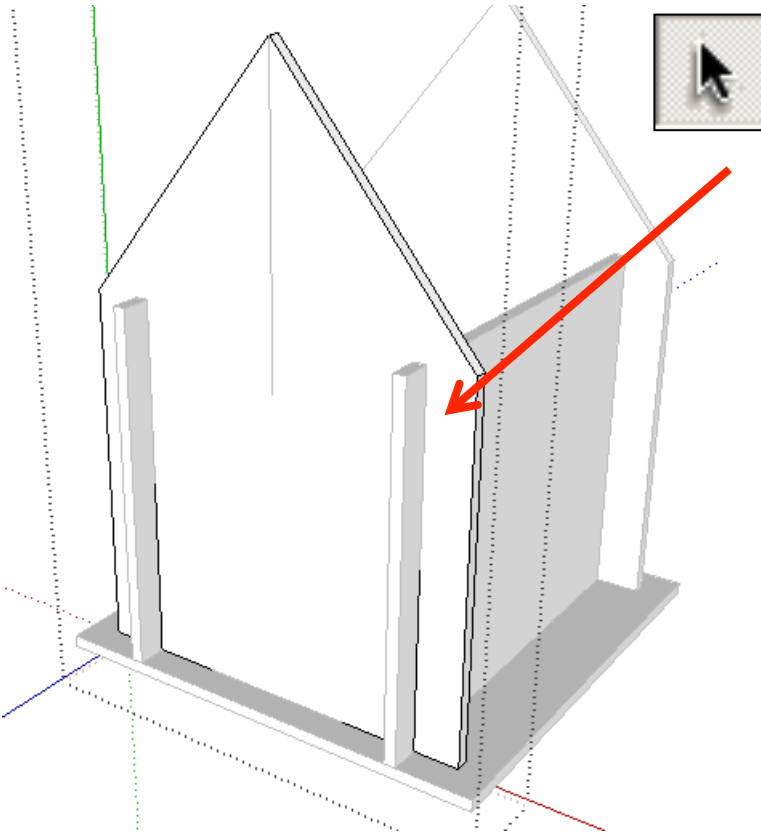
15. Use the **orbit tool** and move around to the underneath so you can check all four slot joints line up with the holes shown.



16. Use the **orbit tool** and move around to the front.



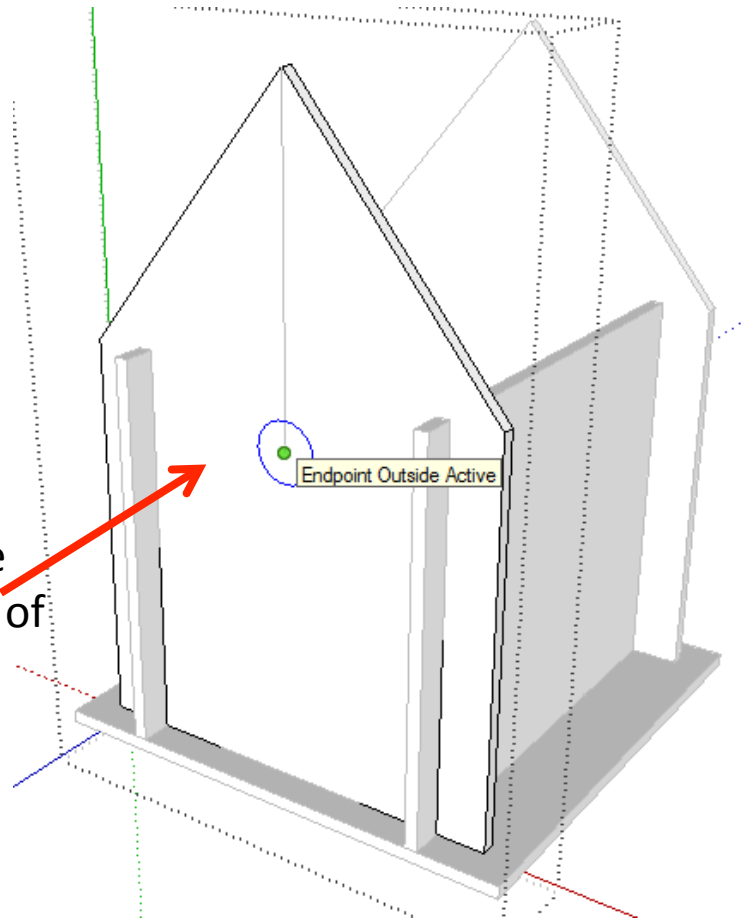
17. Use the **pencil tool**. Snap to the top point and draw a line down on the blue axis. Type in 100 and press enter.

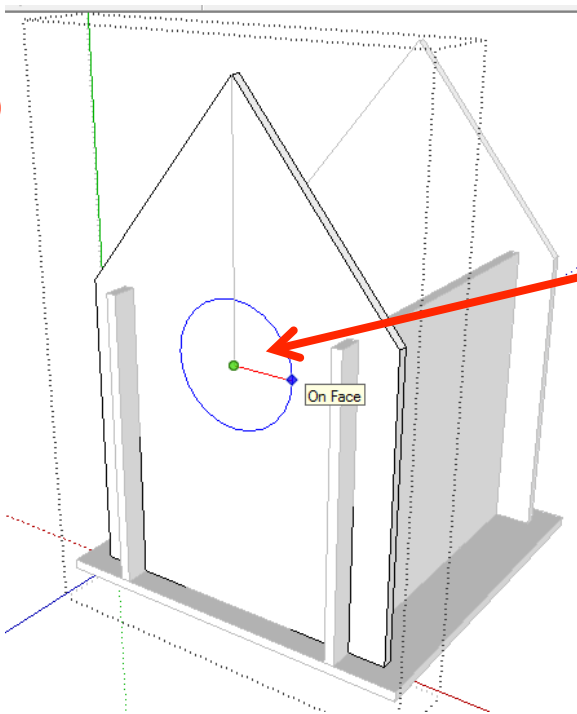


18. Using the ***select tool***, **double click** on a front piece shown. All the other pieces should be greyed out.



19. Using the ***rotate tool***, snap the centre of the circle on the end of the line you have just drawn

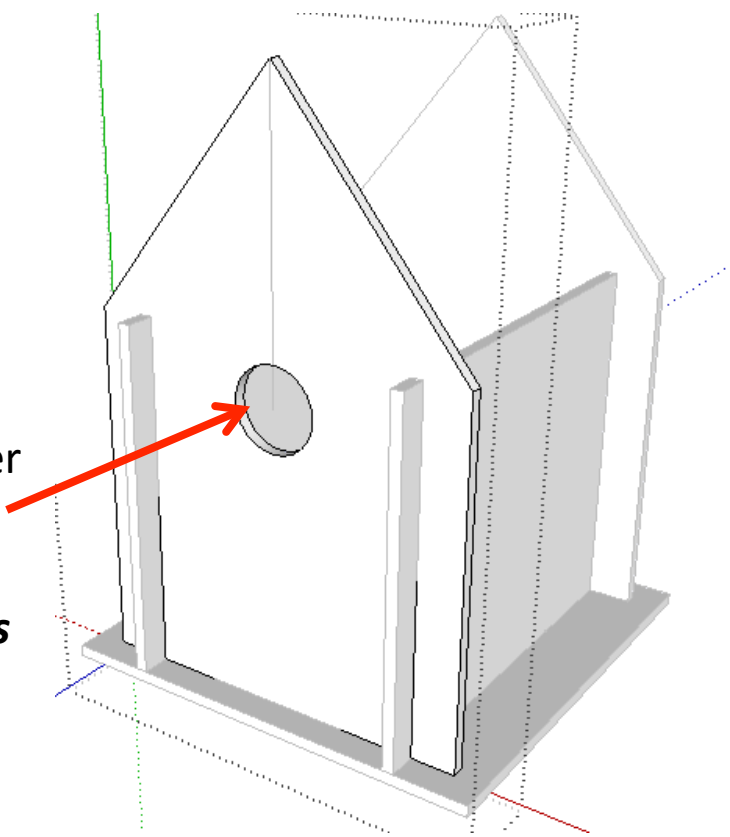


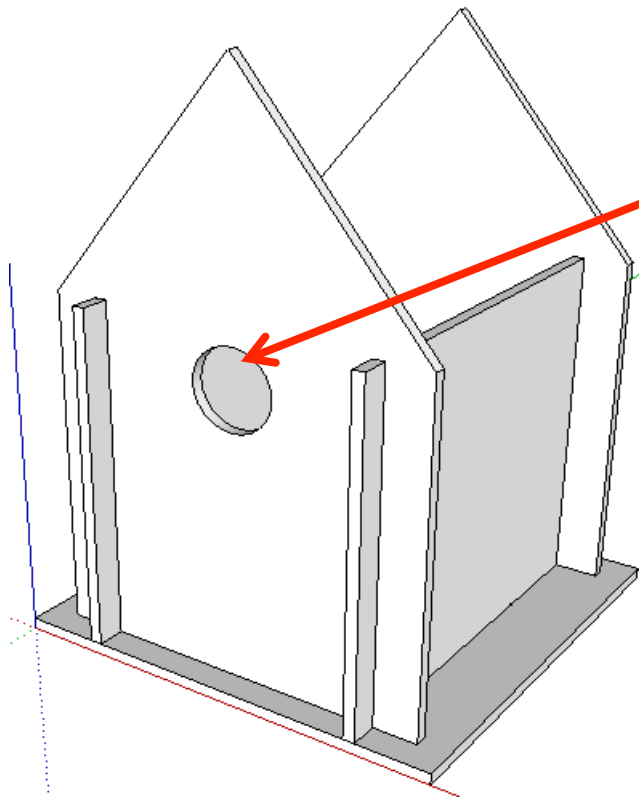


20. Using the **rotate tool**, pull the circle outwards. Type in **14 and press enter**.

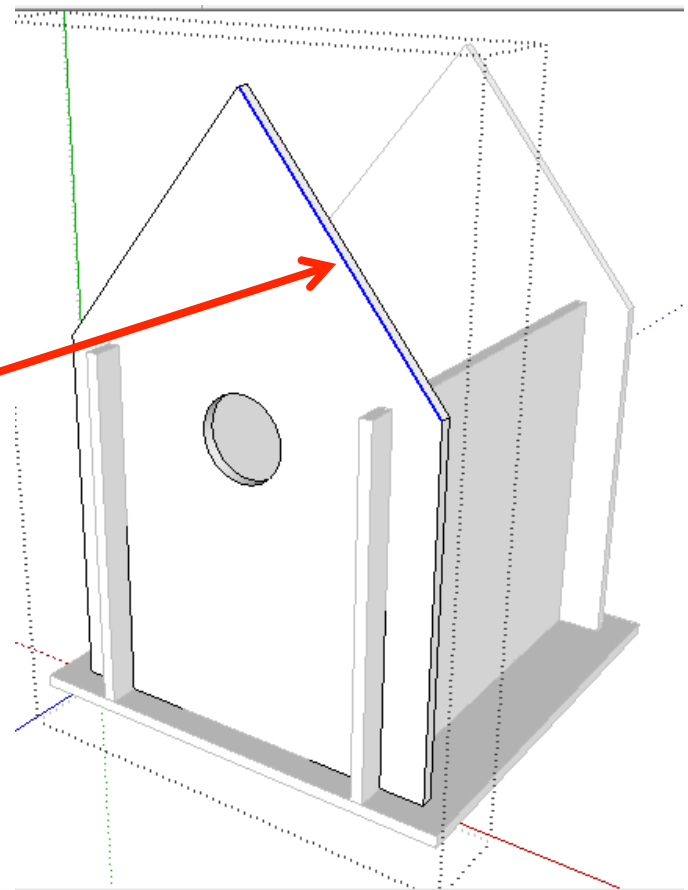


21. Using the **push pull tool**. Hover over the circle you have just drawn. It will go **dotted** as you hover it. Push the shape back. Type in **4 and press enter**.

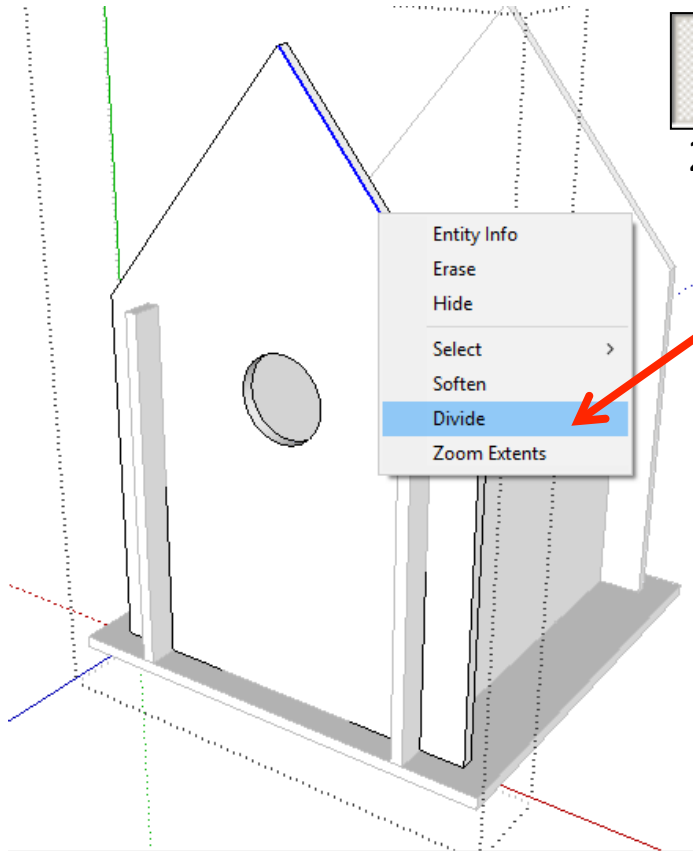




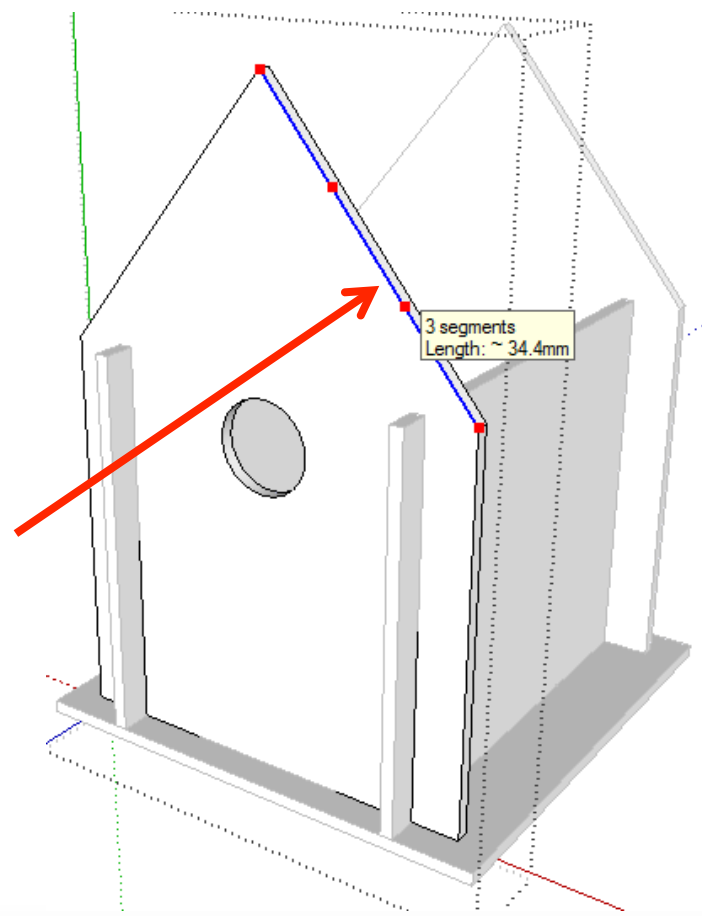
22. You should now have a bird house with a base, front with a correctly sized entrance, a back piece and two sides all slotted together. **Now time for the roof.**



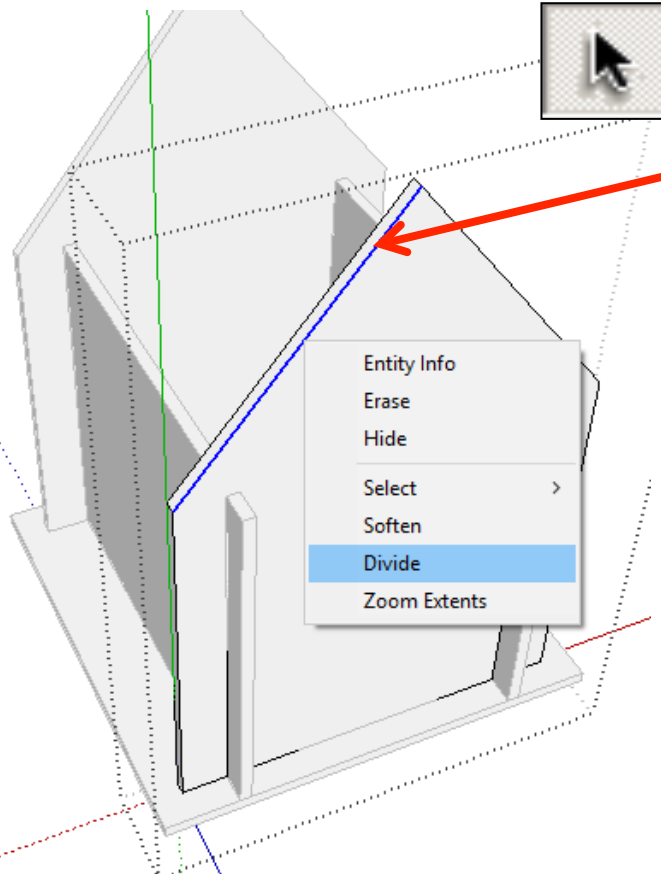
23. Using the ***select tool***, **double click** on a front piece shown. All the other pieces should be greyed out. Then click on the edge shown to highlight it in **blue**.



24. Whilst on the selected **blue** line, **right click** with the mouse and select **divide**.

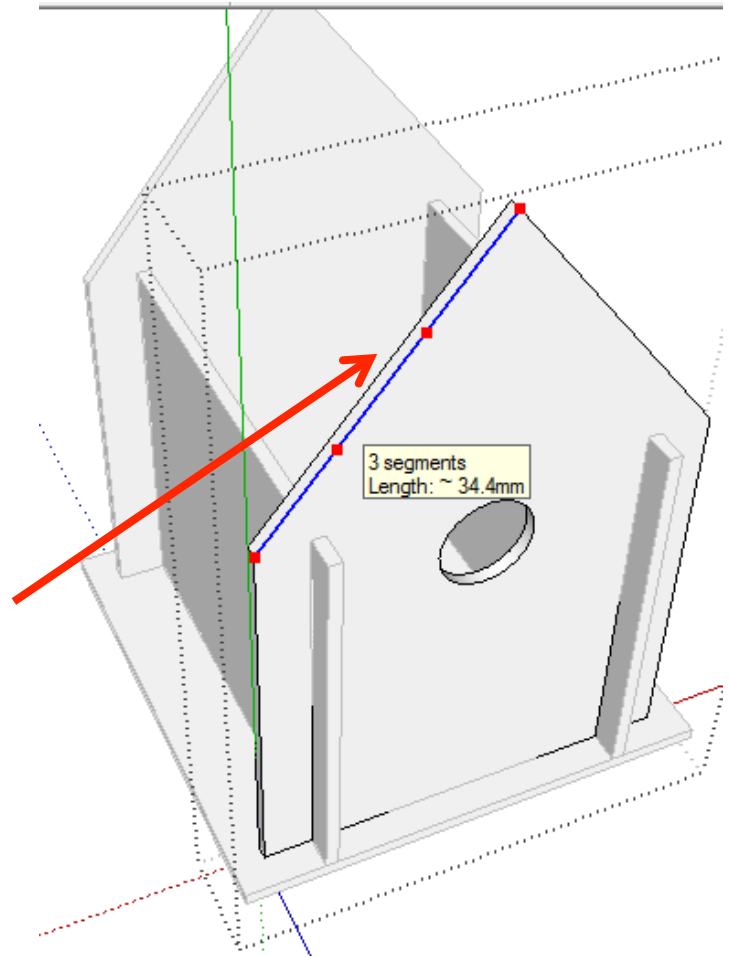


25. Using the **mouse**, you can move it up and down the **blue** line to divide it into 3 segments or you can type **3** and press **enter**.

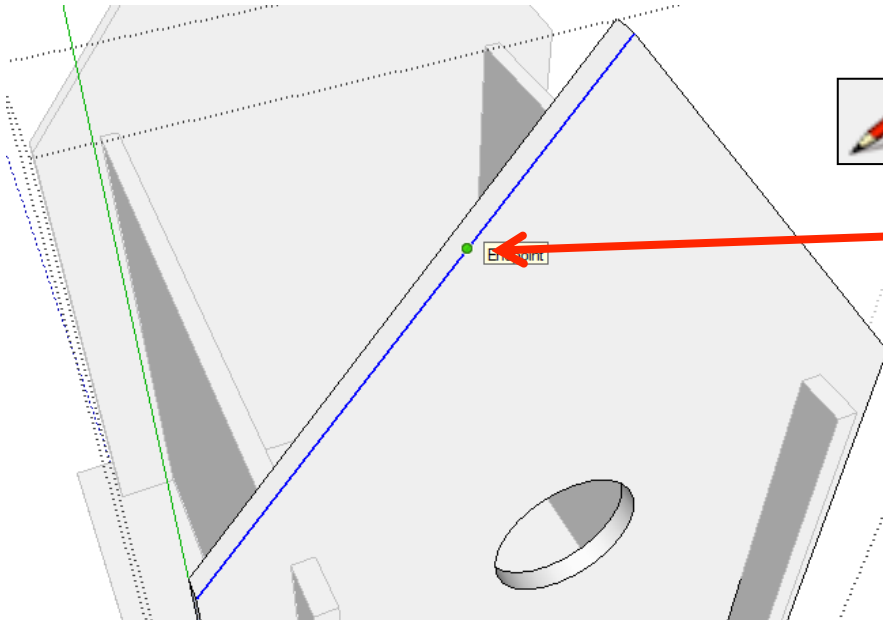


26. Using the ***select tool***, click on the opposite edge shown to highlight it in **blue**. Whilst on the selected **blue** line, ***right click*** with the mouse and select ***divide***.

27. Using the ***mouse***, you can move it up and down the **blue** line to divide it into 3 segments or you can type **3** and ***press enter***.

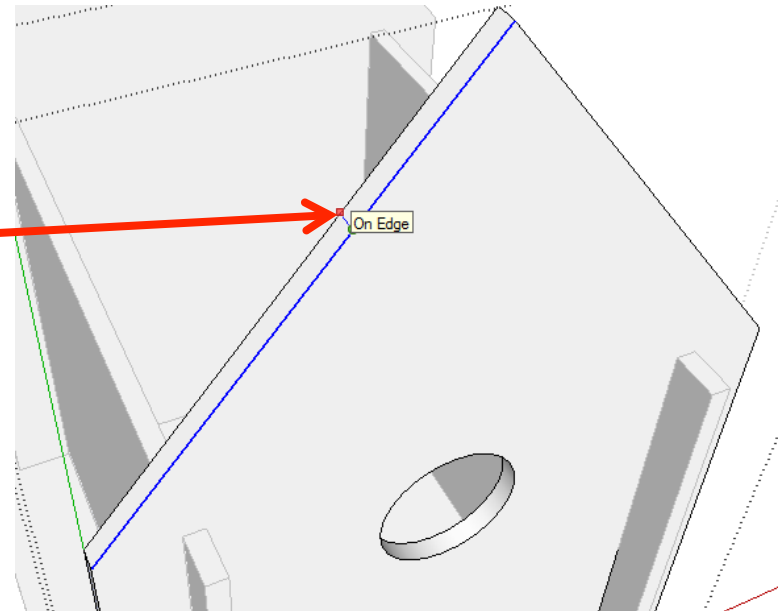


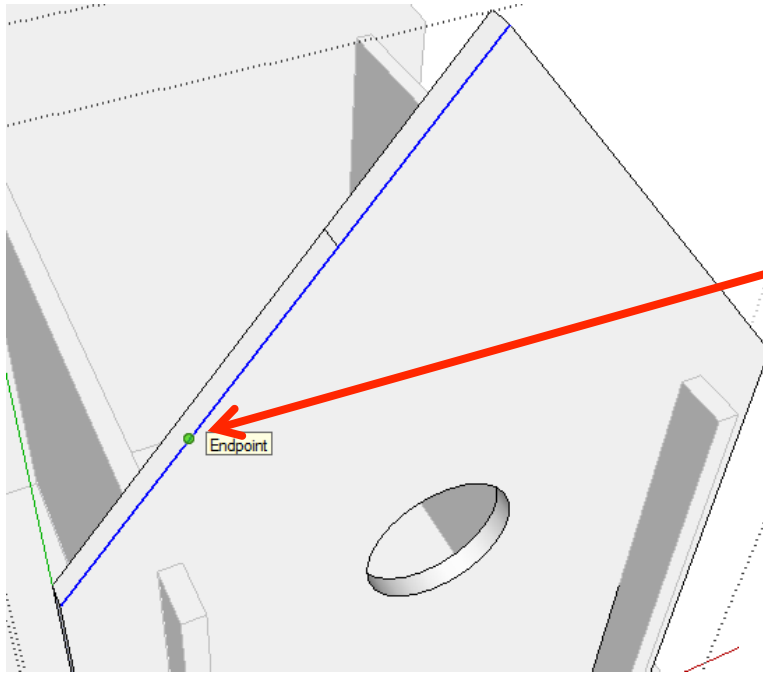




28. Using the **pencil tool**, move your pencil along the blue line until it snaps to an **endpoint**.

29. Using the **pencil tool**, draw you line across to the opposite edge as shown.

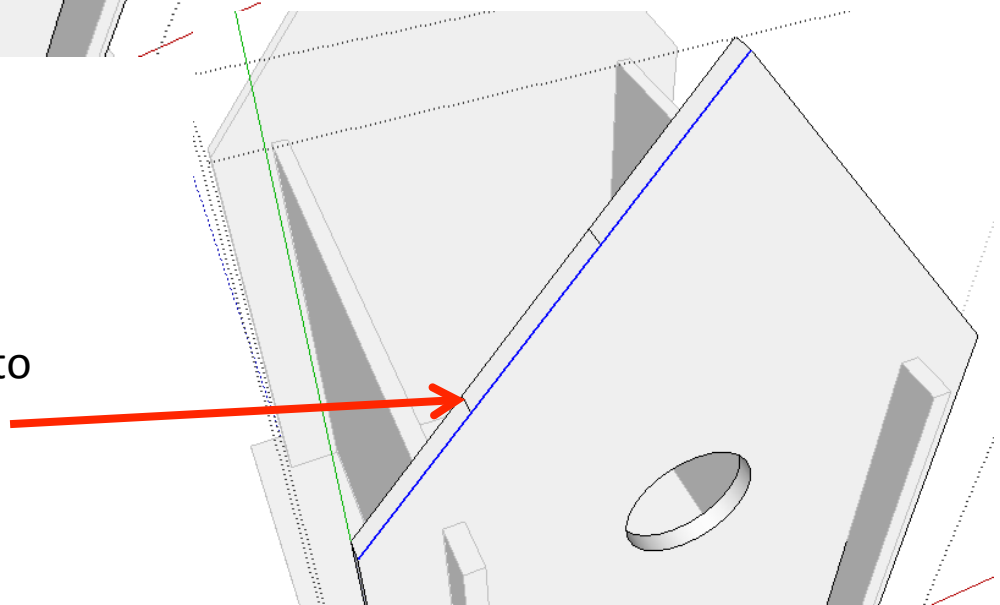


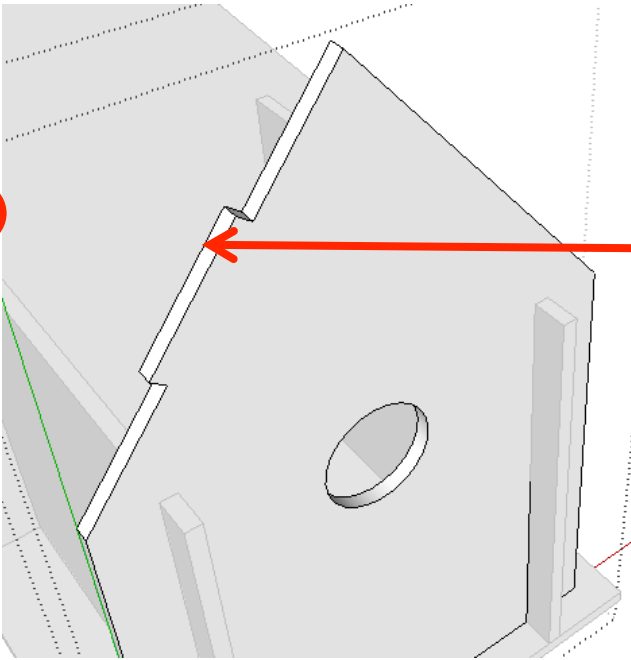


30. Using the **pencil tool**, move your pencil along the blue line until it snaps to the other **endpoint**.



31. Using the **pencil tool**, draw you line across to the opposite edge as shown.

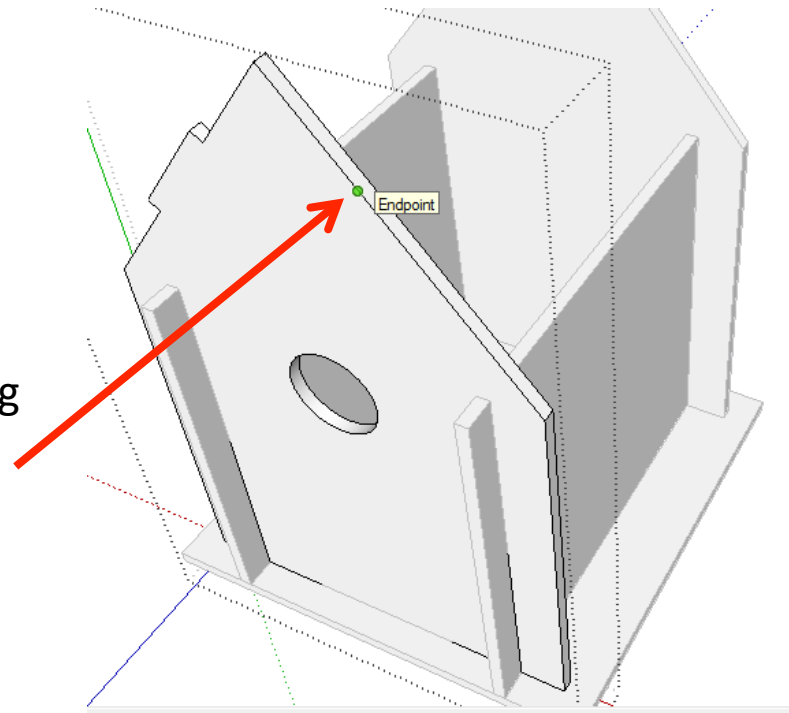


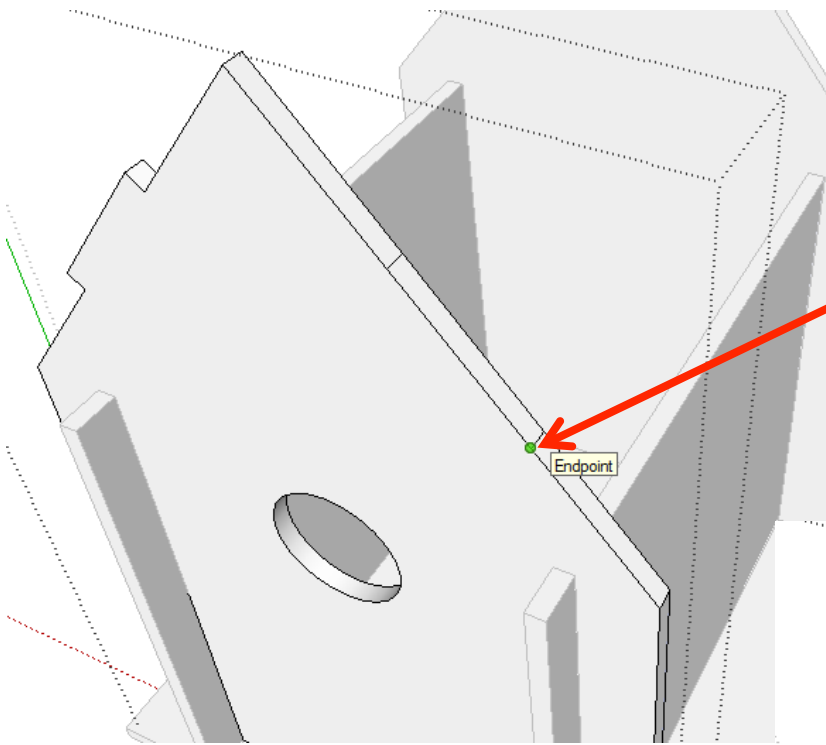


32. Using the **push pull tool**. Hover over the middle rectangle you have just drawn. It will go **dotted** as you hover it. Pull the shape up. Type in **4** and press **enter**.



33. Using the **pencil tool**, move your pencil along the blue line until it snaps to the other **endpoint**. Draw a line across to the opposite edge.

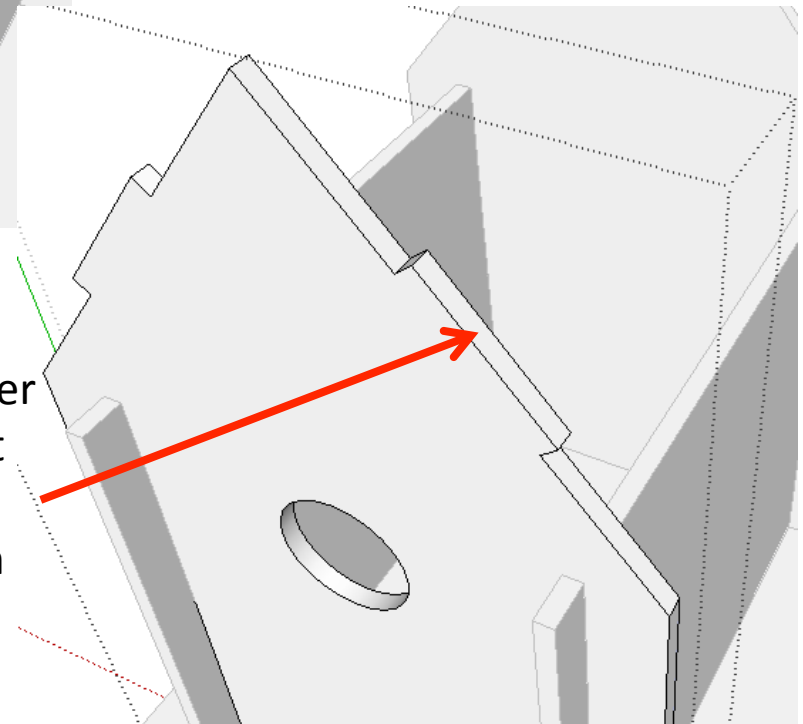


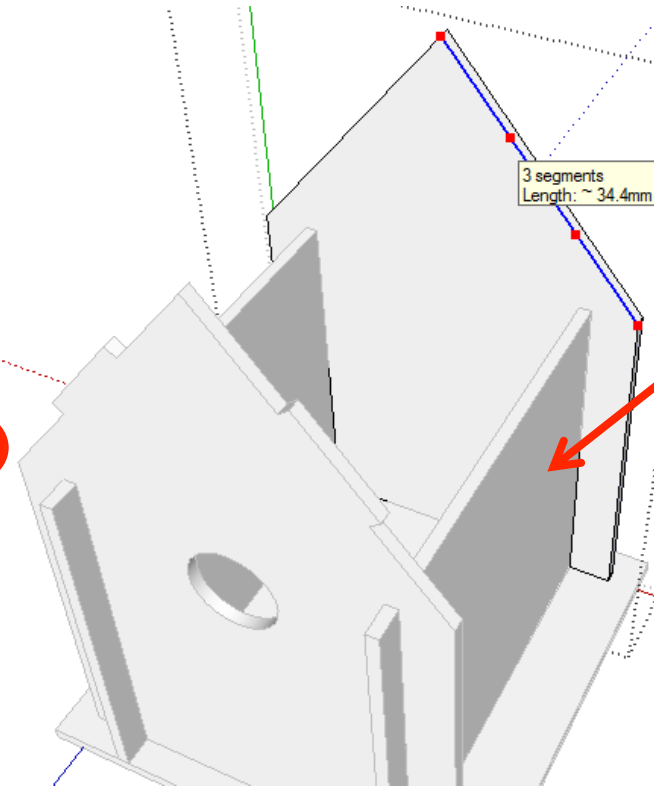


34. Using the **pencil tool**, move your pencil along the blue line until it snaps to the other **endpoint**. Draw a line across to the opposite edge.



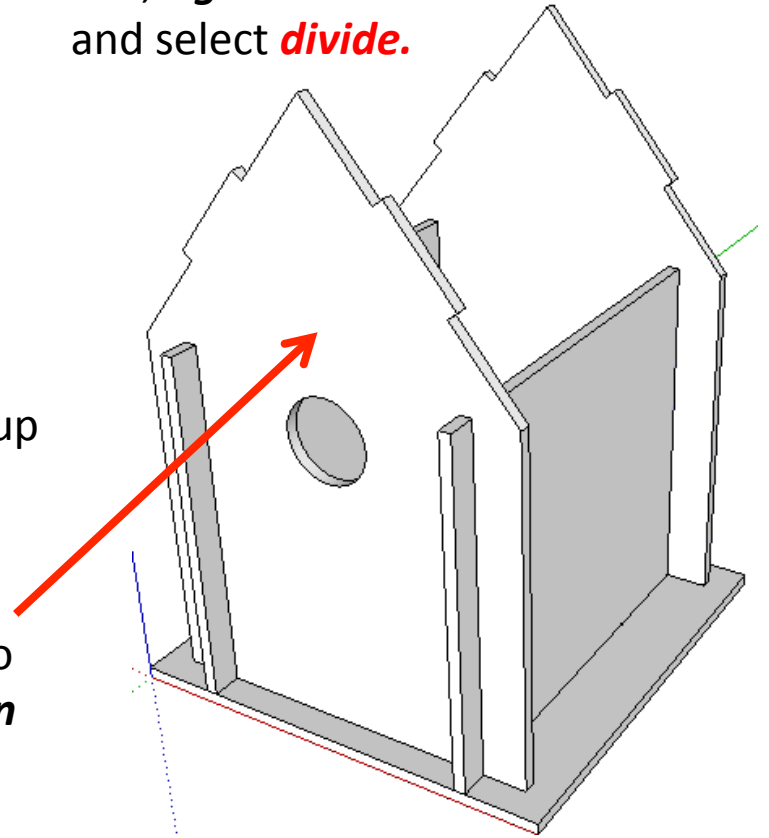
35. Using the **push pull tool**. Hover over the middle rectangle you have just drawn. It will go **dotted** as you hover it. Pull the shape up. Type in **4** and press enter.

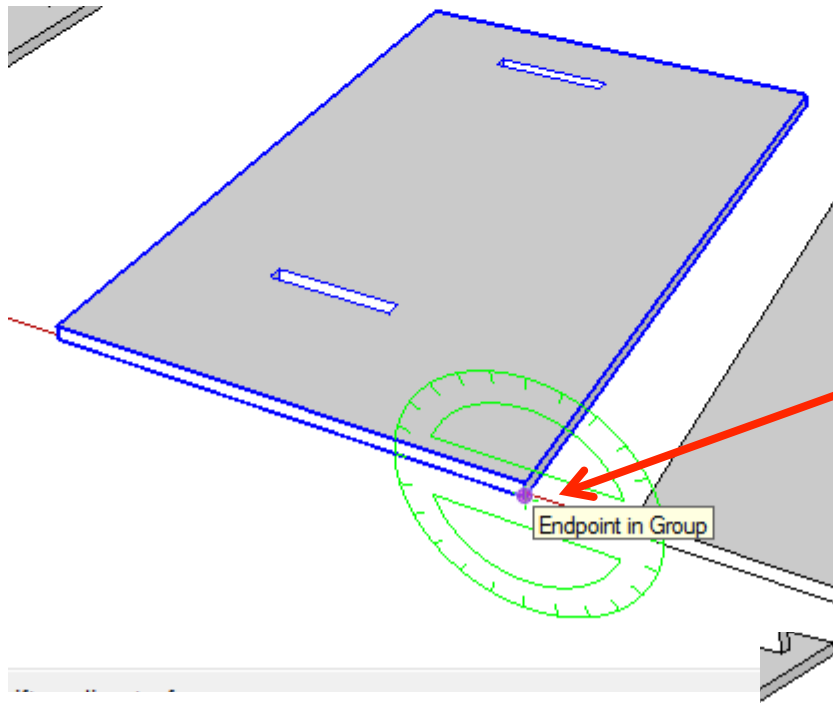




36. Using the **select tool**, **double click** on a back piece shown. All the other pieces should be greyed out. Then click on the edge shown to highlight it in **blue**. Whilst on the selected **blue** line, **right click** with the mouse and select **divide**.

37. Using the **mouse**, you can move it up and down the **blue** line to divide it into 3 segments or you can type **3** and **press enter**. Draw your lines across and use the push pull tool to add you raised slot joint. **Repeat on both sides so you birdhouse looks like the one shown**

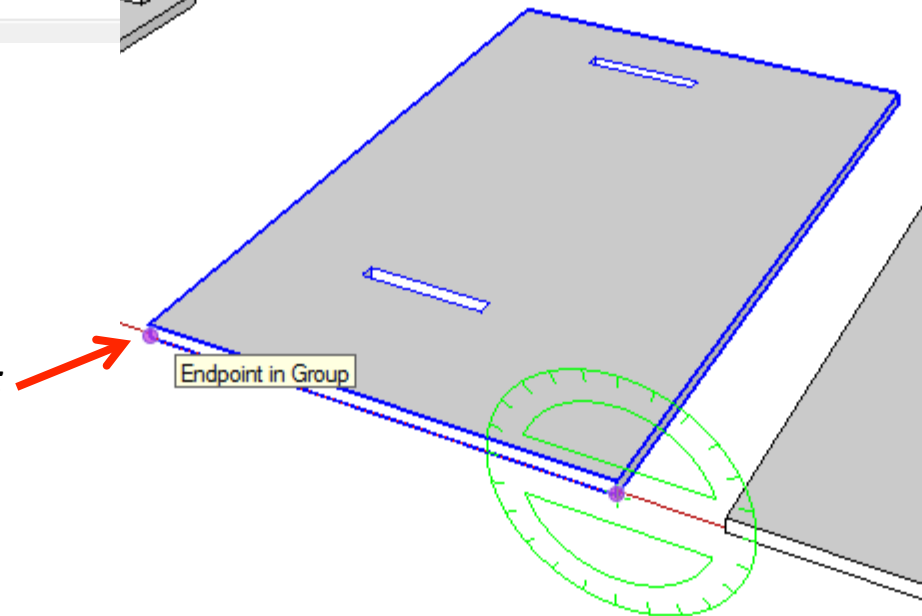


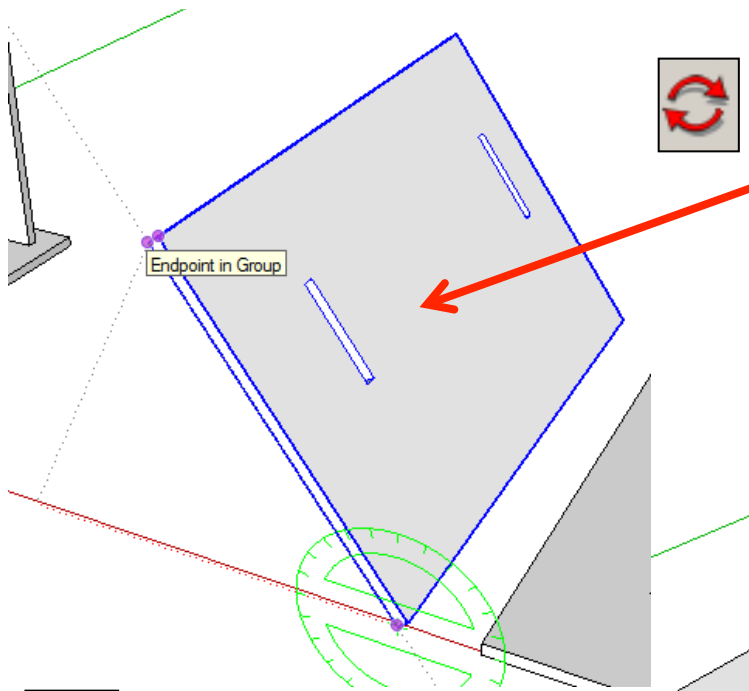


38. Click on **rotate tool bar**.  
Move it to the bottom right hand endpoint of the roof and click to set it in place on the endpoint shown. The rotate protractor must be **GREEN when you click it into place**.



39. To start the rotate move the line coming out of the protractor to the bottom **left hand endpoint** shown. **Click** to start rotating

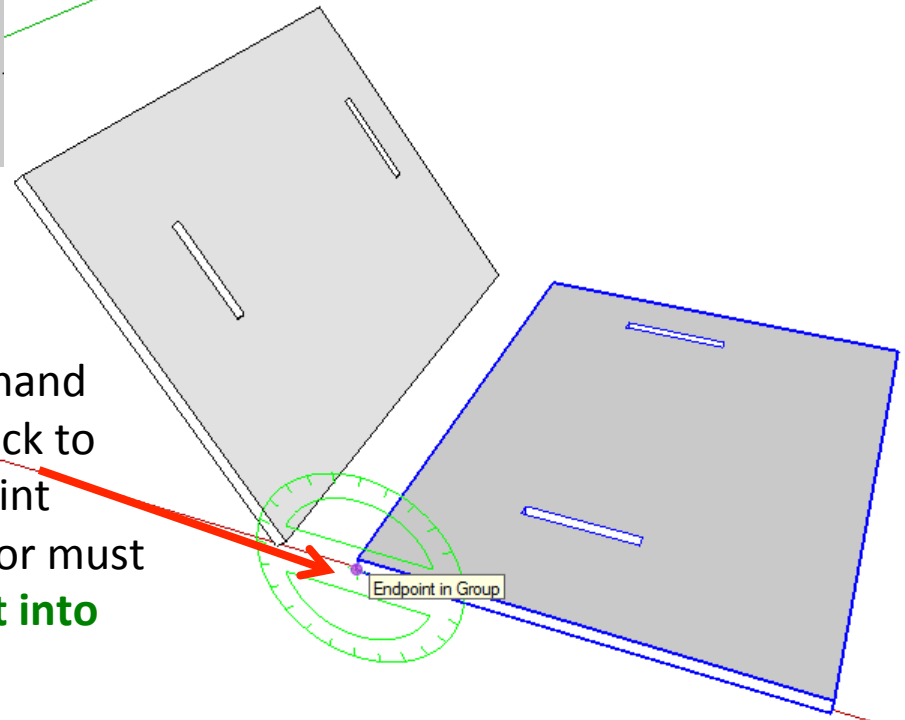




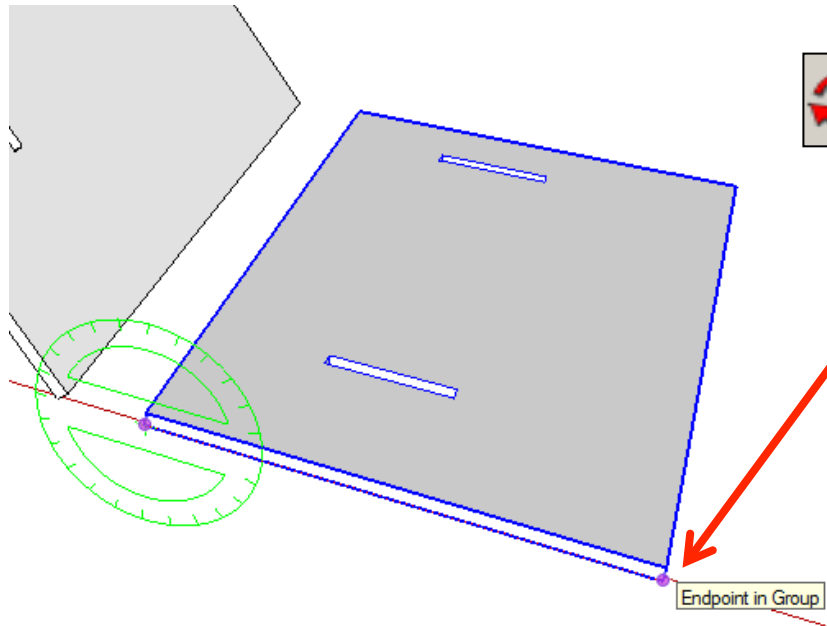
40. Rotate the roof upwards and type **'50.9'** and ***enter***.



41. Click on **rotate tool bar**. Move it to the bottom left hand endpoint of the roof and click to set it in place on the endpoint shown. The rotate protractor must be **GREEN** when you click it into place.



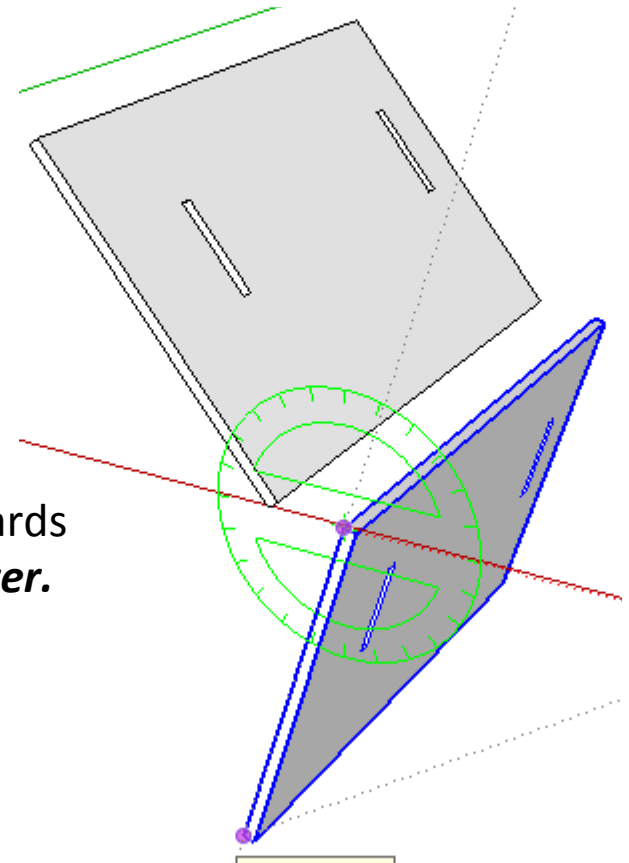


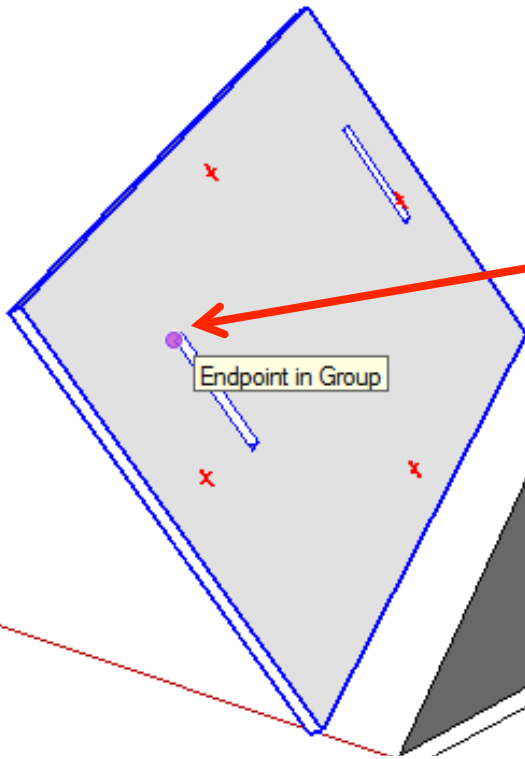


42. To start the rotate move the line coming out of the protractor to the bottom **right hand endpoint** shown. **Click** to start rotating

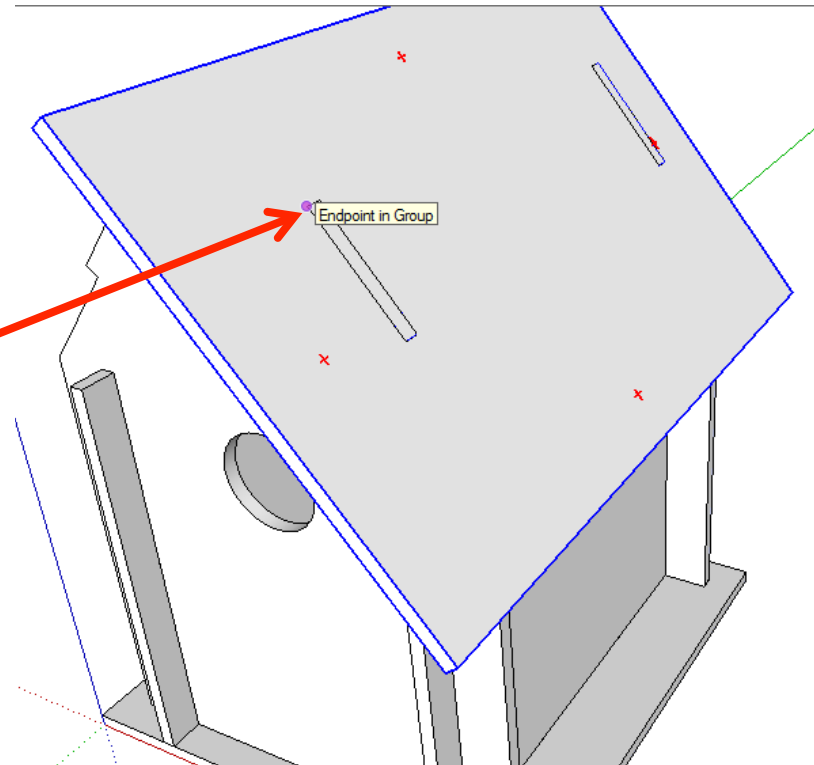


43. Rotate the roof downwards and type '**129.1**' and **enter**.

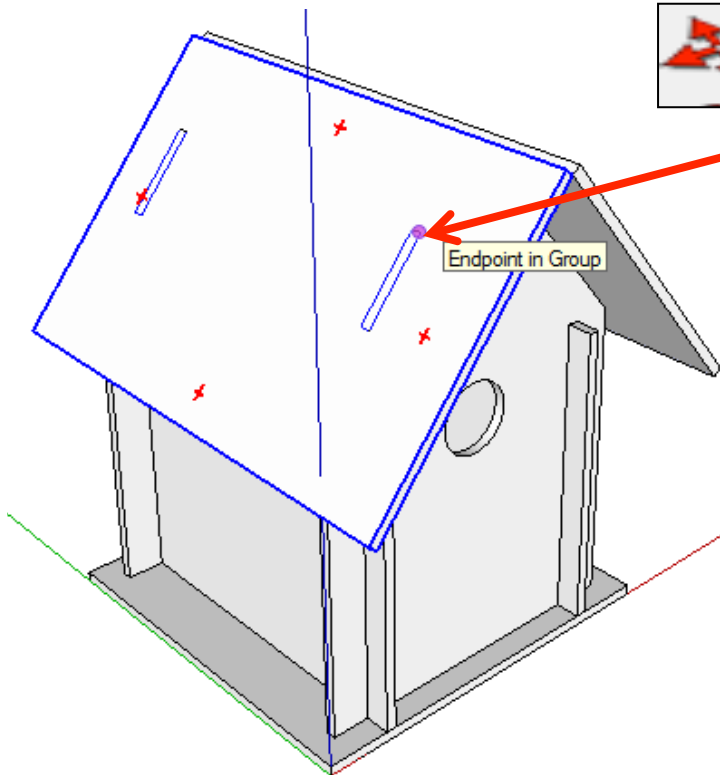




44. Using the **move tool**, click on the **end point** on one of the roof shown. Move it over the base piece of the birdhouse

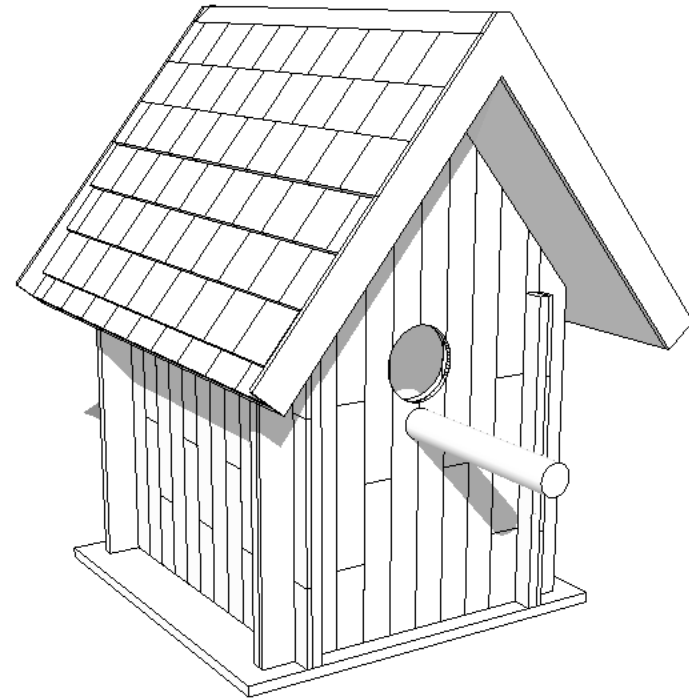


45. Using the **move tool**, snap it into place with the endpoint of the rectangle you previously drew on the birdhouse below.



46. Using the **move tool**, snap the other roof into place with the endpoint of the rectangle you previously drew on the birdhouse shown opposite.

47. Use your own skills to add more details





### Tasks:

- Put other details on the birdhouse such as a perch, wooden sides, bird bath etc.
- Experiment with colours and materials for rendering.

Click **View – toolbars** and un-tick axis. Place a tick next to shadows

