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Solution Papers

Summary: *Creating Roofs Over Bay Window*

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Overview: This solution paper will take you through the procedures necessary to create the roof below. We will create the roof below using Reference Points, Reference Lines and creating planes by Geometry Match and 3rd point.

Solution:

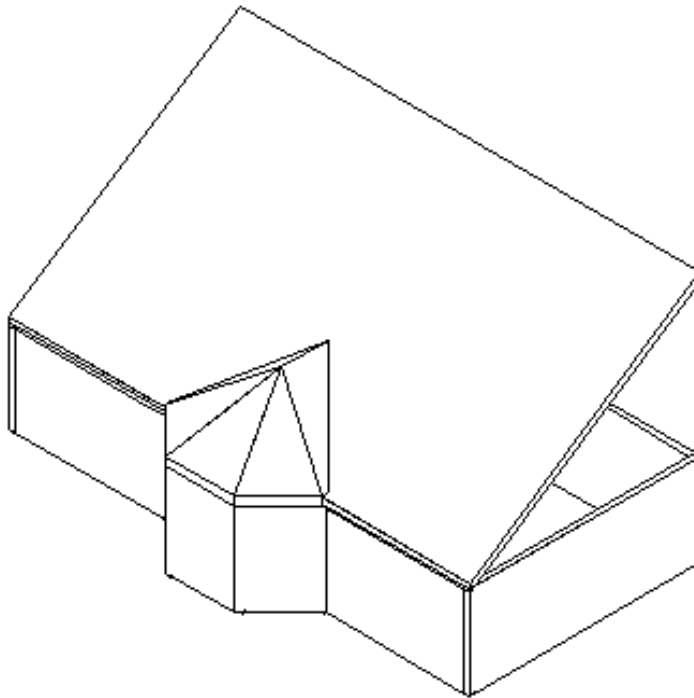


Fig GM1

1. From the main SolidBuilder menu create a new model named Geometry. We will first draw the walls.
2. Select Wall → Exterior → Free Form.
3. Select Elevation → Absolute and make sure Absolute is set to 0.
4. We will start at the upper left hand corner and work counter clockwise.
5. Place the model in Plan View.
6. Mark the first corner point near the upper left hand corner of your screen.
7. Type Y-12' and Enter. You are prompted to select the inside side, pick anywhere to the right of the wall.

8. The next point will be X 12' and Enter.
9. The next point will be the left side wall of the 3 sided bay. Type X 4' and Y -4'.
10. The next point is the front of the bay. Type X 6'.
11. The right side is next. Type X 4' and Y 4'.
12. The right front wall is next. Type X 12'.
13. The right vertical wall is next. Type Y 12'
14. The back wall is next. Type X -38'.
15. Hit ESC to finish.
16. Your model should look like the one below. The letters have been added for reference purposes.

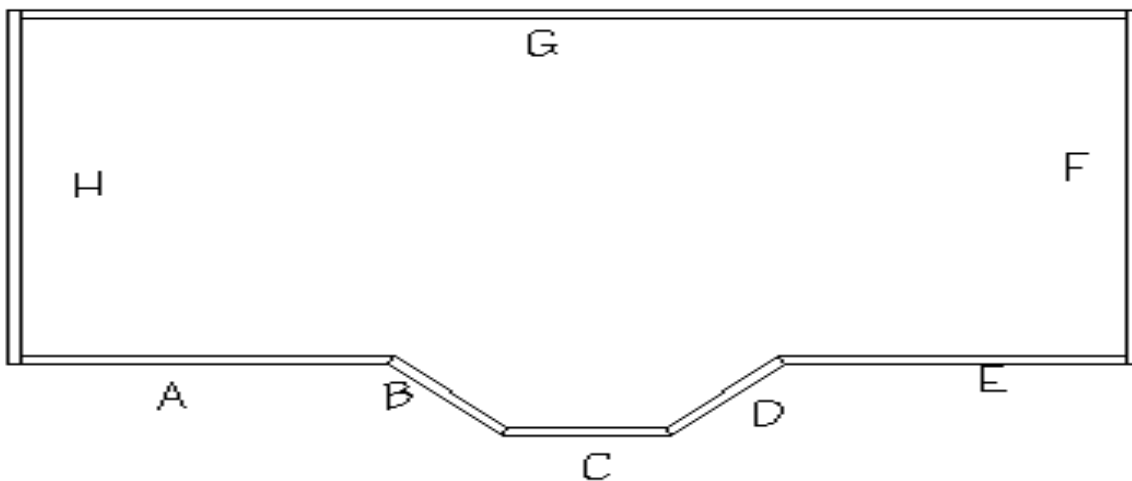


Fig GM2

17. We will place a Plane on wall A . Select Roof → Plane → Options. Set the options to Wall. Set the Elevation option to Framing Rest. Set the Slope to 8.
18. Click on the Roof icon again and when prompted for walls to bear planes, select wall A and right mouse click and Finish.
19. Select Roof → Single and we will create the single main roof.
20. You are prompted to Select starting plane. Pick the Plane on wall A. This will be a single slope roof so next pick wall F, then wall G, and finally wall H and right mouse click and Finish. Hit ESC to end the command.

21. Your model should resemble the figure below.

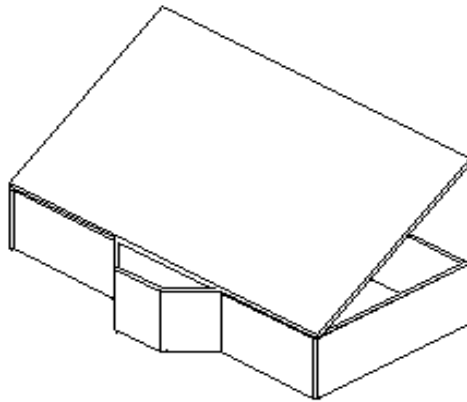


Fig. GM3

22. Place the model in Plan View.

23. Select Roof → Outline → Reference Line.

24. Select Elevation and select Wall. When prompted to Select wall for elevation, select any wall. Select Top for elevation.

25. You are prompted to Enter first point. This will be the intersection of the left front wall and the left angled wall. Use the "E" jump command to select this point.

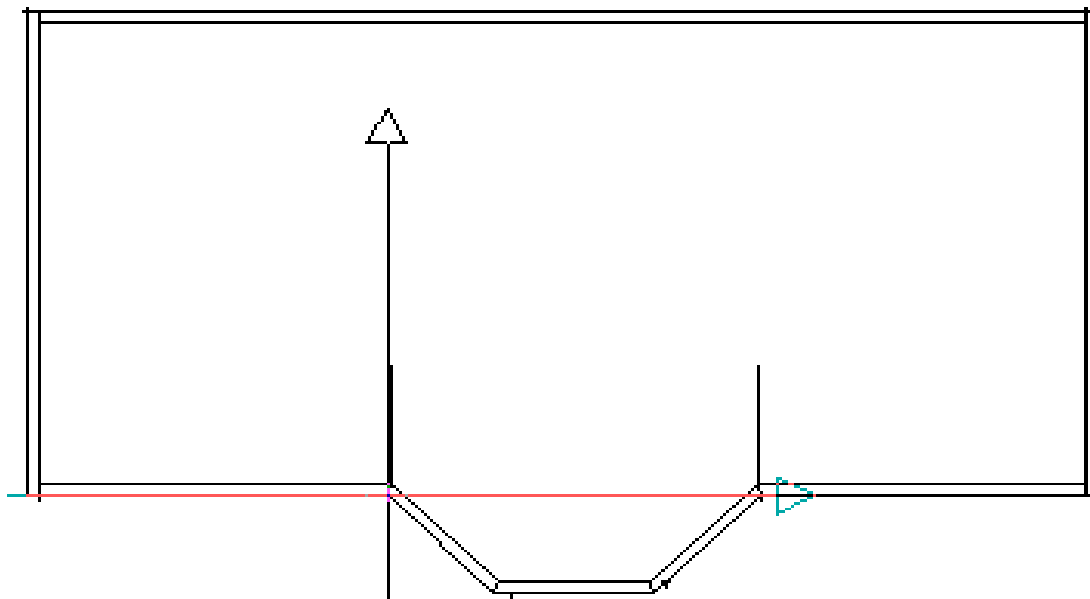


Fig GM4

26. You are prompted to mark second point. Type Y4' and Enter.

27. Repeat this procedure on the right side. You now have two reference lines that will be used to place planes on.

28. Select Roof → Planes → Options. The first plane will be located on the front wall of the bay.

29. In the upper left hand corner of the Build Roof Plane box make sure it is set to Wall.

30. Set the Elevation to Framing Rest.
31. Set the Slope to $\frac{1}{12}$ and 8.
32. Place a plane on walls B, C and D. **NOTE: the planes on walls B and D will later be removed and placed using Geometry Match.**
33. Select Roof → Single. Select the plane on wall C, the plane on wall D and then the plane on wall B. Right click and finish.
34. You now have a single plane on wall C. By using the end of this plane, we will be able to set our elevation for the reference point used in the Geometry Match.
33. Remove the planes on walls B and D.
34. Select Outline → Reference Point. We need to place a reference point at the top endpoint of the roof section.
35. We need to get the correct elevation. Place the model in Right View. Hit the elevation icon and set to mark. Select the Cursor Align icon and View → Apply → OK. Using the “E” jump command and select the top endpoint of the roof section. See Fig. GM5

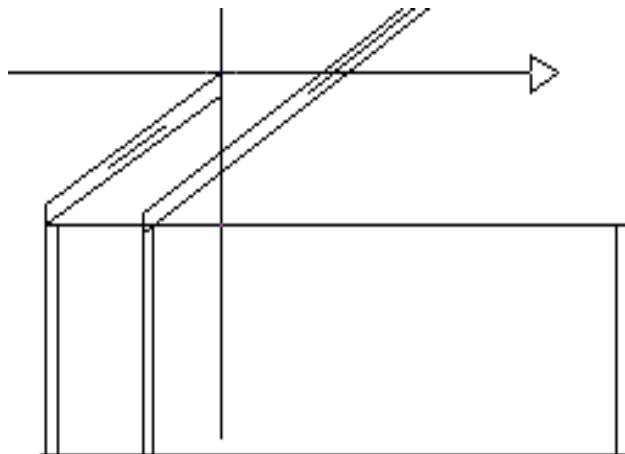


Fig. GM5

36. The Mark Elevation box appears and click OK.
37. Place the model back in Plan View. You are prompted to Enter point. Using the “E” jump command select the roof end point and Enter. See Fig. GM6

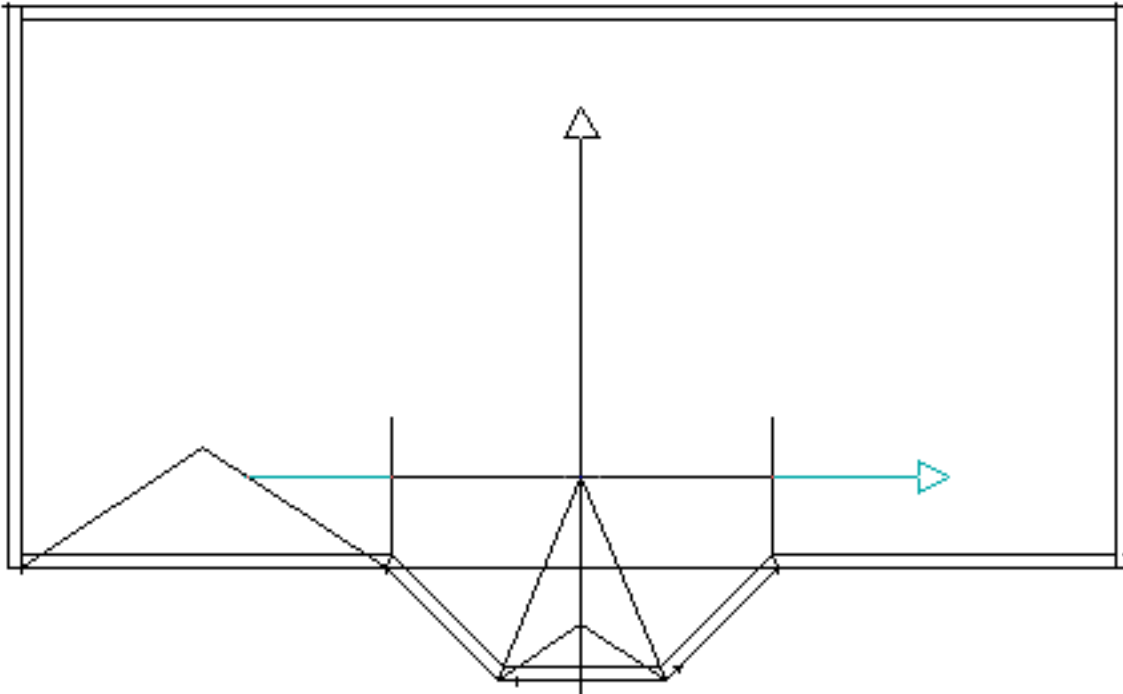


Fig. GM6

38. This Reference Point will be used to create the planes on walls B and D using Geometry Match.
39. Select Roof → Plane → Options. Change the Elevation section to Geometry Match and Reference Point.
40. Set the Slope section to Compute By 3rd Point.
41. You are prompted to Select walls for planes. Select walls B and D.
42. You are prompted to mark a point that defines plane. Using the “P” jump command select the Reference Point we just created. Repeat this procedure for the second plane. You now have planes on walls A, B, C, and D.
43. We need to place planes on the two reference lines we created perpendicular to the front walls.
44. Select Roof → Planes → Options. In the upper left hand corner of the Build Roof Plane box, switch it to Line.
45. Set the Elevation section to Geometry Match and Reference Point.
46. Set the Slope section to Compute By 3rd Point. Click on the Roof icon again.
47. You are prompted to Select lines to locate planes. Select both reference lines.
48. You are prompted to mark a point to indicate up-slope direction. Move the cross hair so it is between the two reference lines and Enter.

49. You are prompted to mark a point that defines this plane. Using the “P” jump command select the Reference Point. We now have created the two planes.

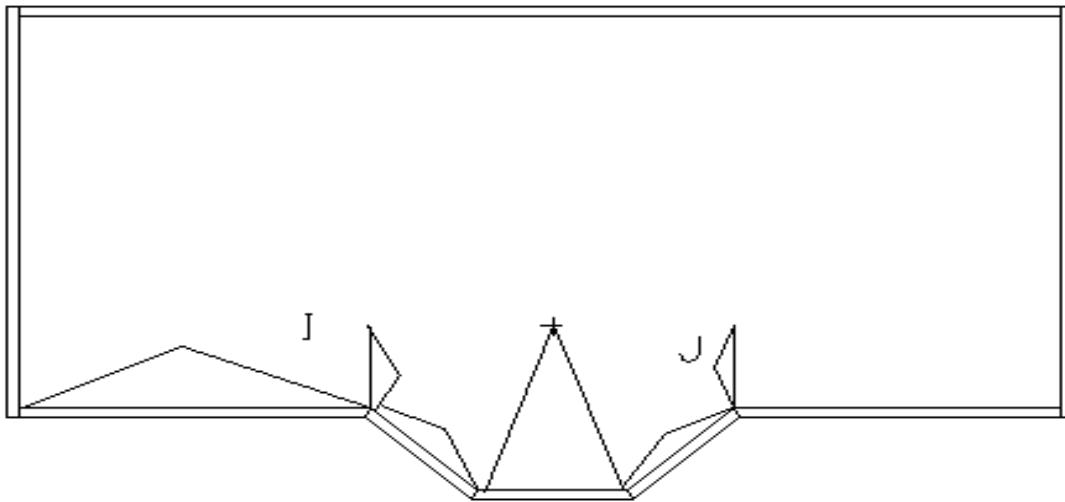


Fig. GM7

50. Select Roof → Single. Select the plane on wall B, then on wall C and finally on reference line I then Finish.

51. Select the plane on wall D, then on wall C and finally on Reference Line J. Your roof should look like Fig. GM8.

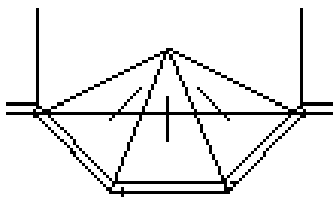


Fig. GM8

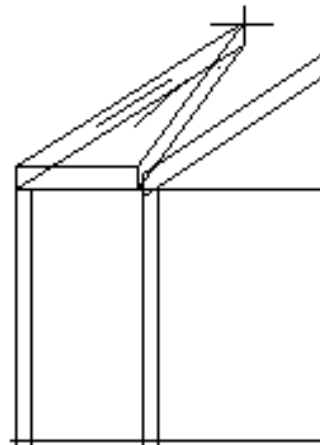


Fig GM9

52. We now need to fill in the area between the roofs we just created and the main roof A.

53. Select Roof → Single. Select the plane on line I, then the plane on wall B, then the plane on line J, and finally the plane on wall A. Right click and Finish.

54. Select the plane on Reference Line J, then the plane on wall D, then the plane on Line I, and finally the plane on wall A. Hit ESC to finish.

The roof is now created and should look like the figure below.

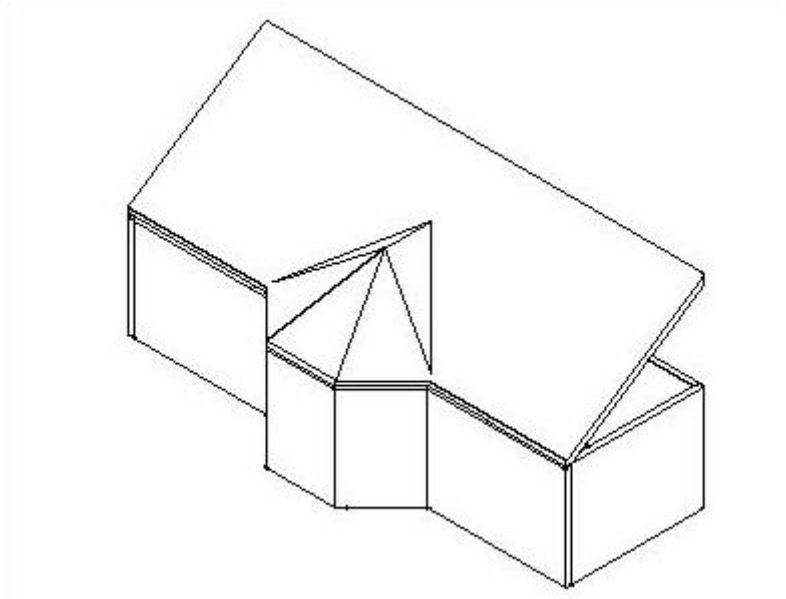


Fig. GM10