Autodesk Revit 2015

Answer Key

Chapter 1

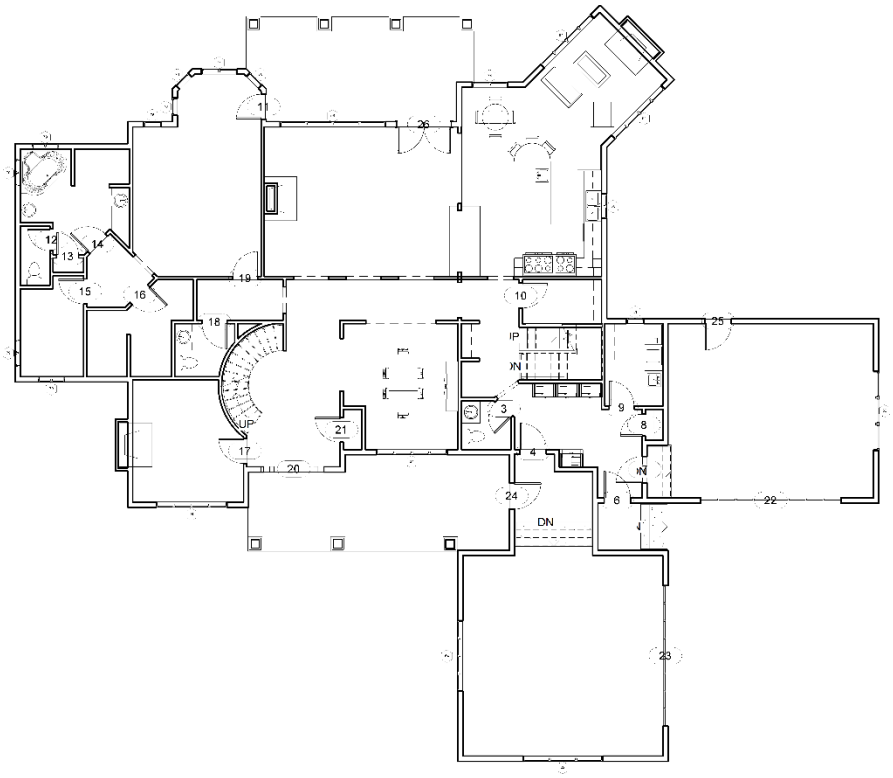
Lesson 1: What is Revit?

1. What is Autodesk Revit?

Revit is a software for architects that allows them to design a building in 2D and 3D, and annotate 2D drafting plans.

2. What does BIM stand for?

BIM stands for "building information modeling." It is a technique of modeling a structure with all of it's elements and utilities. The advantage of a BIM models is that it allows for creative designing, fast modifications, and better communication. BIM allows contractors to plan where their systems will be placed and sized correctly before they even get to the job site.

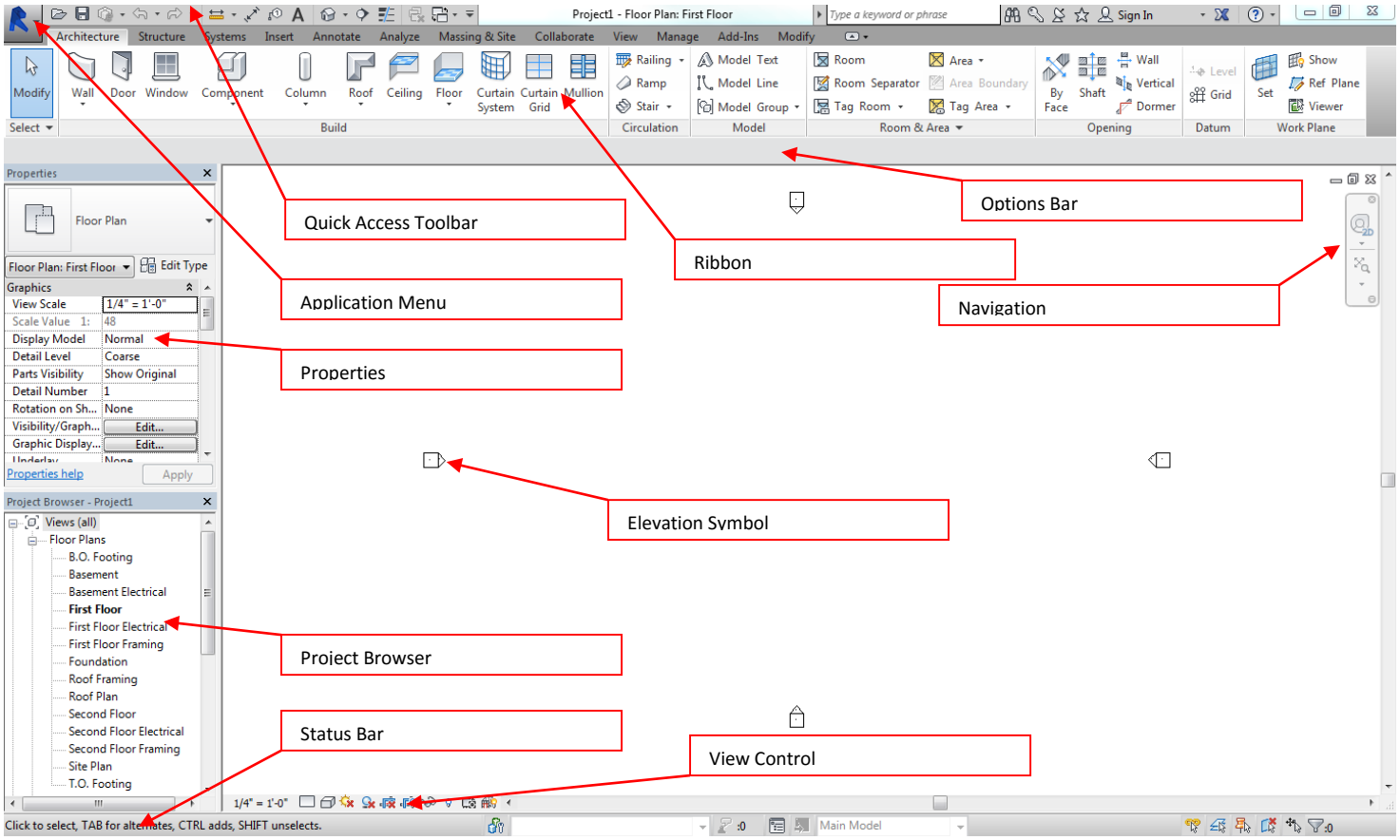


Chapter 1

Lesson 2: User Interface and Navigation

Lecture

Fill in the boxes and record more detail information about each area of the User Interface on the next page.



Give a brief explanation of the steering wheel tools:

Zoom	***Zooms in and out of the view***
Orbit	***Rotates the screen in 3D***
Pan	***Slides the view up/down/left/right***
Rewind	***Allows the user to select from previous views of the screen***
Center	***Allows the user to select a point to center on the screen***
Walk	***Acts like a zoom and pan in a camera view***
Look	***Moves the view like the turning of your head***
Up/Down	***Changes the elevation of the view on the Z axis***

Label each icon and give a brief description of what it is used for:

1/8" = 1'-0	**Scale of view: Changes the size of the view**
	**Detail Level: Allows the user to see either simplified views of the object or very detailed (individual components of a wall.)**
	**Visual Style: Allows the user to switch between shaded/wireframe/hidden line views.**
	**Sun Path: Shows the path the sun will take around the structure.**
	**Shadows: Adds shadows relative to specified time of day/year.**
	**Rendering: Quick access to the rendering dialog box.**
	**Crop View: Allows the user to show less or more of the structure.**
	**Show Crop Region: Displays the rectangle that controls where the view will be cropped.**
	**Lock/Unlock 3D View: Locks the view so the user can only pan and zoom.**
	**Temporary Hide/Isolate: Temporarily turns off elements within the view.**
	**Reveal Hidden Elements: Shows elements that were hidden within the view.**
	**Temporary View Properties: Temporarily changes view settings without messing up the entire projects view settings.**
	**Show Analytical Model: Shows where loads and stresses are placed on the structure.**
	**Highlight Displacement Sets: Components that were moved in the exploded view are highlighted.**

User Interface

Describe the main functions of the following items

1. List the tabs across the top of the ribbon.

a. Architecture	d. Annotate	g. Collaborate	j. Add-ins
b. Structure	e. Analyze	h. View	k. Modify
c. Insert	f. Massing & Site	I. Manage	

2. Project Browser:

The Project Browser allows the user to navigate to the different floor plans, views, and models in Revit.

3. Properties Box:

The Properties Box allows the user to change the type, size, color, etc. of elements in Revit.

4. Navigation Bar:

The Navigation Bar contains tools like zoom and pan.

5. Options Bar:

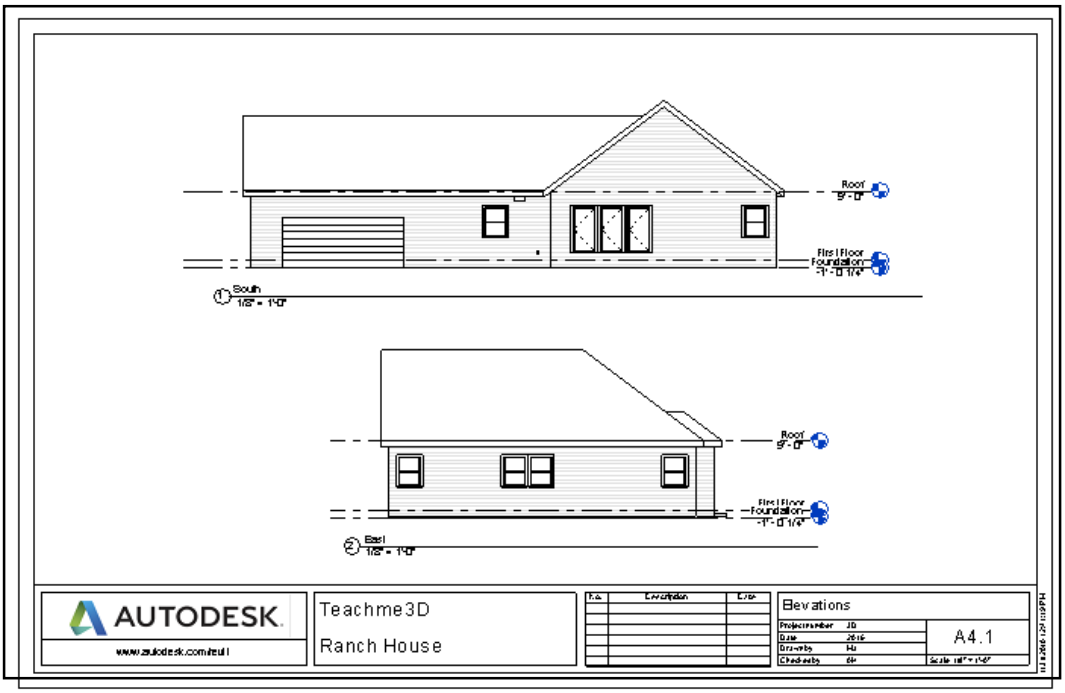
The Options Bar will appear when a tool is selected. Each tool may have unique options like “multiple” or base and top constraints.

6. Elevation Symbols:

The Elevation symbols deal with how the structure’s elevations look like. The location of the symbol relates to where a person would be standing and how far the person can see.

Demonstration

Follow along with the demonstration video and print out the elevation sheet that shows the South and East views. Tape the image in the space provided below.



Activity

Turn the visibility of elements on and off to find the message inside of the house. Write what the text says in the box below.

I love Teachme3D Revit!

Chapter 2
Lesson 1: Walls

1. Why is it important to start a Revit Project using the correct template?
   Each template has preloaded elements unique to that style of structure. For example, a residential project template will have elements like walls with siding, kitchen cabinets, and even furniture.

2. What are the 4 different types of templates in Revit?
   a. **Residential**
   b. **Commercial**
   c. **Construction**
   d. **Architectural/Default**

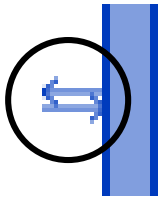
3. After you've started a project, what could be the first thing you check before starting your model?
   Level height in the elevation view.

4. It's a good idea to check a _**wall's top constraint**__ before starting a wall.

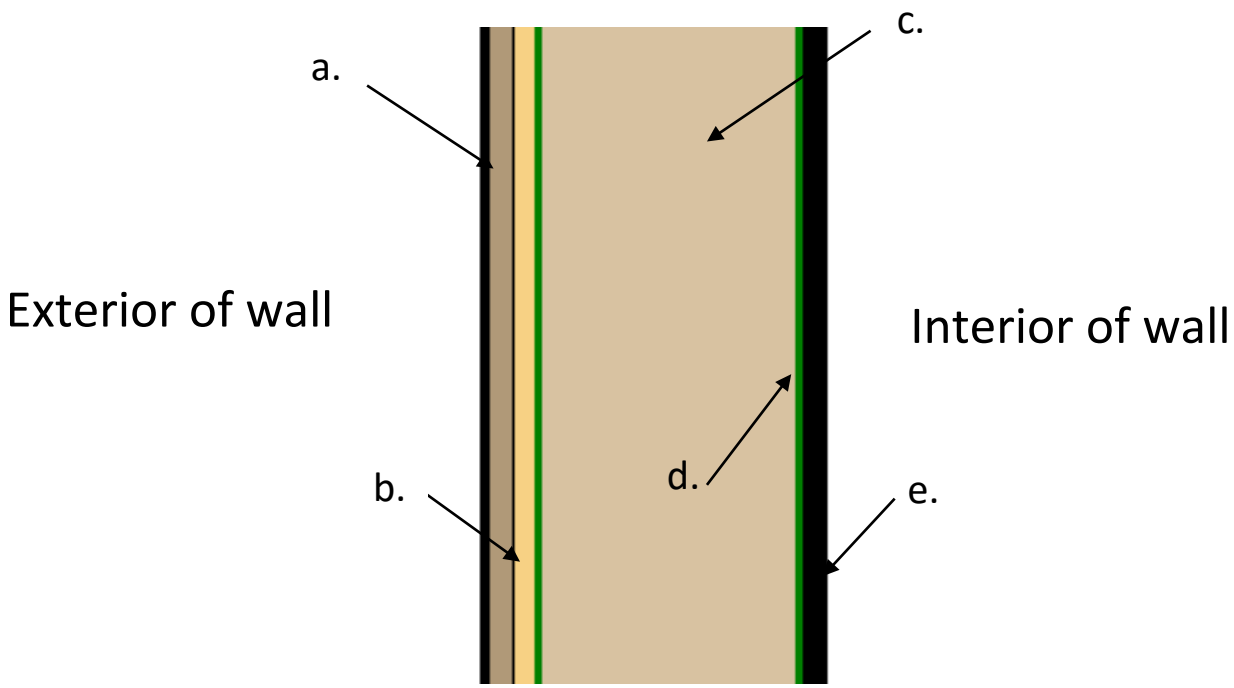
5. While not absolutely necessary, it will speed up your workflow to draw exterior walls **clockwise**/counterclockwise.

6. What does this symbol allow the Revit user to do quickly?

   This symbol allows the user to "flip" things like walls, doors, windows and stairs.



7. Label each layer of the wall section.
   a. _Siding_____
   b. _Plywood Sheathing_____
   c. _Wood Stud/2 x 6_____
   d. _Vapor Retarder_____
   e. _Drywall/Gypsum_____



8. Revit sees units in _feet_ unless otherwise annotated.

9. Adjust the _witness lines___ before changing a dimension.

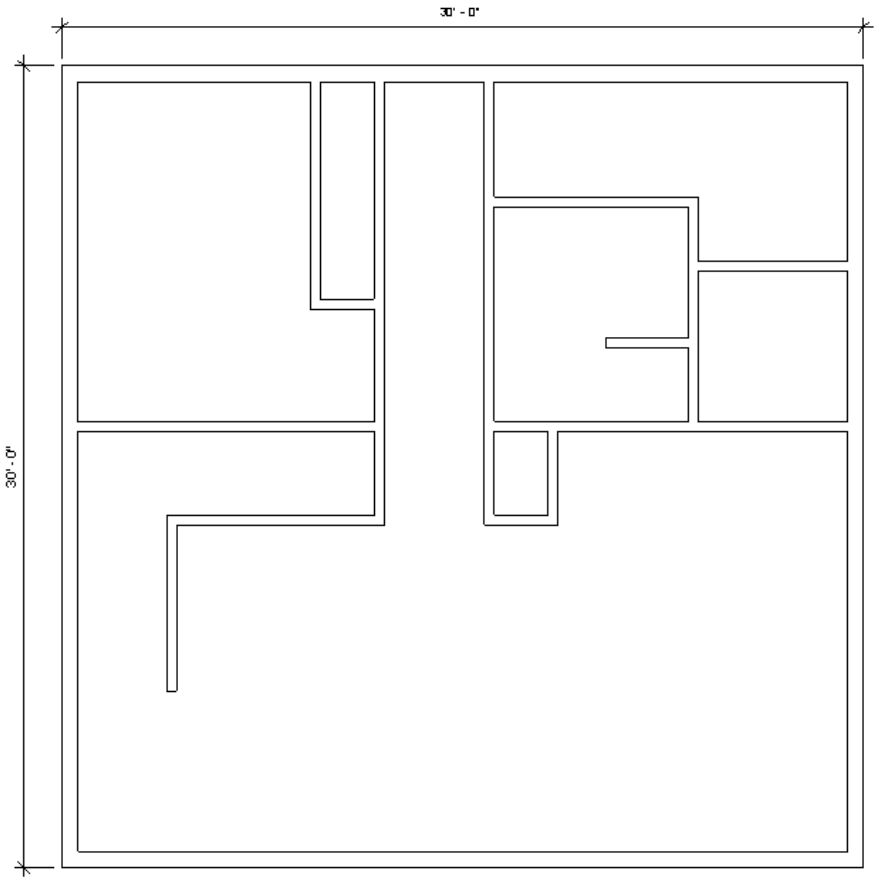
10. The element that is __selected____ will move when the dimension is changed.

11. Label and describe what the following *Modify* tools are used for:

	**Align**	**Aligns one or more elements with a selected element.**
	**Offset**	**Copies or moves a selected element a specified distance perpendicular to its length.**
	**Mirror – Pick Axis**	**Reverses the position of selected elements, using an existing line or edge as the mirror line.**
	**Mirror – Draw Axis**	**Draws a temporary line to use as an axis for mirroring.**
	**Move**	**Moves selected elements to the specified location in the current view.**
	**Copy**	**Copies selected elements and places them in the specified location in the current view.**
	**Rotate**	**Rotates selected elements around an axis.**
	**Trim/Extend to Corner**	**Trims or extends elements to form a corner.**
	Split Element	**Cuts an element at a selected point, or removes a segment between 2 points.**
	Split with Gap	**Splits a wall into 2 separate walls with a defined gap between them.**
	**Array**	**Creates a linear or radial array of selected elements.**
	**Scale**	**Resizes the selected item.**
	**Trim/Extend Single Element**	**Trims or extends one element to a boundary defined by another element.**
	**Trim/Extend Multiple Elements**	**Trims or extends multiple elements to a boundary defined by another element.**
	**Unpin**	**Unlocks a model element so it can move.**
	**Pin**	**Locks a model element in place.**
	**Delete**	**Removes selected elements from the building model.**

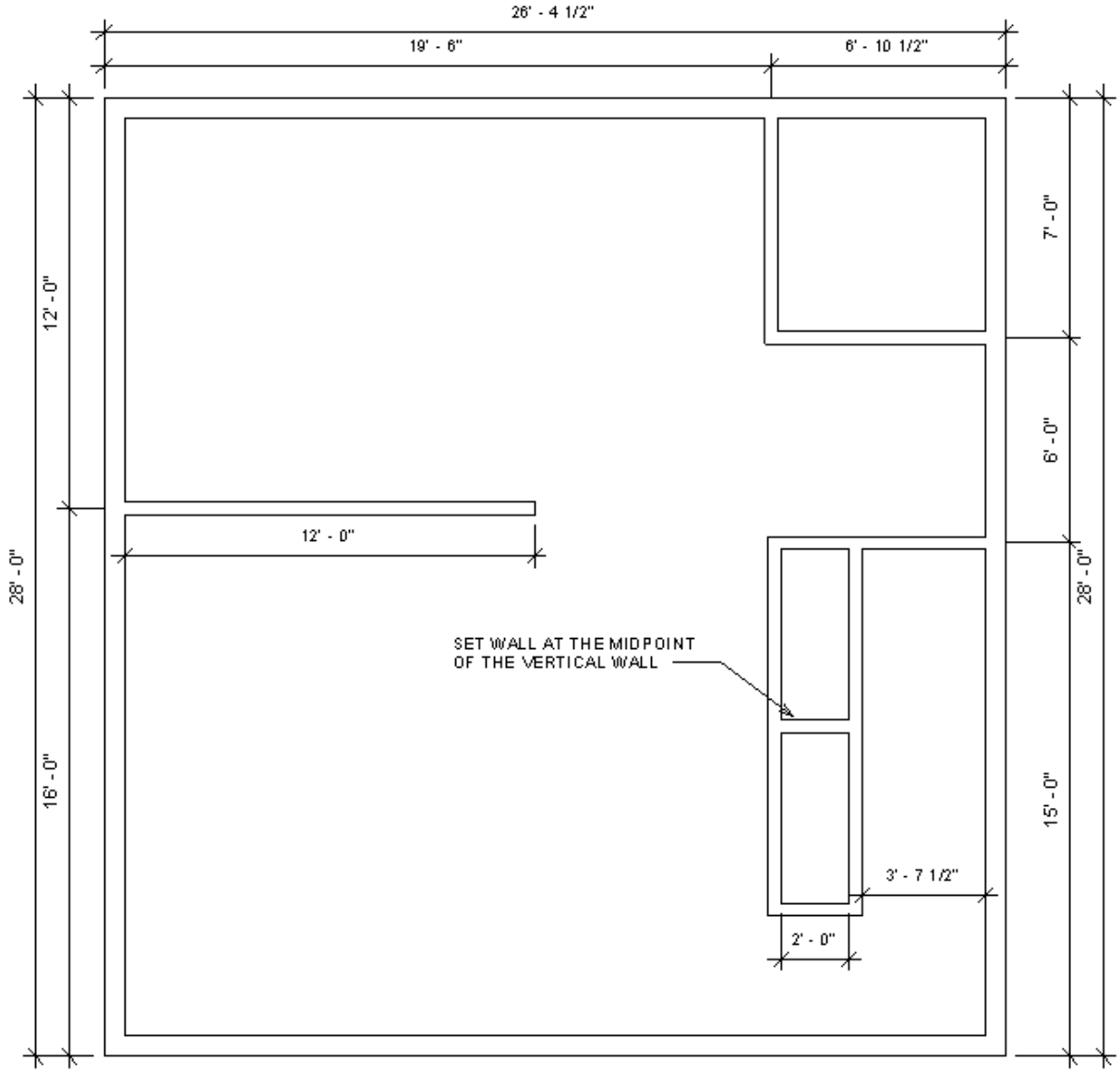
Demonstration

Follow along with the demonstration video and print out the floor plan at 50%. Tape the image in the space provided below.



Activity

Start a new Residential Project and draw the first floor of the Activity House below. Leave the level heights as 9'-0". Print out the floor plan at 50% and turn in with this chapter worksheet.

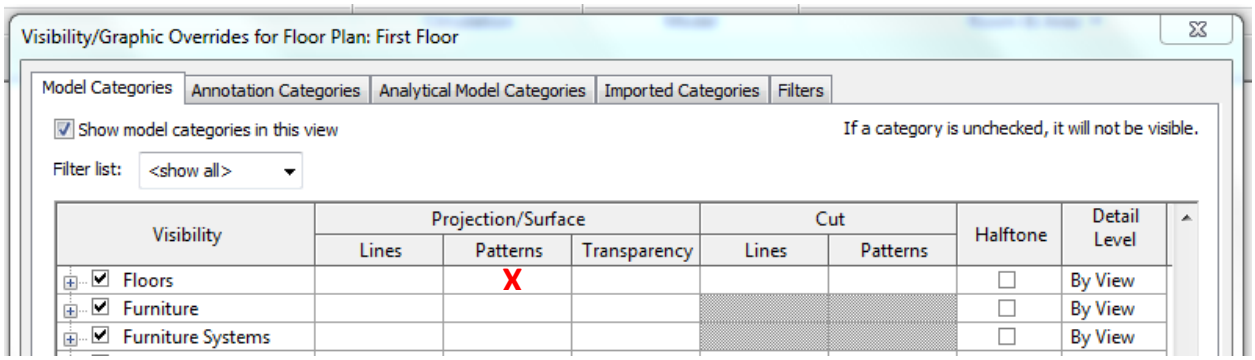


Chapter 3
Lesson 1: Adding a Second Floor and Stairs

1. When adding other levels or floors to a house model, be sure to turn on the **underlay** of the floor above or below to line-up outside walls.

2. You can quickly access the Visibility/Graphics Override by typing **V V**.

3. Place an "X" in the correct box to show where you go to turn off the visibility of floor patterns.

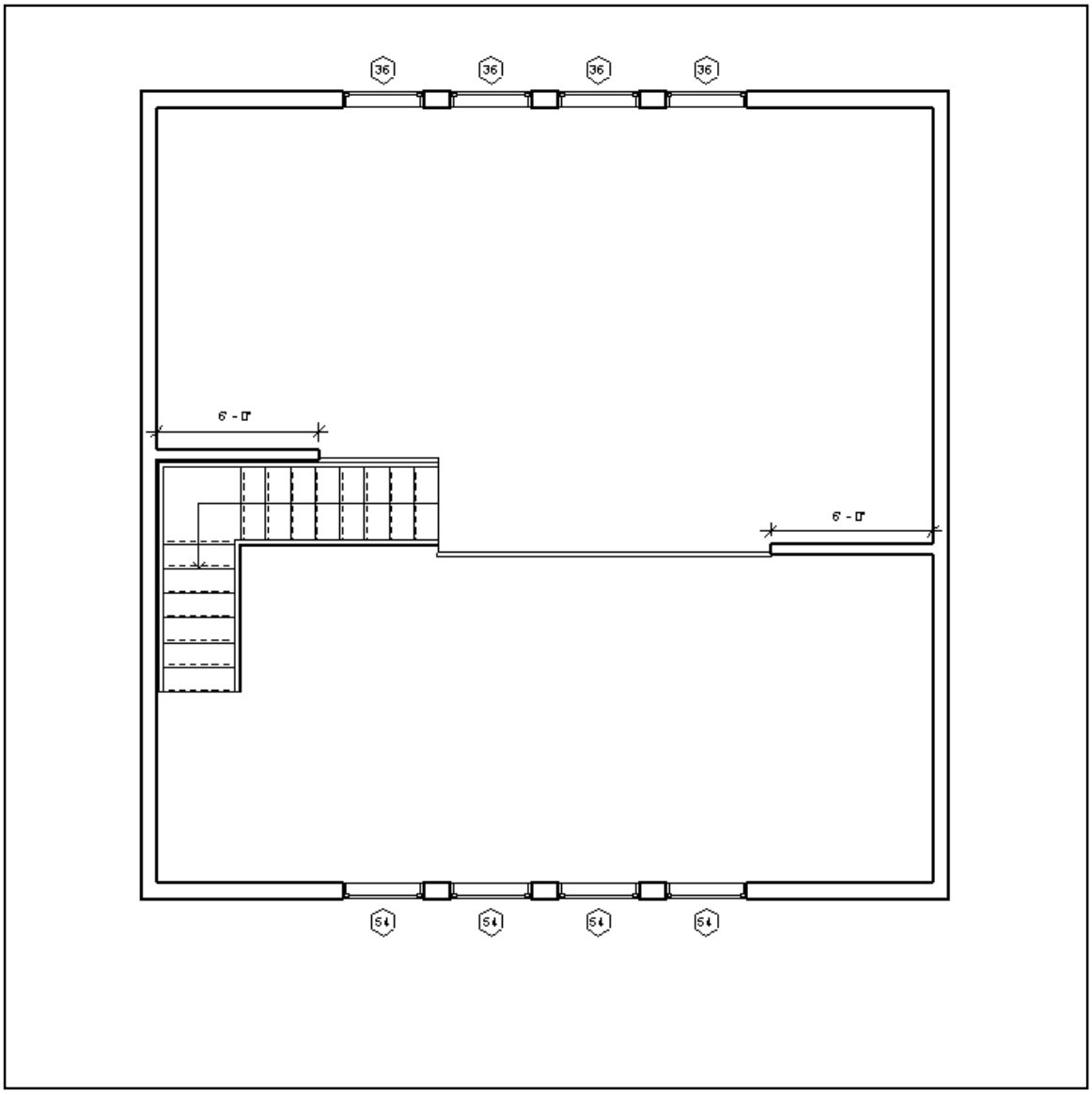


4. Label and describe what the following *Stair Component* tools are used for:

	**Straight**	**Creates a straight run by specifying a start point and an endpoint.**
	**Full – Step Spiral**	**Creates a spiral run by specifying the start point and radius.**
	**Center – Ends Spiral**	**Creates a spiral run by specifying the center point, start point, and endpoint.**
	**L – Shape Winder**	**Creates an L-shaped winder run by specifying the lower end.**
	**U – Shape Winder**	**Creates a U-shaped winder run by specifying the lower end.**
	**Create a Sketch**	**Creates a custom run by sketching the shape.**

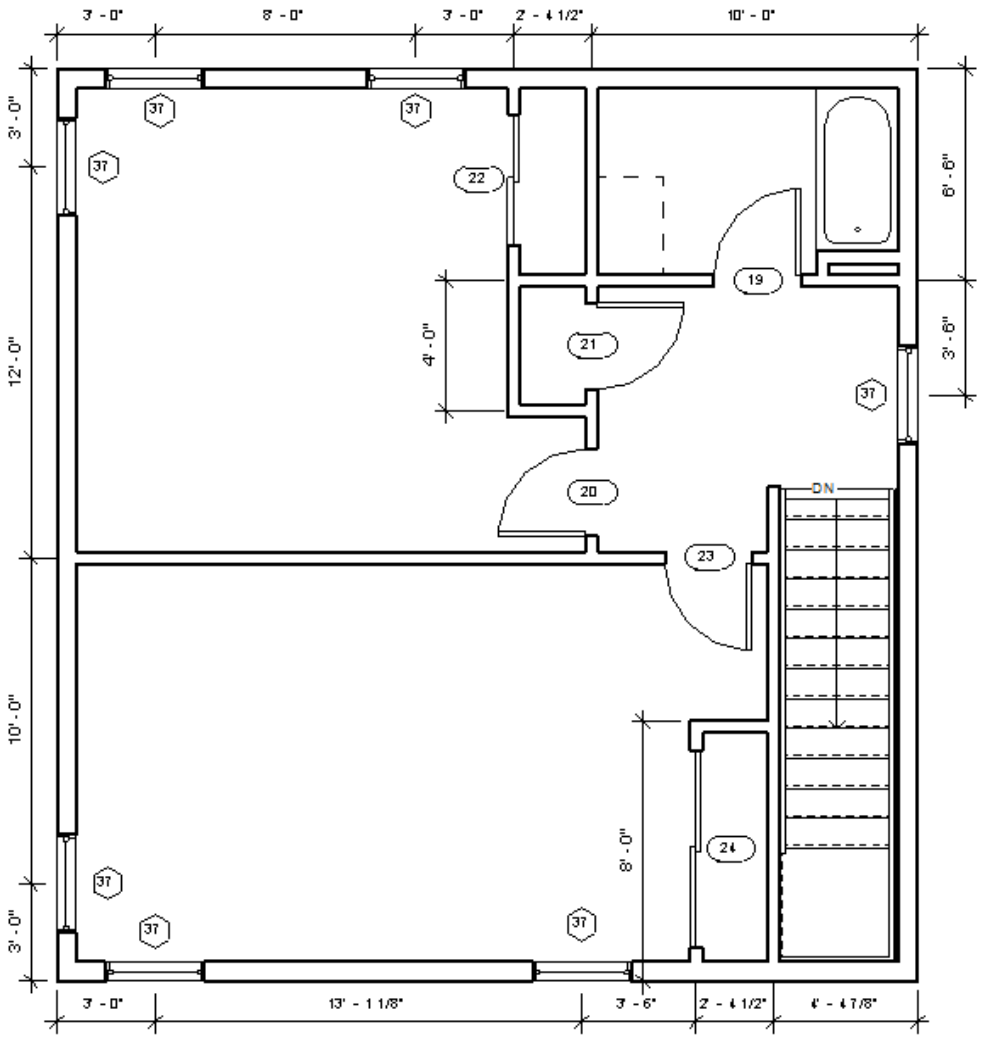
Demonstration

Follow along with the demonstration video and print out the floor plan at 50%. Tape the image in the space provided below.



Activity

Complete the Second Floor of the Activity House. The door and window tags have been moved for clarity. Do not move your tags. Any door that does not have a dimension to it is either centered on the wall or 2'-0 away from the nearby wall.



Door Schedule			
Door Type	Family	Door Size	Count
51	Sliding-Closet	72" x 80"	1
54	Sliding-Closet	48" x 80"	1
57	Single-Flush	32" x 80"	4

Window Schedule			
Type Mark	Type	Type	Count
37	Double Hung with Trim	36" x 48"	7

Chapter 3
Lesson 2: Roofs

1. What are the 3 fastest roof styles you can create in Revit?

   a. **Hip**

   b. **Gable**

   c. **Shed**

2. What the three ways to create a roof in Revit?

   a. **Roof by Footprint**

   b. **Roof by Extrusion**

   c. **Roof by Face**

3. What does 

mean when creating a roof?

When this is checked, the roof will slope to this wall. When it is not checked, the wall extends up to the roof to create a gable end.

4. In the roof command, what does the triangle mean? 

It is the symbol for slope.

5. In the roof command, what does 9”/12” mean?

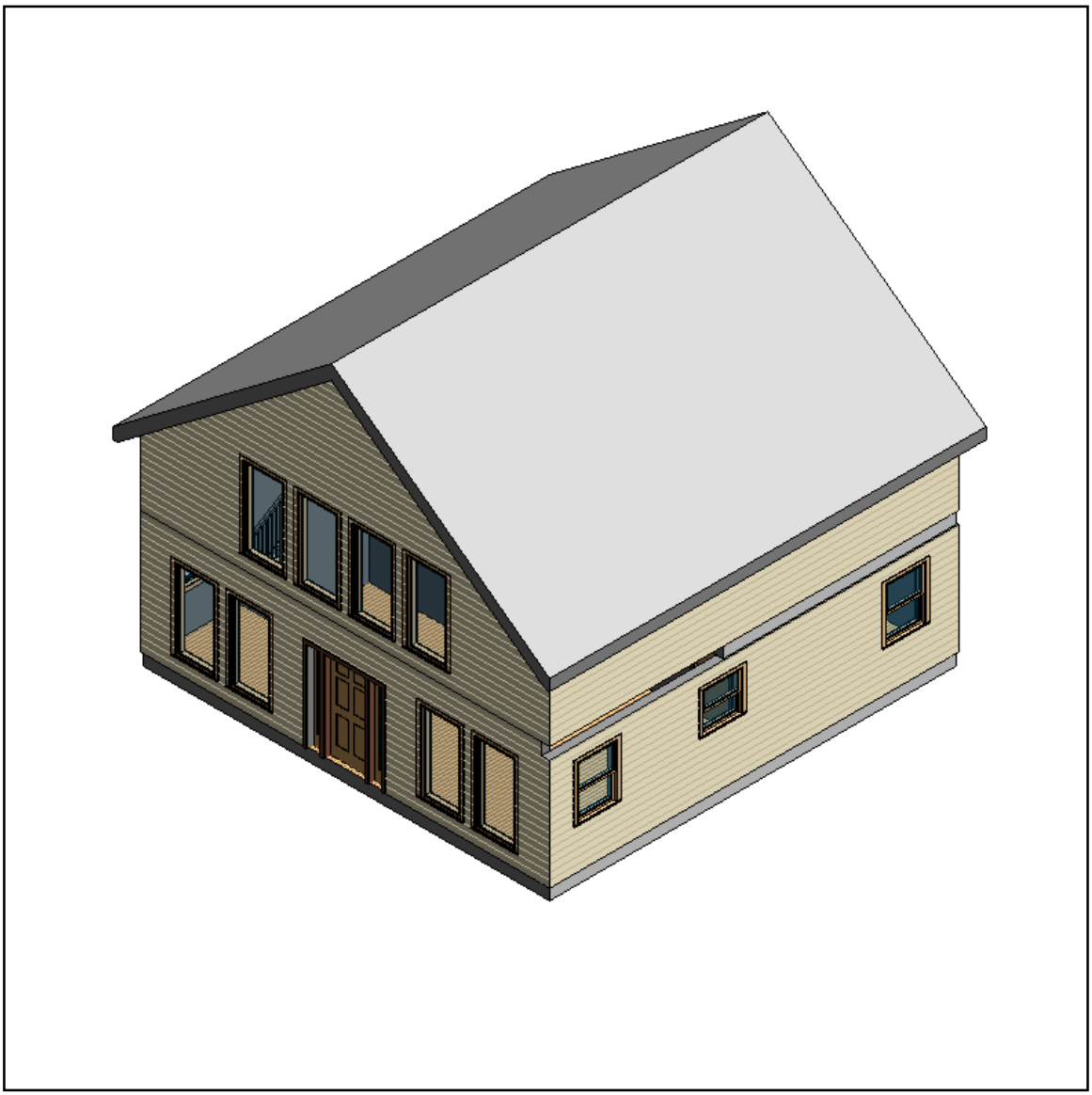
The 9” represents the rise of the roof, the 12” represents the run. For every 12” of horizontal distance there is 9” of rise.

6. Describe what the following tools do:

	**This command will attach a wall's top or base to things like a roof or floor.**
	**This command will detach a wall's top or base from roofs and floors.**
	**This command joins geometry into one shape.**
	**This command will extend a roof to meet another roof.**

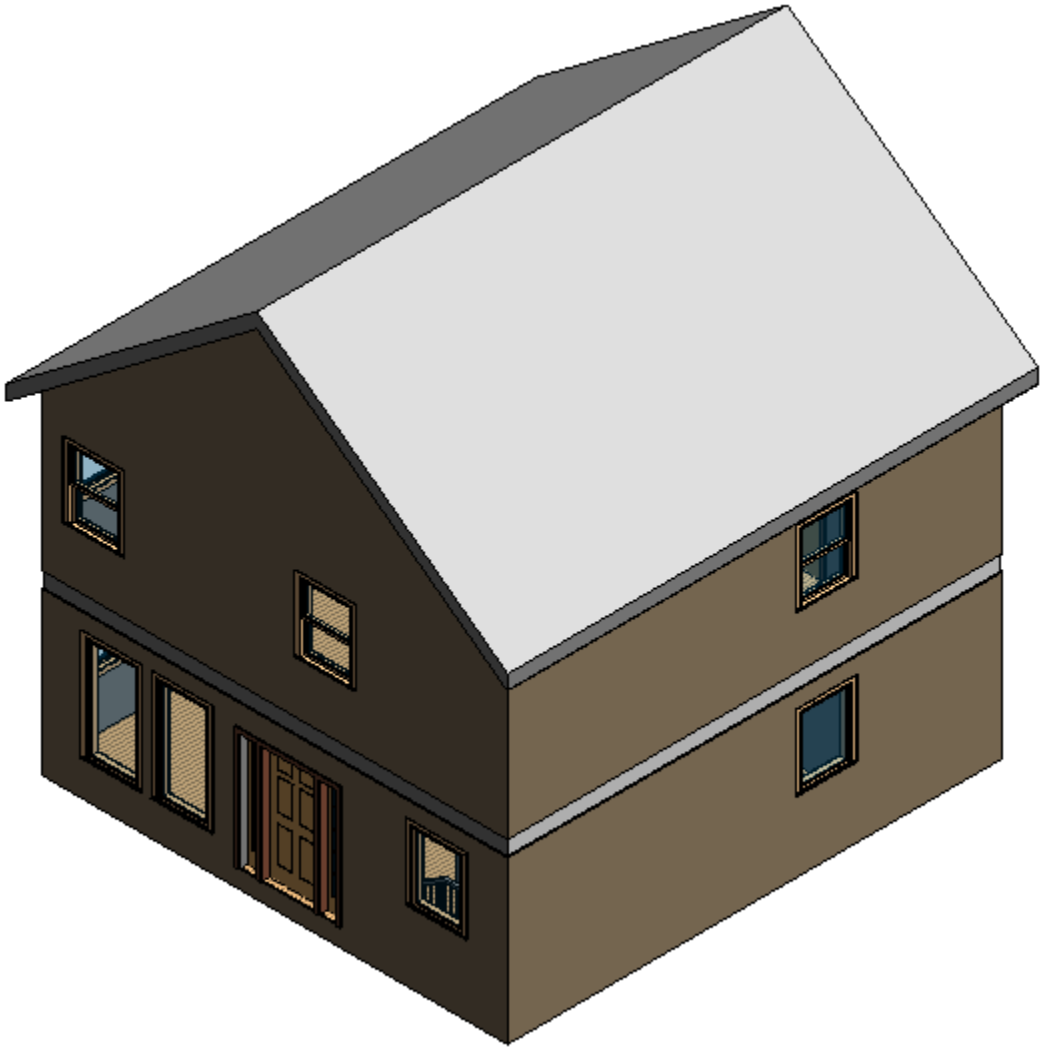
Demonstration

Follow along with the demonstration video. Take a screenshot of the Demo House in 3D and tape to your workbook.



Activity

Open your Activity House and place a gable style roof on the roof level. Print out per your instructor's direction.



Chapter 3
Lesson 3: Foundations/Footings

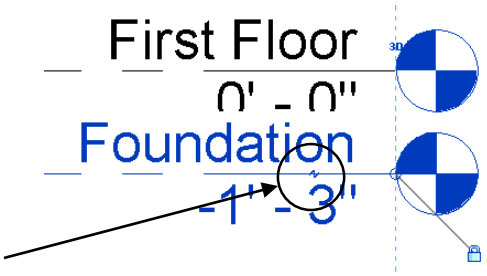
1. Any level's distance below the first floor is seen as a **negative measurement**.

2. Why is it a good idea to place and lock dimensions between the levels?

   This allows the user to move the elevation of levels up and down but maintain the spacing between levels with the locked dimension.

3. What does this "heartbeat" symbol do to a level?

   It will "step down" the level's label so it is not blocking the label from another level.



4. What is the best view to draw the foundation/basement walls in?

   Foundation floorplan

5. What is the best level to draw the footing?

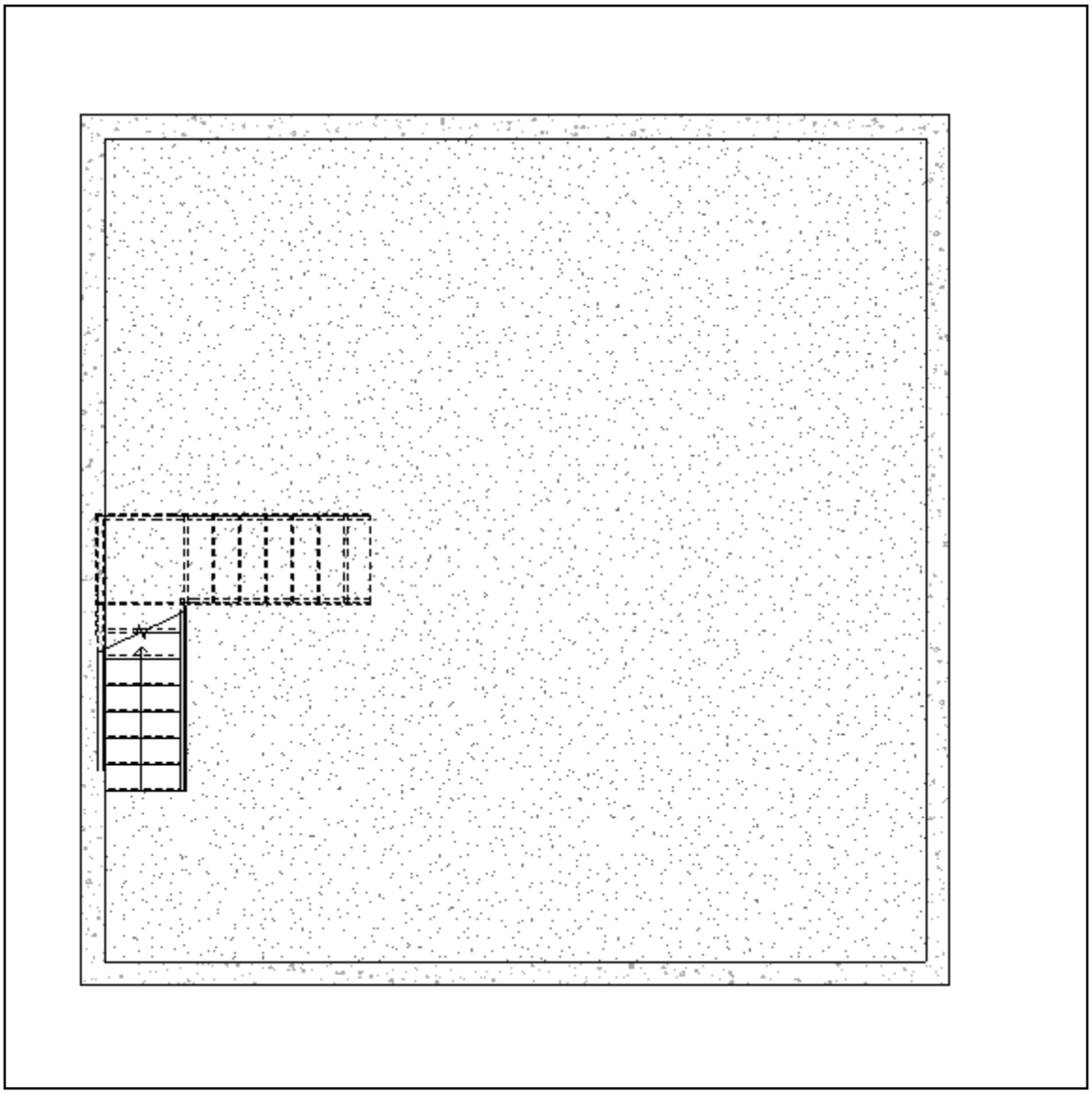
   T.O. Footing floorplan

6. What is the purpose of the footing?

   The footing is the base that the entire building rests on.

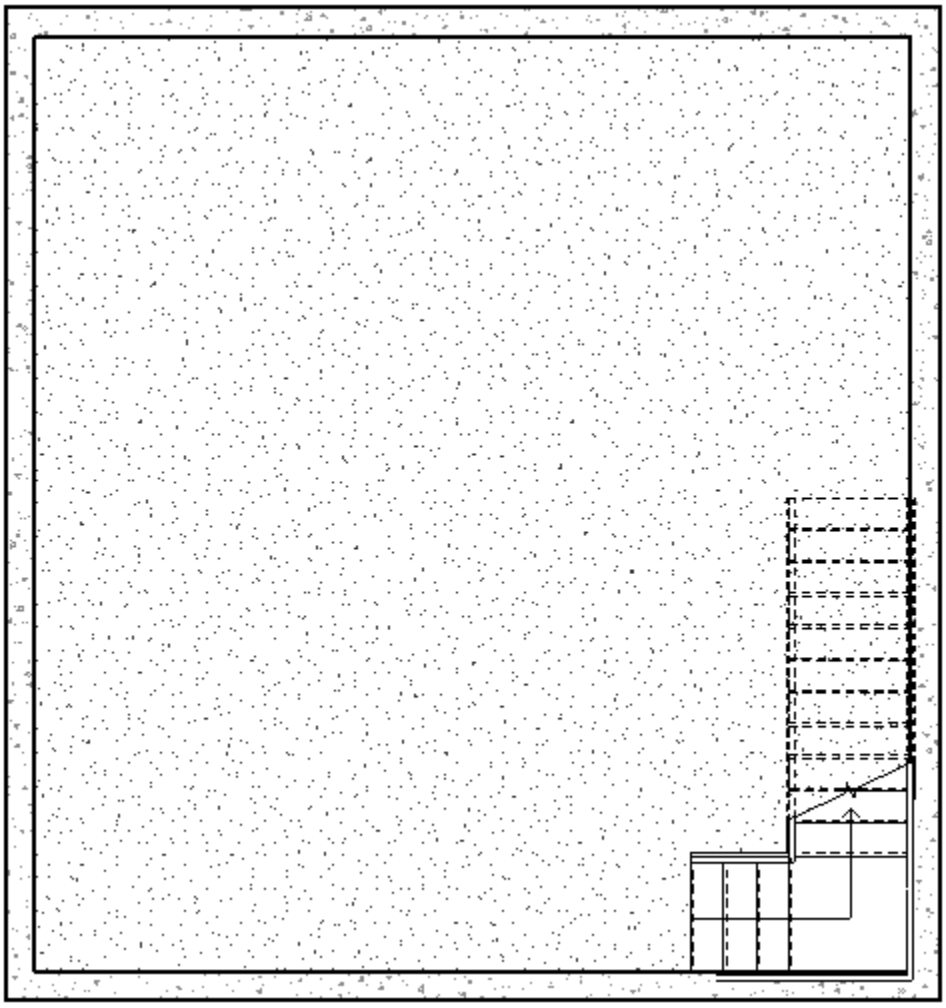
Demonstration

Follow along with the demonstration video and print out the basement floorplan at 50% and tape in your workbook.



Activity

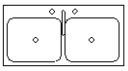
Add the foundation, footing, and staircase to the Activity House. Print out per your instructor's direction.



Chapter 4
Lesson 1: Kitchens and Bathrooms

1. When placing items in Revit, hitting the **space bar** will rotate the items by 90 degree increments.

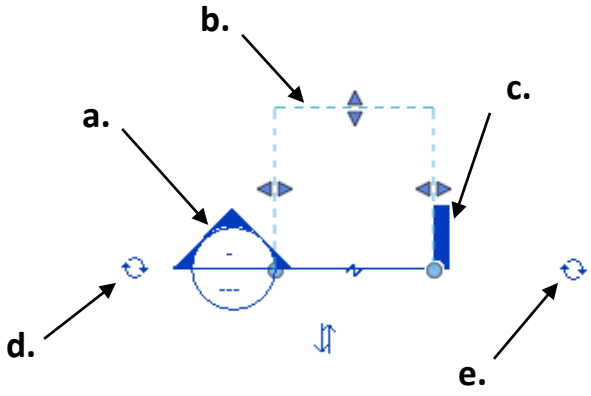
2. Label each of the components typically found in a kitchen:

	**Kitchen Sink**
	**Refrigerator**
	**Dishwasher**
	**Range (Stove)**
	**Base Cabinet**
	**Upper Cabinet**

3. What is the purpose of using a Section View?

   It allows the user to see an elevation anywhere they choose.

4. Describe each component of the section view symbol.



a. Section head

b. View range

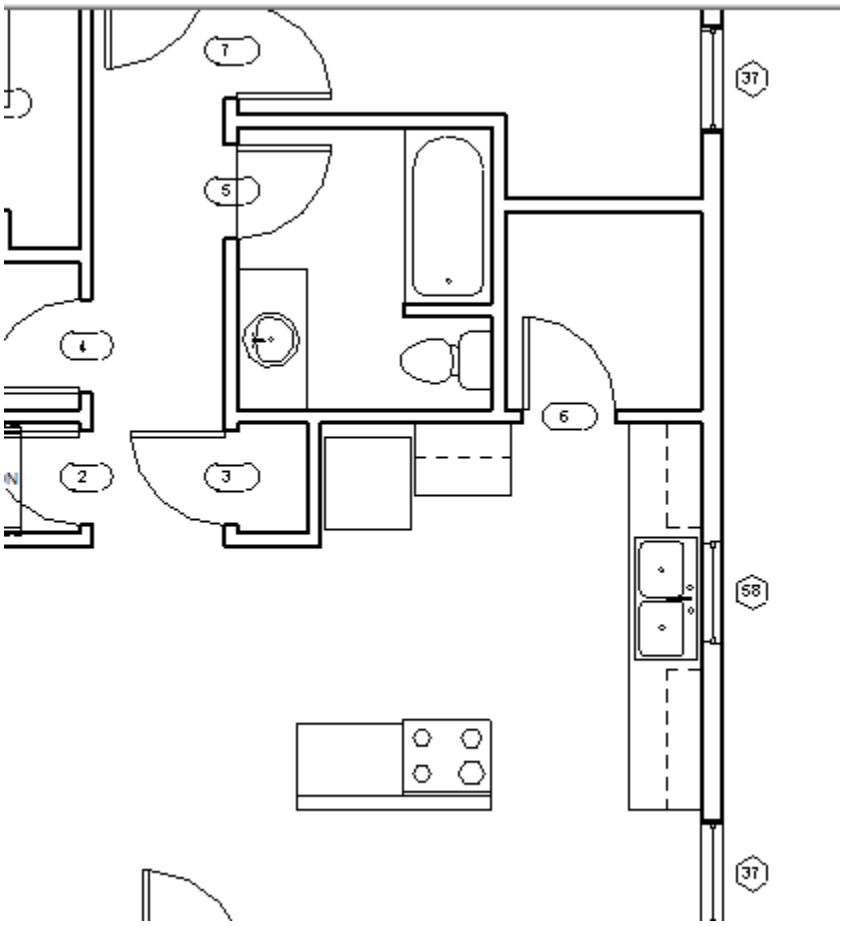
c. Section tail

d. Changes style of Section head

e. Changes Section tail

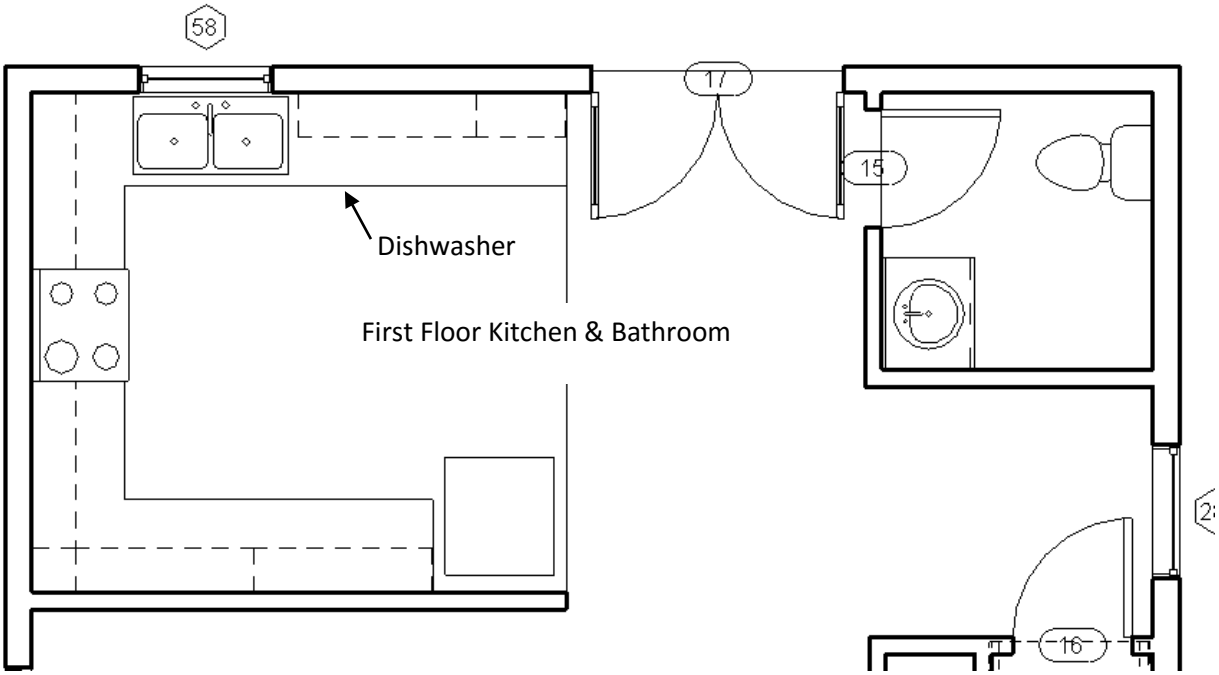
Demonstration

Follow along with the demonstration video and print out the floor plan at 50%. Tape the image in the space provided below.

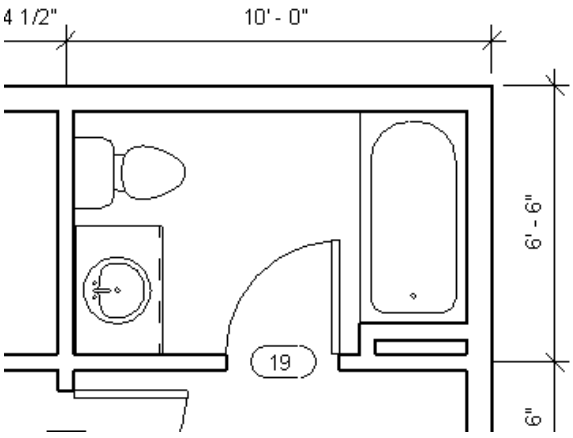


Activity

Complete the kitchen, first floor bathroom, and upstairs bathroom. Print out at 50% and turn in to your instructor.



First Floor Kitchen & Bathroom



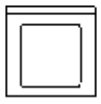
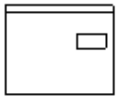
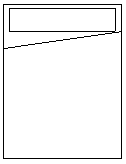
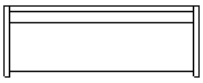
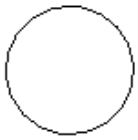
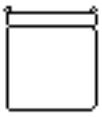
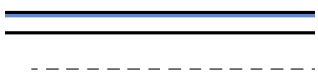
Upstairs Bathroom

Chapter 4
Lesson 2: Adding Components

1. Why is it a good idea to place furniture and other components in your floorplans?

It's a good way to judge how big a room is or a space's dimensions.

2. Label each of the symbols below:

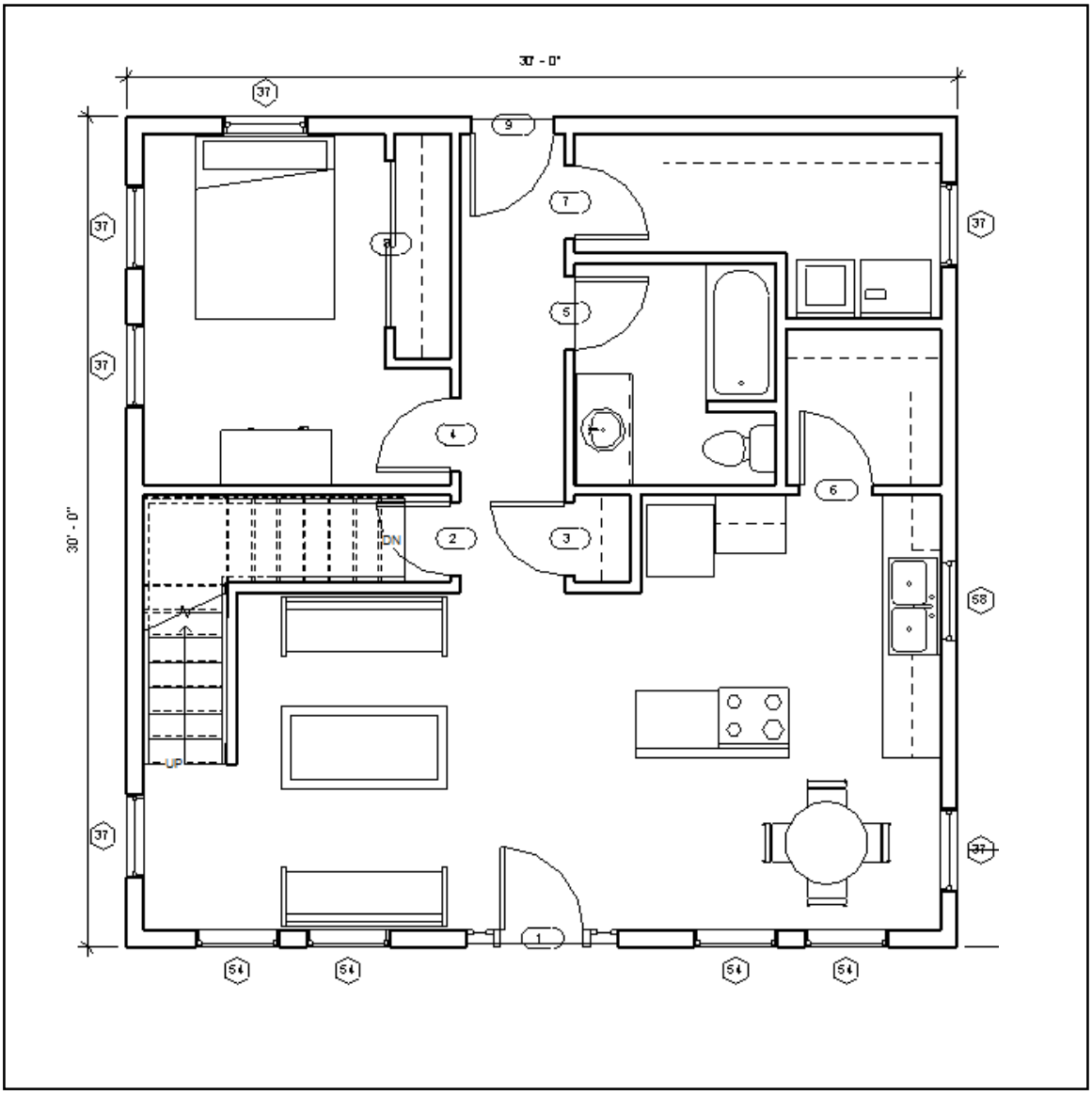
	**Washer (Clothes)**
	**Dryer**
	**Queen Bed**
	**Sofa**
	**Table**
	**Chair**
	**Closet Rod and Shelf**

3. How do you add components/doors/windows/etc. that are not preloaded into the project template?

Go to the appropriate tool and click "Load Family."

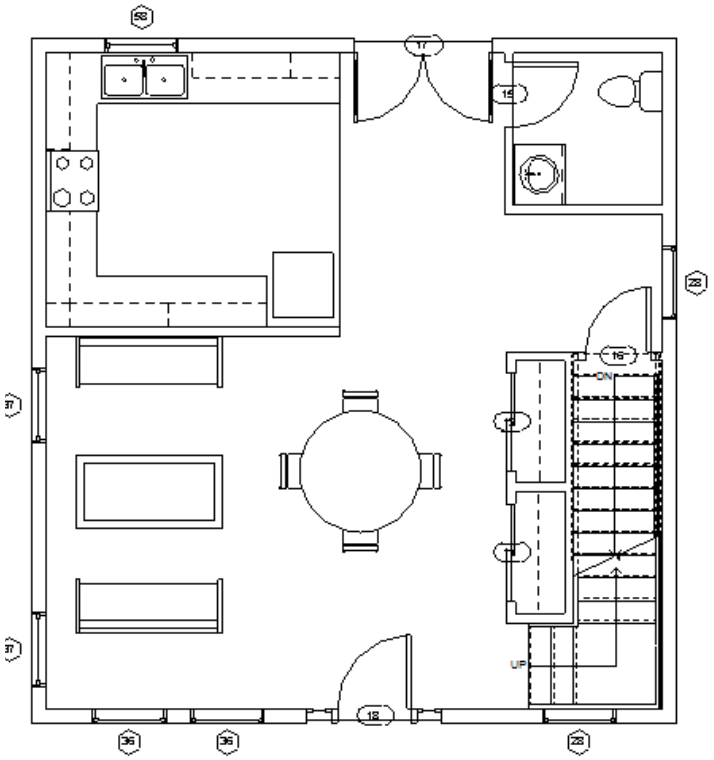
Demonstration

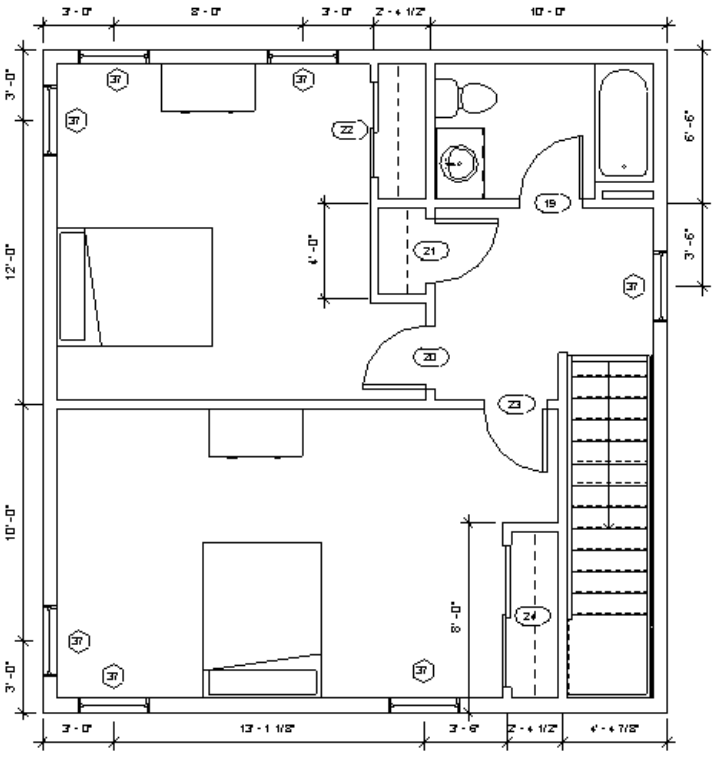
Follow along with the demonstration video. Take a screenshot of the First Floor of the Demo House.



Activity

Open your Activity House and place SIMILAR furniture in the various roomsl. Print out per your instructor's direction.



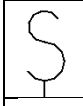
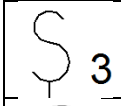
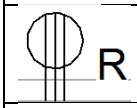


Chapter 5
Lesson 1: Electrical Plans & Ceilings

1. Why is the electrical plan grayed out?

   It makes it easier to see the electrical components.

2. Label each of the components typically found in an electrical plan:

	**Switch – Single**
	**Switch – 3 Way**
	**Outlet - Duplex Single**
	**Outlet - Duplex Range**
	**Outlet – GFI (Ground Fault Interrupter)**
	**Downlight – Recessed Can**

3. What is a reason why the Automatic Ceiling tool doesn't work?

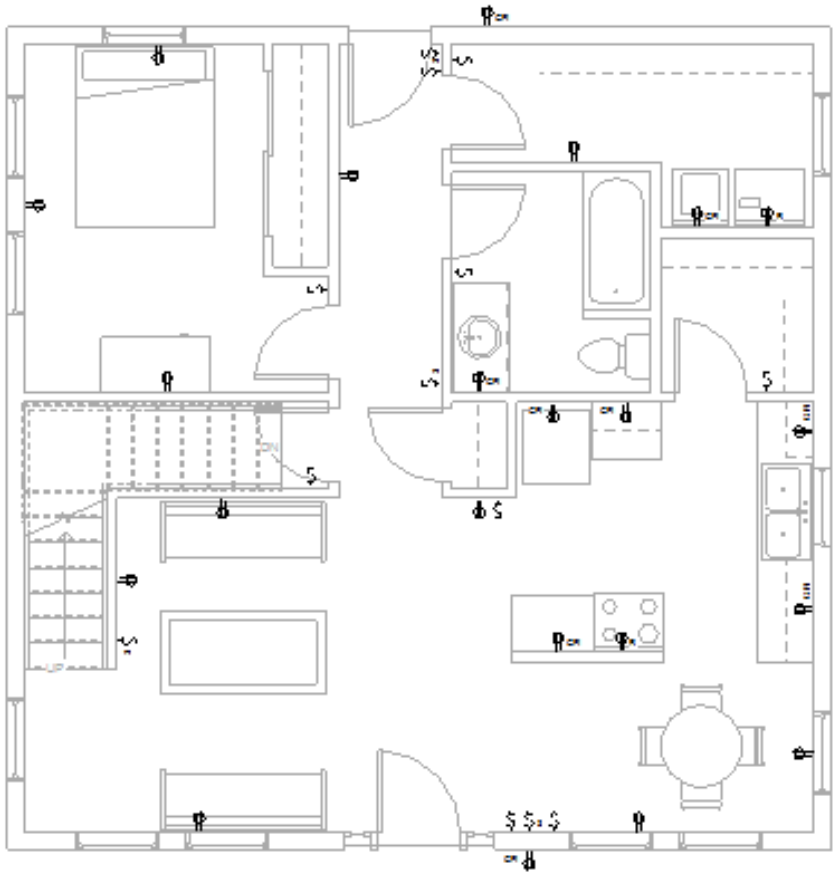
   The walls are not extended up to the floor above.

4. To create a vaulted ceiling you have to use the **Slope Arrow** and adjust the Level at Tail and Level at Head.

5. After setting up the Revit sheets you will connect the light switches to lights using hidden line arcs called **switch legs**.

Demonstration

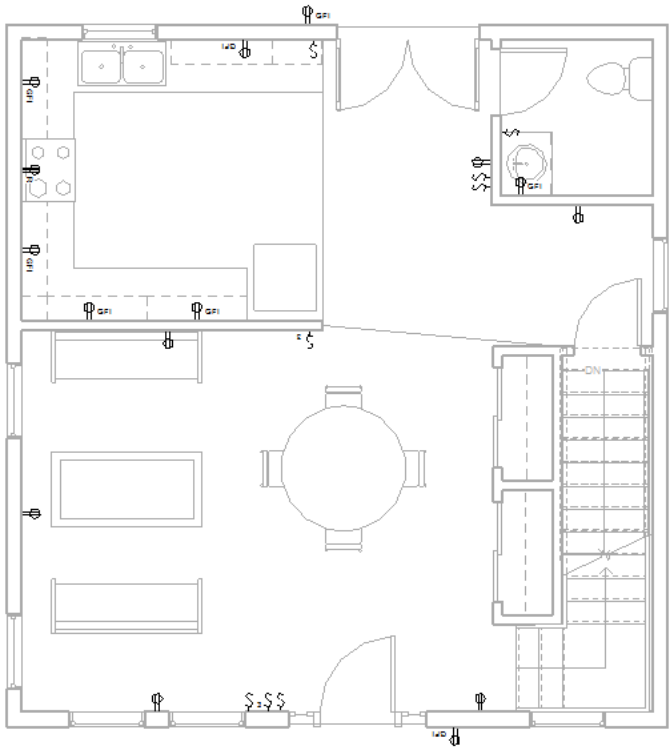
Follow along with the demonstration video and print out the floor plan at 50%. Tape the image in the space provided below.

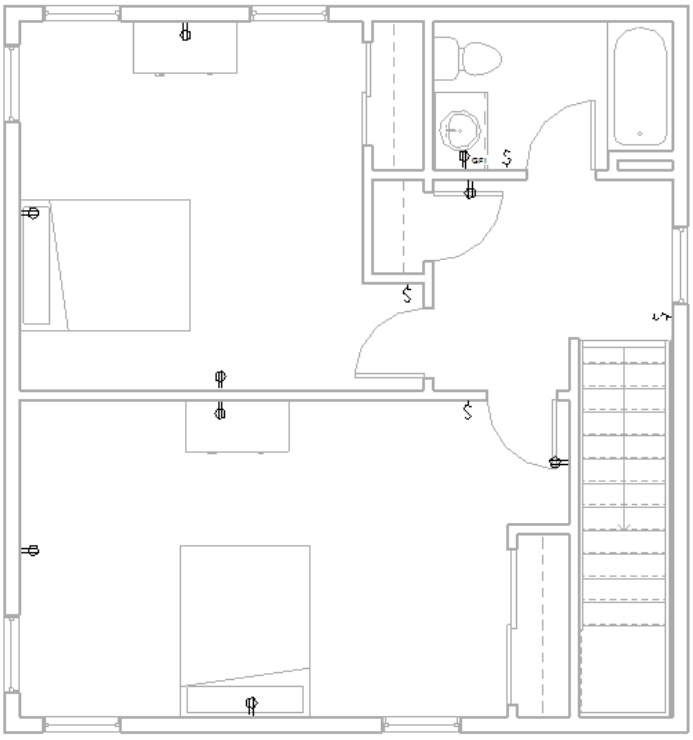


Activity

Complete the first and second floor electrical plans. Print out at 50% and turn in to your instructor.

REVIT ANSWER KEY





Chapter 5
Lesson 2: Wall Section/Kitchen Elevations

1. What is the purpose of a section view?

   It allows us to see what components make up the wall/floor/etc.

2. It's easiest to pull the siding down in **elevation views**.

3. What is the purpose of using the 

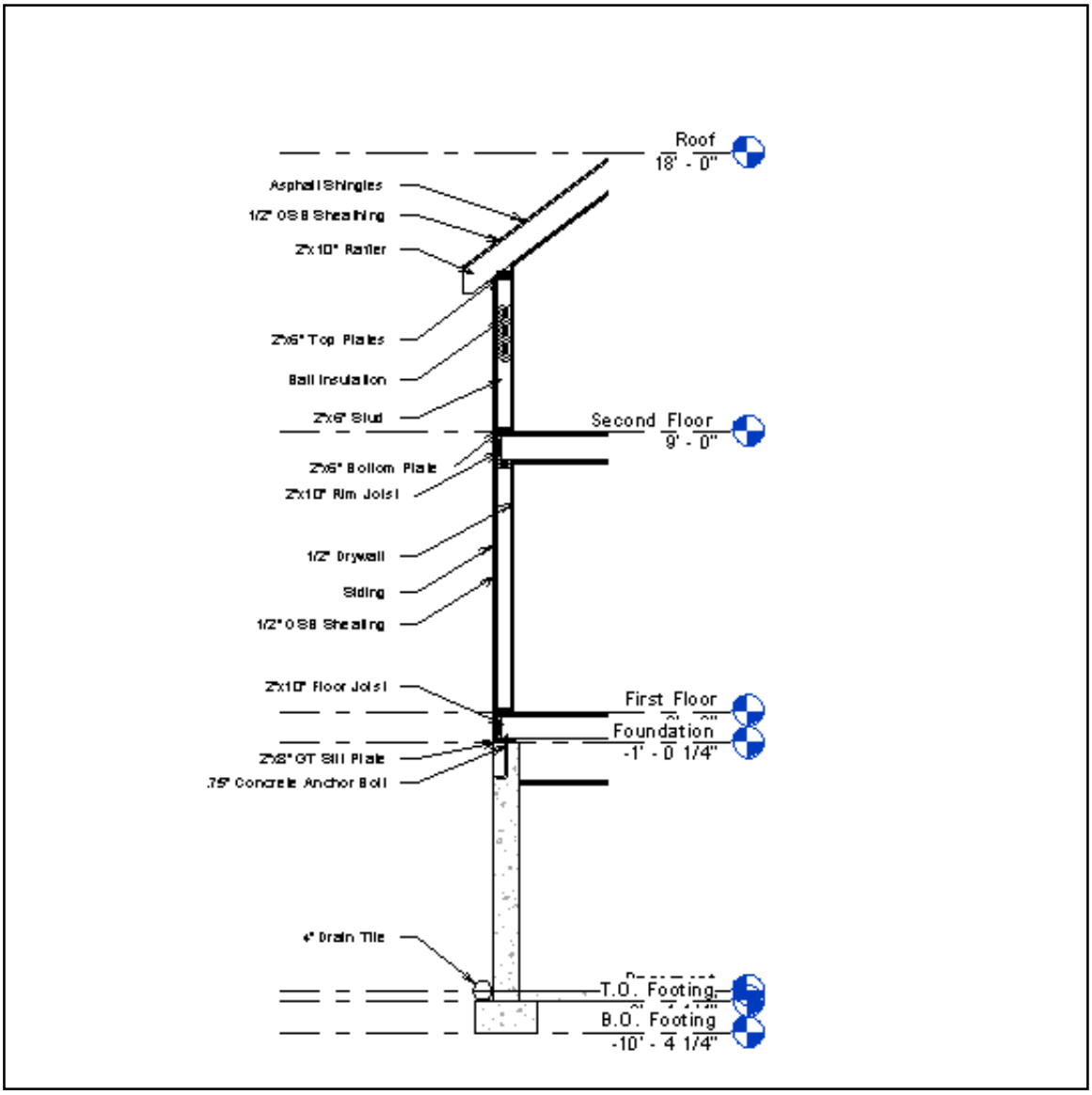
tool?

   The Revit program "bolds" lines so they are easier to see when the camera view is far away. Clicking on the Thin Lines tool changes the line weight to think so you can see more detail while zoomed in.

4. In order to see the individual components in a wall section you have to change the **Detail Level**.

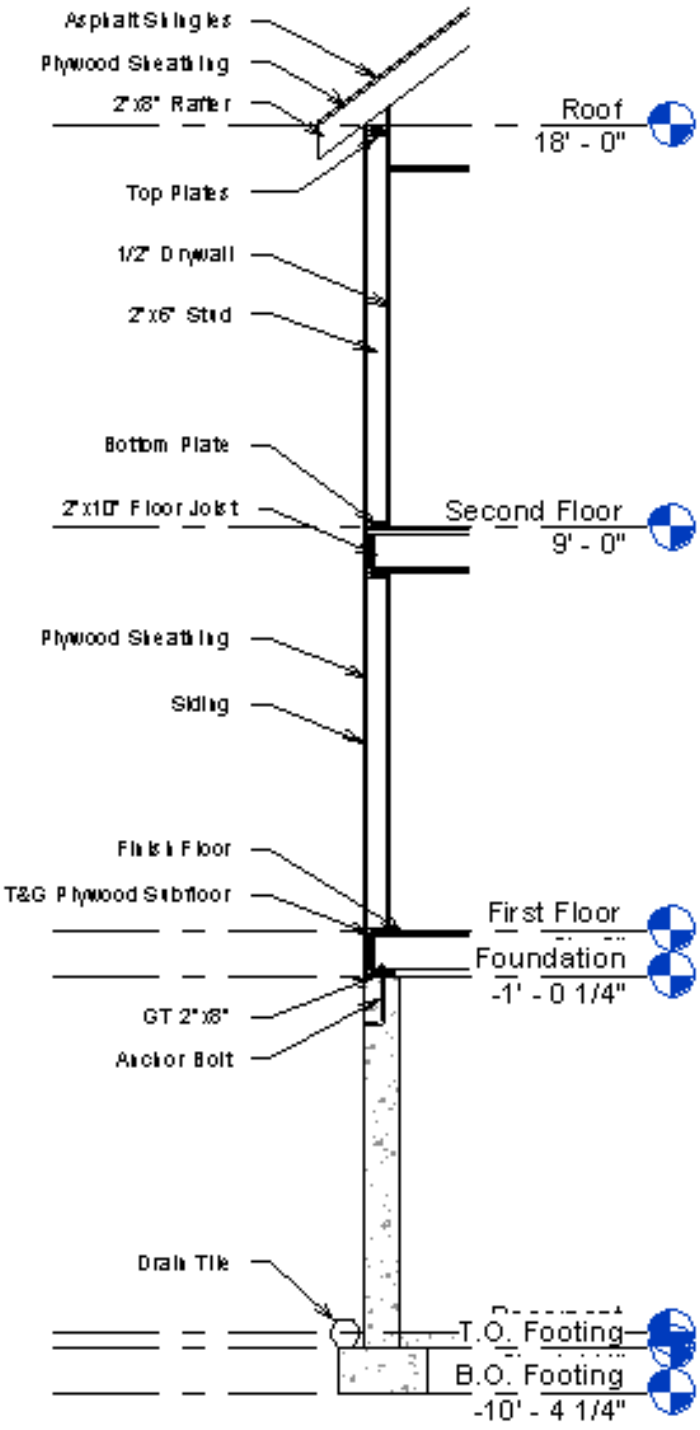
Demonstration

Follow along with the demonstration video. Take a screenshot of the First Floor of the Demo House.



Activity

Open your Activity House and create a wall section with appropriate labels. Watch the Demo video again if needed. Print out per your instructor's direction.



Chapter 5
Lesson 3: Adding Topography and Outside Elements

1. Why may we want to create the site in a separate file from the main structure?

   In every view of the house file you may have to turn the visibility of topography and plantings.

2. Describe what each tool does:

 Toposurface	**Creates the land the structure sits on.**
 Site Component	**Places elements like trees, shrubs, lights, etc.**
 Parking Component	**Places elements related to parking lots.**
 Building Pad	**Creates a cavity in the topography surface. Commonly used for a basement.**
 Split Surface	**Splits the topographical surface into 2 separate entities. Commonly used to "trim" the topography.**
 Merge Surfaces	**Merges split surfaces back together.**
 Subregion	**Places a separate region on the topographical surface.**
 Property Line	**Created in the site plan view. Establishes the site's property lines by sketch or typing in distances in a table.**
 Graded Region	**Shows changes to the site during the construction process.**

3. Describe what these Material tools are used for:

	**Opens User Defined Libraries**
	**Creates and Duplicates materials**
	**Opens the Asset Browser**

4. By checking **Use Render Appearance** your material color will look more like the finished color while still in the Shaded view style.

5. Using this tool is a great way to create driveways, sidewalks, and patios.

   Sub Region

6. What are the two ways to create Property lines on a site plan?

   a. **Create by entering distances and bearings**

   b. **Create by sketching**

7. What three things should be annotated on a site plan?

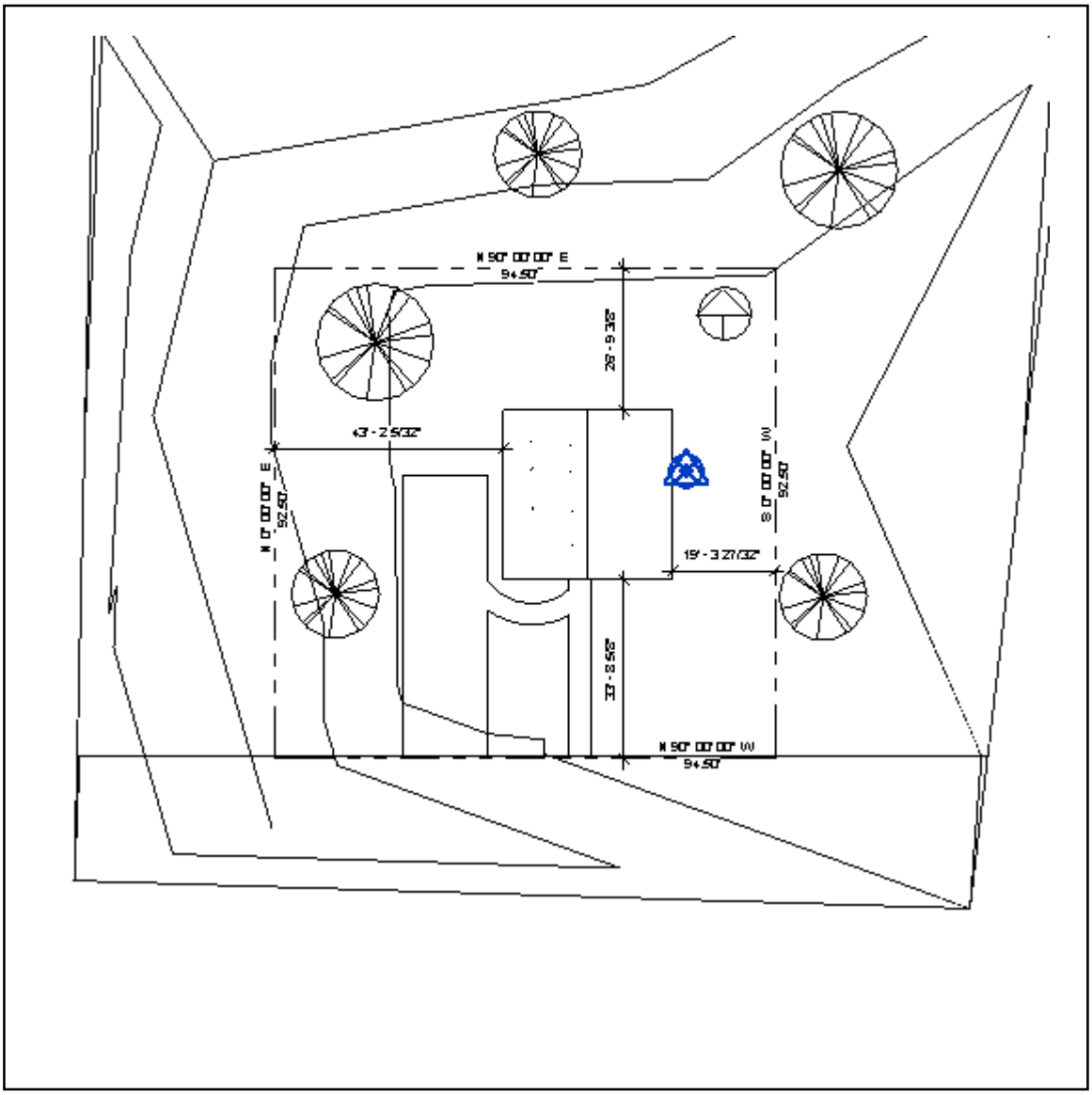
   a. **Property lines/tags**

   b. **North Symbol**

   c. **Setbacks**

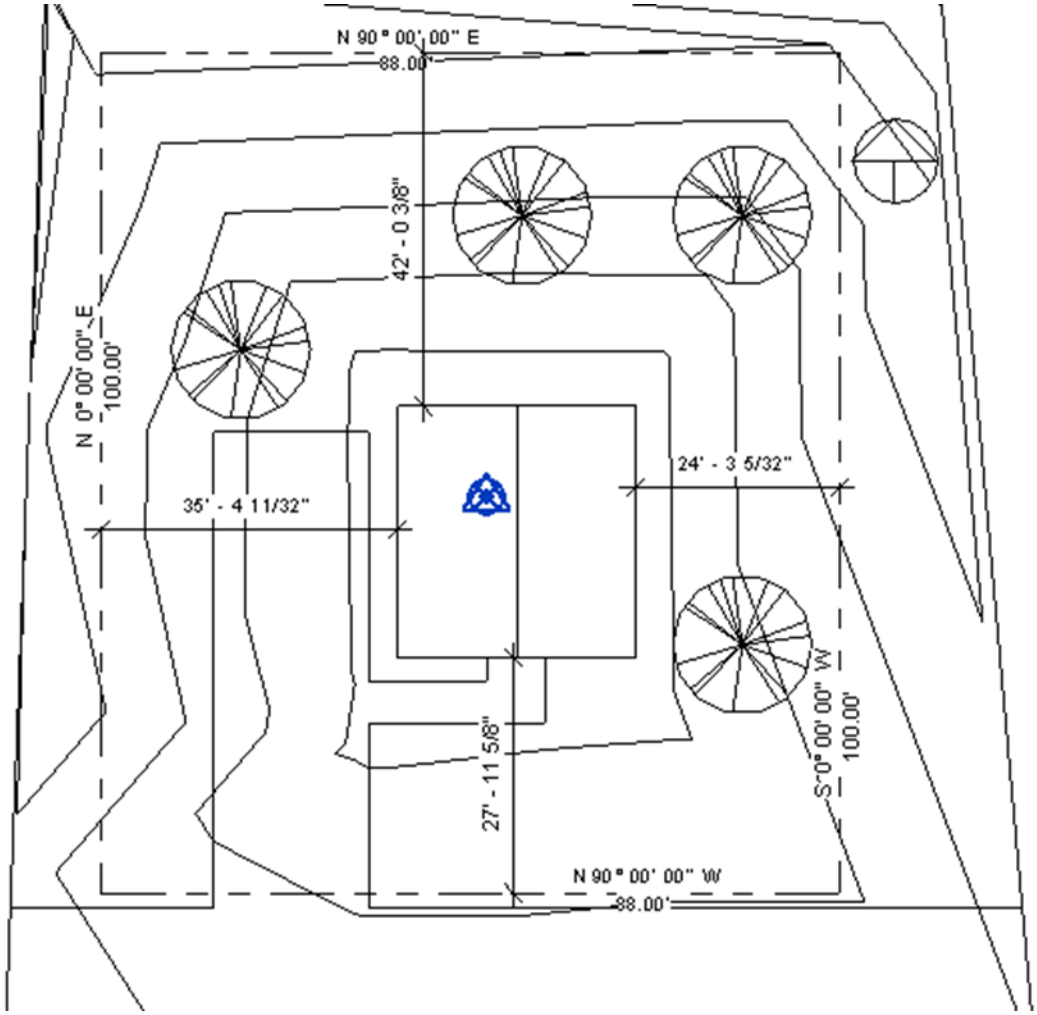
Demonstration

Follow along with the demonstration video. When finished take a screenshot of the Site Plan. Print out at 50% and tape the image into your workbook. (The position of the trees/property lines/sub regions/setbacks do not have match the Demo video)



Activity

Open your Activity House and create a Site Plan for the house. Be sure to include the elements discussed in the Demo Video. Print out per your instructor's direction.



Chapter 6
Lesson 1: Dimension Plans

1. The first step in creating a dimensioned floor plan is to **duplicate** the floor plan you are planning to dimension.

2. Describe what each of the following tools does:

 Duplicate View	**Duplicates only the model elements, without annotation symbols, dimensions, tags.**
 Duplicate with Detailing	**Duplicates model elements and annotations.**
 Duplicate as Dependent	**Primary and duplicate view are connected. When one change is made, it is updated onto the other view.**

3. What needs to be done to the floorplan before adding dimensions?

   All furniture, section symbols, and tags should be turned off. Keep counters, casework, plumbing fixtures.

4. What are the two ways of selecting elements to dimension?

   a. **Individual Reference**

   b. **Entire Walls**

5. When dimensioning a floor plan, start at the **outside corner** of the floor, then select the **centers** of walls/windows/doors, and finish with the other **outside corner**.

6. List the 3 steps when dimension the side of a structure:

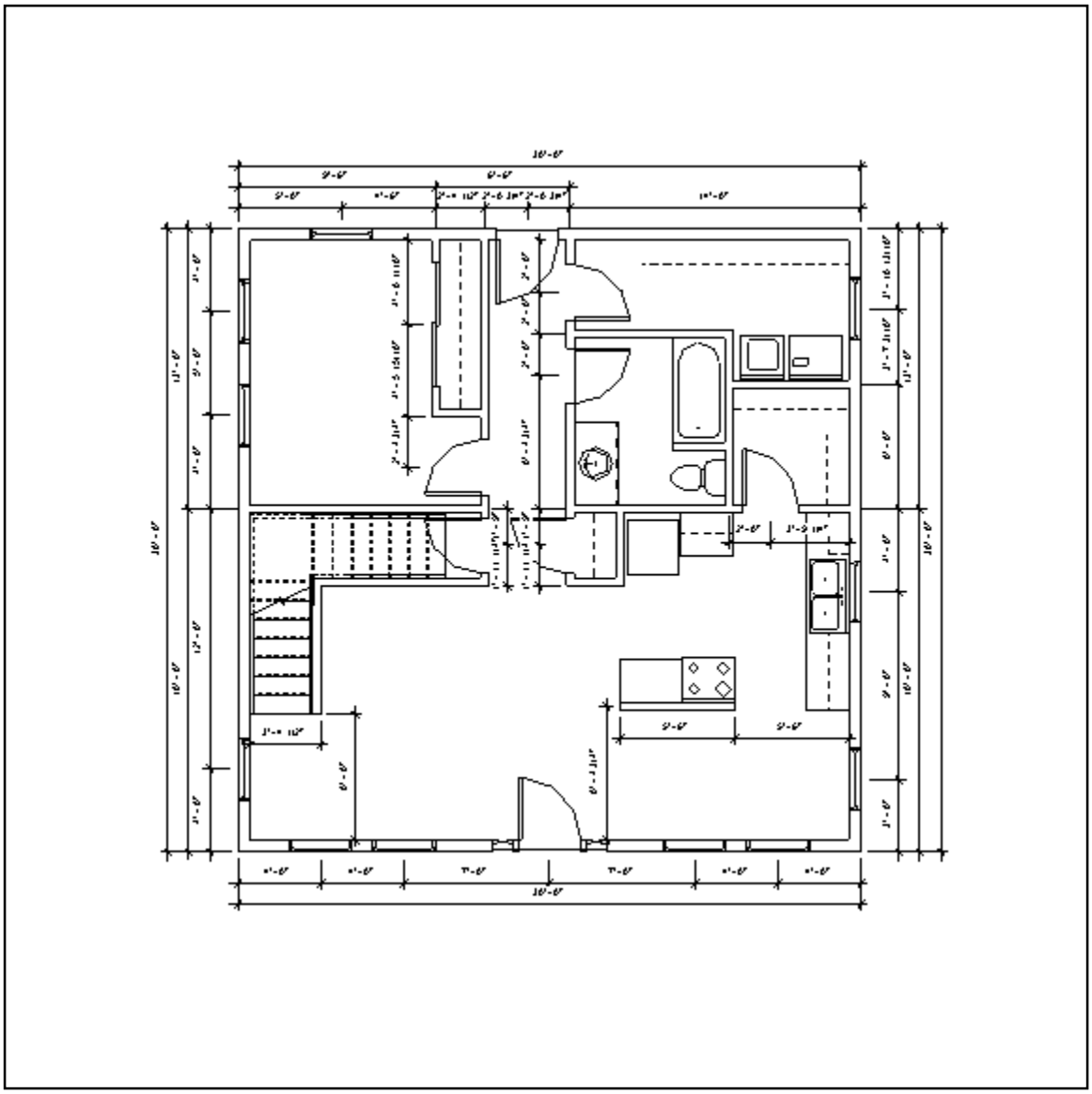
   a. **Pick all elements**

   b. **Pick only walls**

   c. **Pick the overall length**

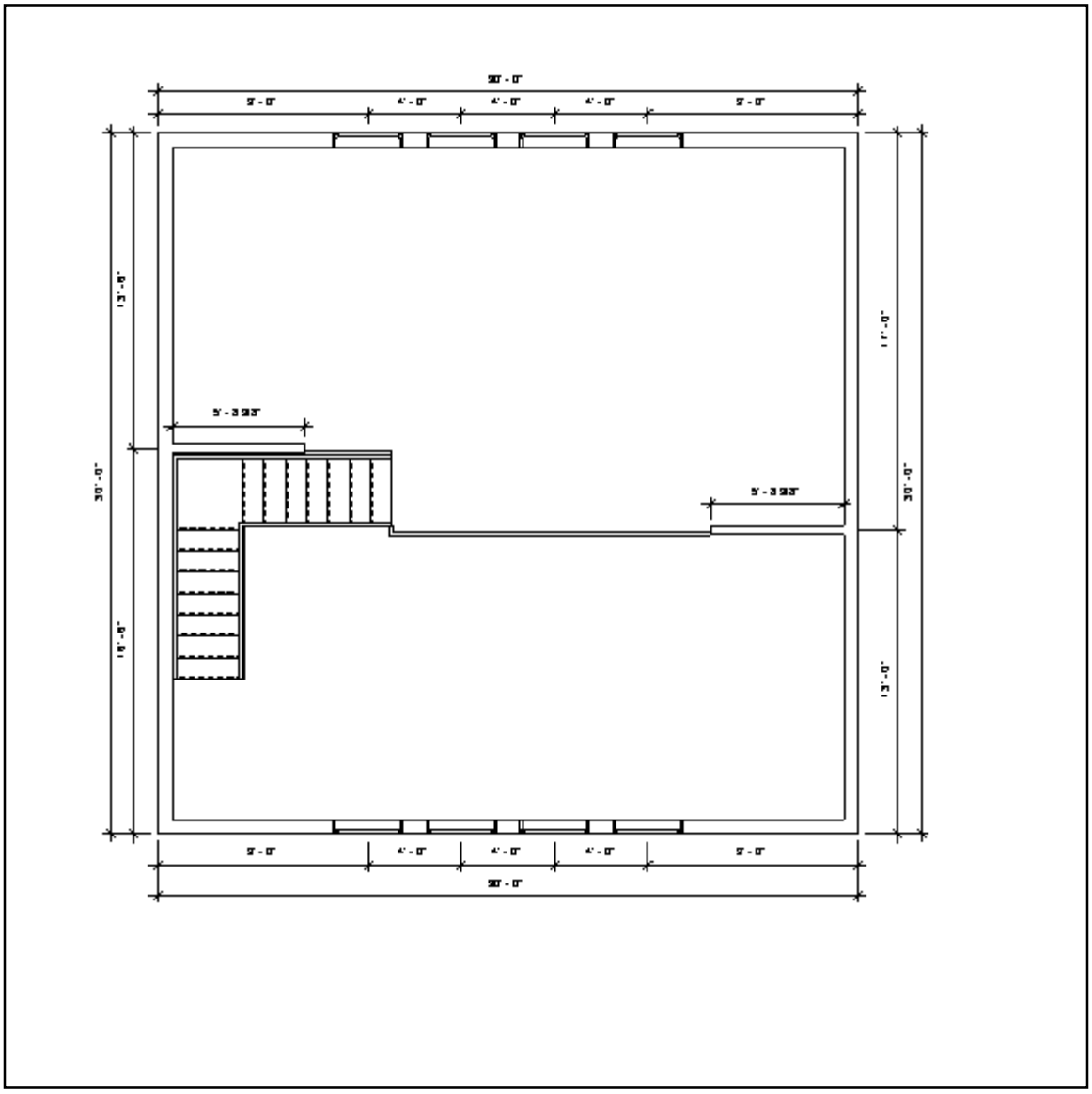
Demonstration

Follow along with the demonstration video and print out the floor plan at 50%. Tape the image in the space provided below.



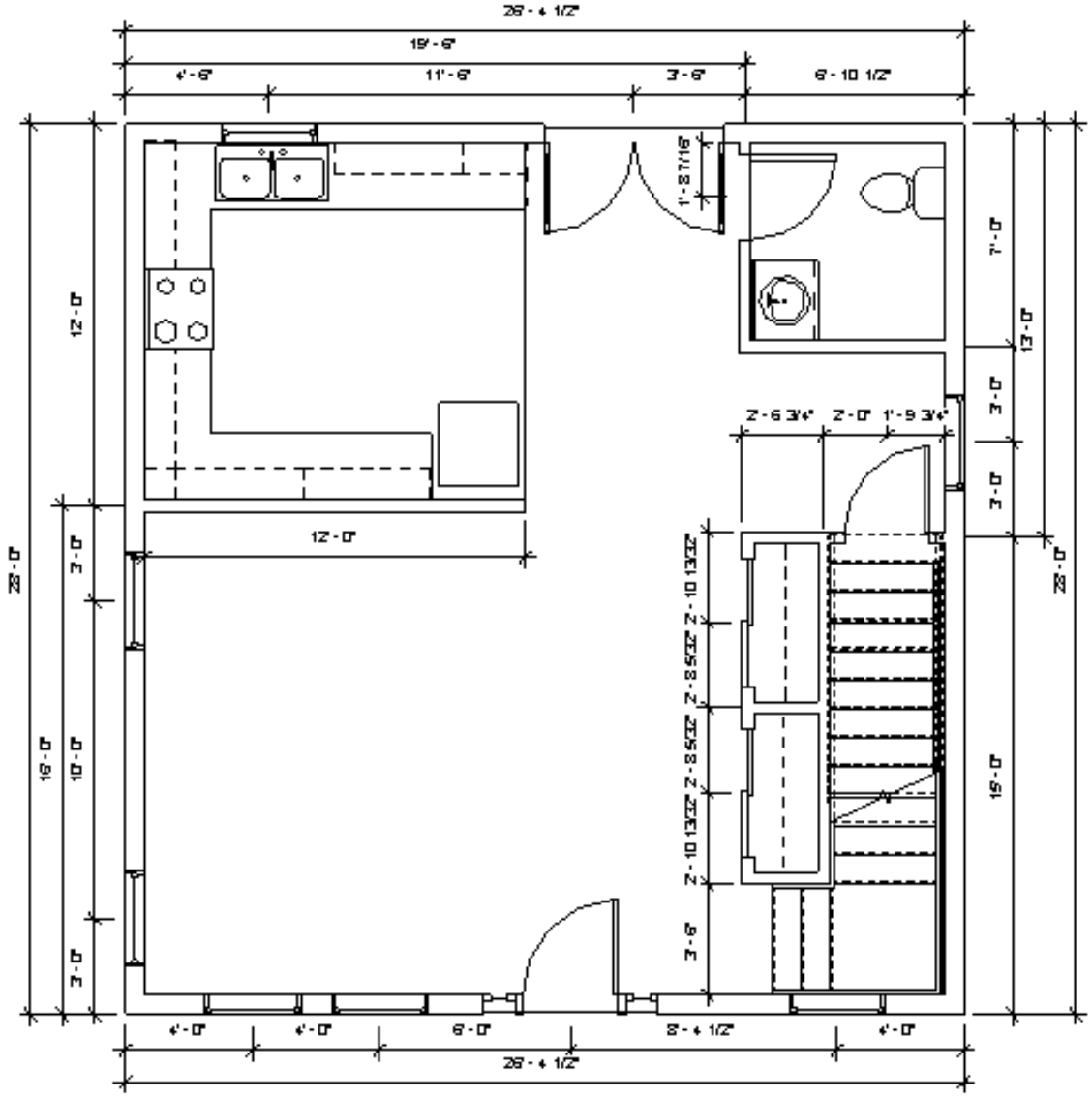
Demonstration

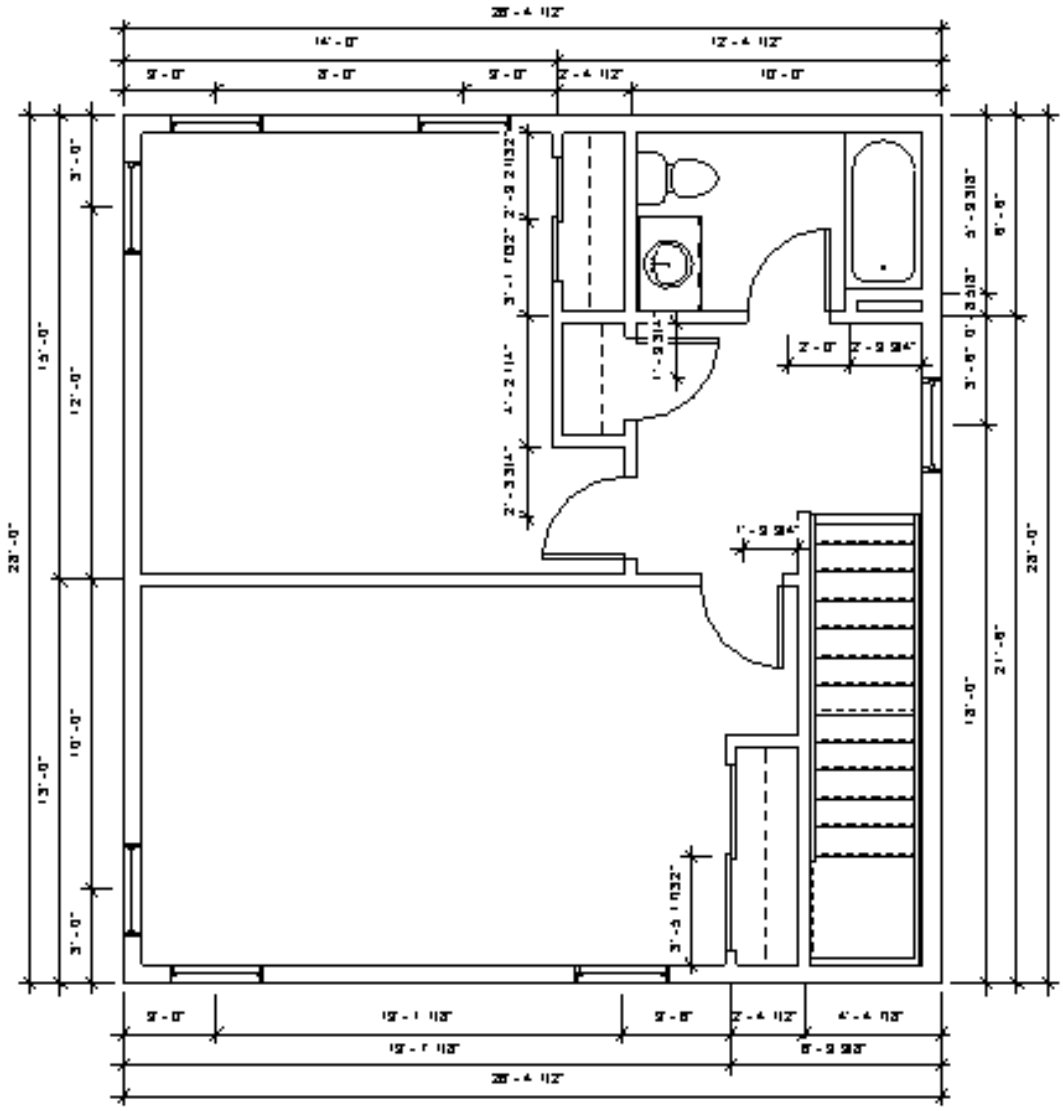
Follow along with the demonstration video and print out the floor plan at 50%. Tape the image in the space provided below.



Activity

Complete the first and second floor dimension plans. Print out at 50% and turn in to your instructor.





Chapter 6
Lesson 2: Revit Sheets

1. Why may you want to delete the existing sheets in a Revit file and replace them with a size of your choosing?

   Revit sheets automatically places the views on the sheets which gives us less control of where we want to place views.

2. If we don't have access to a large format printer, what size sheet could we possibly use and print out at "Fit to Page?"

   C size, 17"x22"

3. List the order of sheets:

T1	**Title Page**
A1	**Site Plan**
A2	**Elevations**
A3	**Foundation Plan**
A4	**First Floor Plan**
A5	**Basement Floor Plan**
A6	**Dimensioned Floor Plans**
A7	**Schedules**
A8	**Interior Elevations**
A9	**Wall Section**
A10	**Roof Plan**
L1	**Landscaping Plan**
E1	**Lighting/Electrical Plan**

Demonstration

Follow along with the demonstration video. Wait to print out your Revit sheets until the final demonstration video.

Activity

Open your Activity House and update your Revit sheets. Wait to print out your Revit sheets until the final demonstration video.

Chapter 6
Lesson 3: Schedules/Room Tags

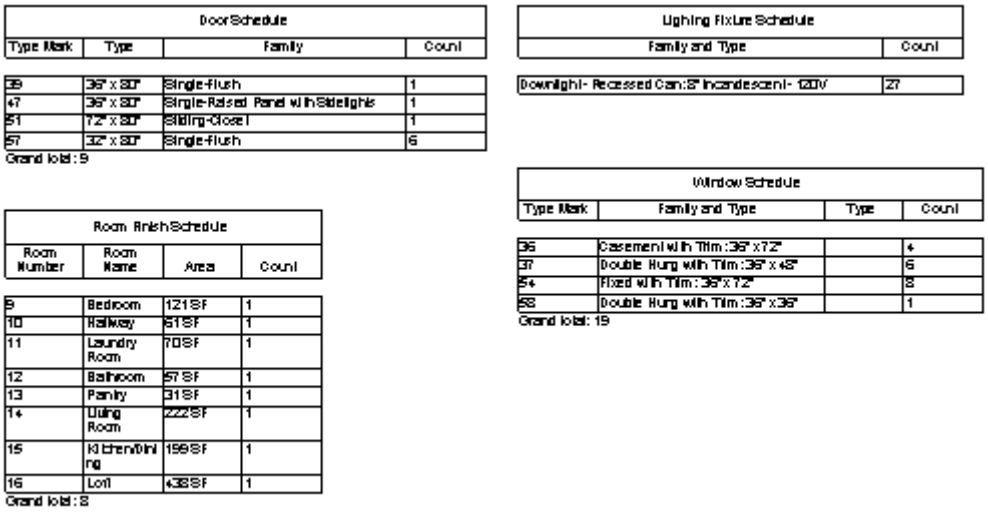
1. List the fields necessary for a door, lighting, room and window schedule.

Door Schedule	Lighting Fixture Schedule	Room Finish Schedule	Window Schedule
Type Mark	**Family and Type**	**Number**	**Type Mark**
Type	**Count**	**Name**	**Family and Type**
Family		**Area**	**Type**
Count		**Count**	**Count**

2. A room tag can be put outside of a room as long as the **leader line** is activated.

Demonstration

Follow along with the demonstration video. Take a screen shot of your Schedules Sheet, print out and tape in your workbook.



Door Schedule

Type Mark	Type	Family	Count
39	36" x 80"	Single-Flush	1
47	36" x 80"	Single-Raised Panel with Sidelights	1
51	72" x 80"	Sliding-Closet	1
57	32" x 80"	Single-Flush	6

Grand total: 9

Lighting Fixture Schedule

Family and Type	Count
Downlight- Recessed Can: 6" Incandescent- 120V	27

Window Schedule

Type Mark	Family and Type	Type	Count
36	Casement with Trim: 36" x 72"		4
37	Double Hung with Trim: 36" x 48"		6
54	Fixed with Trim: 36" x 72"		8
58	Double Hung with Trim: 36" x 36"		1

Grand total: 19

Room Finish Schedule

Room Number	Room Name	Area	Count
9	Bedroom	121 SF	1
10	Hallway	61 SF	1
11	Laundry Room	70 SF	1
12	Bathroom	57 SF	1
13	Pantry	31 SF	1
14	Living Room	222 SF	1
15	Kitchen/Dining	199 SF	1
16	Loft	438 SF	1

Grand total: 8

Activity

Open your Activity House and update your Revit sheets with your schedules.

Door Schedule			
Door Type	Door Size	Family	Count
30	68" x 80"	Double-Glass 1	1
47	36" x 80"	Single-Raised Panel with Sidelights	1
51	72" x 80"	Sliding-Closet	1
54	48" x 80"	Sliding-Closet	3
57	32" x 80"	Single-Flush	6
Grand total: 12			

Room Finish Schedule		
Room Number	Room Name	Area
1	Kitchen	249 SF
2	Bathroom	38 SF
3	Great Room	289 SF
4	Bedroom	198 SF
5	Bathroom	51 SF
6	Bedroom	241 SF
Grand total: 6		

Window Schedule			
Type Mark	Type	Type	Count
28	Casement with Trim	36" x 48"	2
36	Casement with Trim	36" x 72"	2
37	Double Hung with Trim	36" x 48"	9
58	Double Hung with Trim	36" x 36"	1
Grand total: 14			

Lighting Fixture Schedule	
Family and Type	Count
Downlight - Recessed Can: 8" Incandescent - 120V	23
Wall Pack - Exterior: Wall Pack	2

Chapter 6
Lesson 4: Electrical Plan Switch Legs

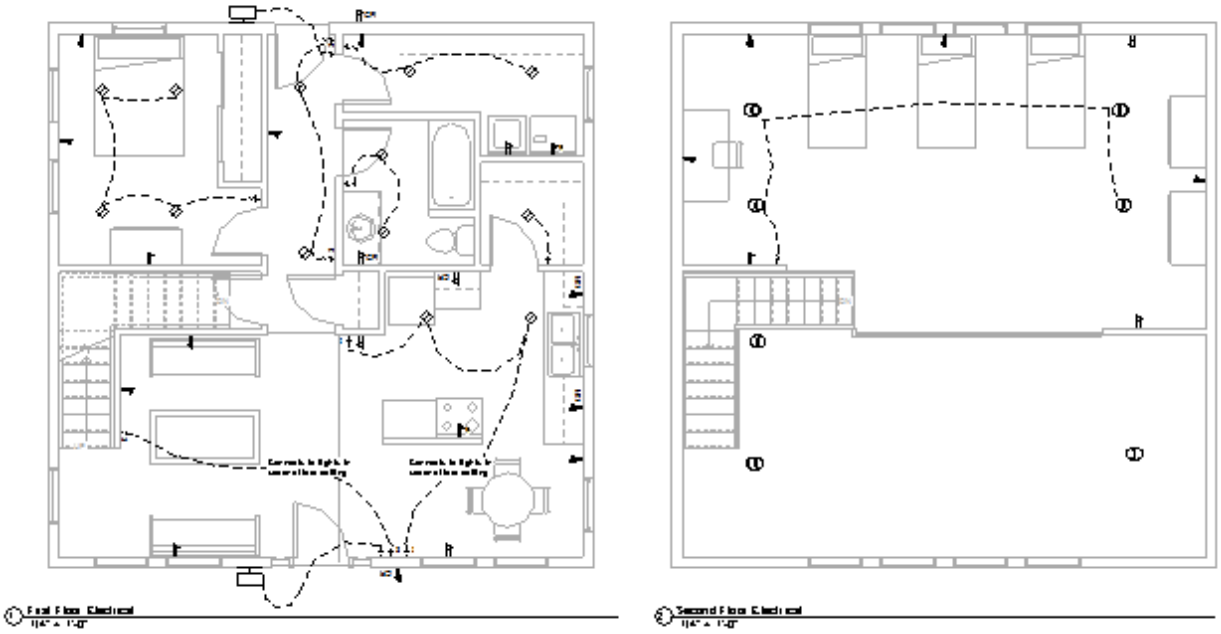
1. The **ceiling plan** gets placed directly over the **electrical plan** so both the lights and switches can be seen at the same time.

2. The connections between switches and lights are known as **switch legs.**

3. What type of line type is used for switch legs? **Hidden line arcs**

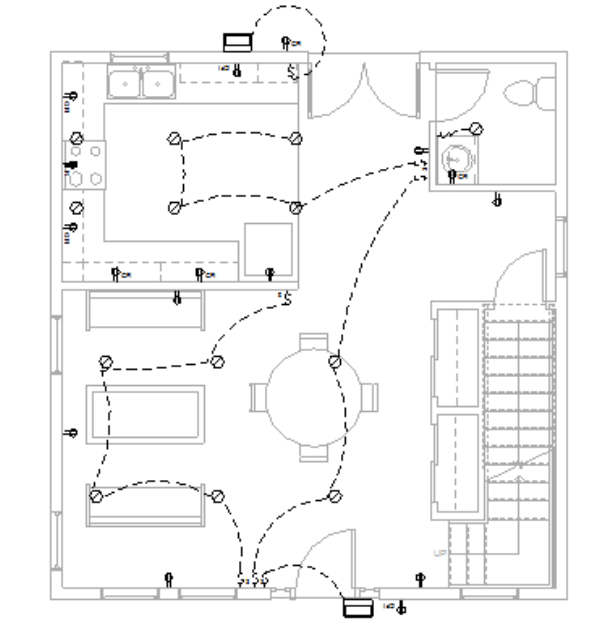
Demonstration

Follow along with the demonstration video. When finished take a screenshot of the electrical plans and tape below.

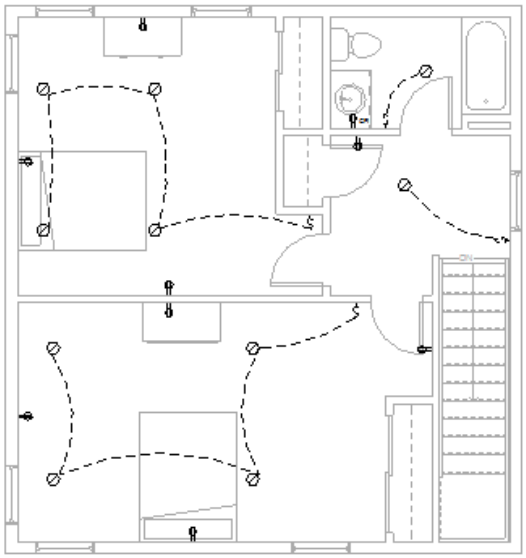


Activity

Open your Activity House and create the electrical plans.



1 First Floor Electrical
1/4" = 1'-0"



2 Second Floor Electrical
1/4" = 1'-0"

Chapter 6
Lesson 5: Rendering and Walkthroughs

1. What are the 2 fields added to a Sheet List?

    a. **Sheet Number**

    b. **Sheet Name**

2. How can we change the angle of the camera?

    We can adjust the height of the Eye Elevation and the height of the Target Elevation.

3. List the different Render Quality Settings:

    a. **Draft**

    b. **Low**

    c. **Medium**

    d. **High**

    e. **Best**

Demonstration

Follow along with the demonstration video. When finished print out all of the sheets from the project.

Activity

Open your Activity House, make the changes to your Title Sheet, then print out all the sheets from the project.