

Working with stairs

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Paul from Vancouver wants to put some new stairs down to his basement, but he has a very limited opening in the floor above. He wants to know just how do you determine the slope of stairs.

In the first photo you can see on the model the triangle formed by stairs as they go to the basement. The trick is to not make them so steep that you have built a ladder, not a stairway, and not to make them sloped so far out that you bump your head. In fact you need to work back and fourth with a couple of formulas. The ones I give work, but some people prefer others -- nothing is carved in stone with stairs -- only that we want them to be both comfortable and safe to walk on.

Measure the total rise. The total rise is measured from the top of the basement floor to the top of the floor above. We want each individual step to be somewhere between 5 and 8 inches -- that is how far you will have to pick up your foot. Basement stairs tend to be a little more steep than others, precisely to allow for a minimum floor cut-out, so let's start with a 7 inch rise. Divide 7 into the total rise and that gives you the number of steps. Round it up or down to an even number of steps, you never want one step a different rise than the others as you would stumble on it every time you negotiated the steps.

Now divide 7 into 75, my formula in the second graphic: $\text{rise} \times \text{run} = 75$. That gives these steps a run of 10.7 inches. I suggest you actually draw the triangle out on the wall where the steps will go. That will allow you to measure directly down from where you might bump your head on the floor opening above to the diagonal of your stair triangle. If you do not have 75 inches of clearance, you will need to make the floor opening bigger or make the stairway steeper. One trick with the floor opening is to have the opening on an angle, not square, you gain an inch or so clearance.

If you need to, try it all over again with a rise of 7-1/2 or 8 inches, until you get the clearance you need.

Now if you want to avoid all the difficult math and fancy carpentry, I have helped a Quebec inventor to develop and market a great custom hardwood staircase system that goes together like a Lego set -- and I have done all the math for you with a calculator on the web -- just measure finished floor to finished floor and you can get all the rest from www.CaseModular.com. We have managed to put all the skill in the factory made step units and on the web -- you just need basic carpentry skill. It is worth checking out.

Jim from Mississauga took the carpet off of his stairs and found that the tread was separated from the riser. It is all finished below. How can he close up that gap? One way to do that would be to use a 'pocket jig' that drills a clearance and pilot hole on an angle, as you can see in the third photo above. These are used a lot under tables for attaching the skirts. On a stairway, it would allow you to pull the riser tight to the tread, but you would have to fill in all the holes with a dowel and refinish the stairs.

Lucie from Oakville complains about squeaking stairs. The fourth photo, which happens to be twisted around at an odd angle for the camera, shows how many stairs are built by socketing the risers and treads into the stringers. If you have access to the back side, you can force in shims and glue them into place, stopping the movement which causes the noise.

Ed is building some outdoor steps and wants some help. Often outdoor steps are even less sloped than those inside the house. Ed wants to know how to you mark out those side stringers that are cut like a saw tooth. The key is to use a carpenter's square and some 'stringer stops'. You can see the stops in the last photo. They are little clamps that attach directly to the carpenter's square; one placed at the dimension of the rise and the other placed at the dimension of the run. Then simply hook those stops on the edge of the 2x you are using for the stringer and mark out the stair notches.

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