Ask Jon Eakes

The mathematical challenge - A Walkway Curve

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Don in Winnipeg wanted to make a wooden walkway. He wanted to fan the boards out at the 90 degree corner, but couldn't figure out how to calculate the angle to cut the boards to make them fit. The first important reflection was that the center point of this fanning out should not be right in the corner of the walkway, or the boards would be cut to such a fine point (in the centre of the pie) that they would have no strength for walking. Pulling the centre point back would leave a bit more meat on the walkway boards.

So, what is the mathematical formula for calculating the angle to cut the boards? 57.3W/R of course. The details are on the graphic, but this didn't really come out of nowhere, and it wasn't really that complicated either.

What we need to know is how many boards are going to be used in going around the corner and then divide that number into 90 to know what angle to cut each board. The number of boards is done simply by dividing the width of each board into the length of the curve around the corner, measured where the curve would be drawn to reach the longest board. The distance around a circle is pi times the diameter or 3.1416D. D is twice the radius of the circle, which is the length of the longest board. Put that together and you get that funny number 57.3 times the width of the board divided by the length of the longest board. I loved geometry in school, and honed it in the cabinet shop.

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