PROBLEM SOLVED
MAKING SENSE OF MATHEMATICS

Scene		Full Transcript
1	**Carlos:**	Hey! It's Carlos. Today, I am helping Rick of Rathmell Construction prepare a cost estimate for replacing this cement patio.
2	**Voice-Over Carlos:**	The homeowner told him that he wants to double the length and the width of the patio. Rick's taking all the measurements so that he can do the calculations, and he asked me to check them over just to be sure.
3	**Carlos:**	Before he can complete his cost estimate, he needs to know how changing dimensions affects area. Hey, there's no time to lounge around on this job. Sharpen your pencil, and we'll figure out another *Problem Solved*.
4	**Voice-Over Carlos:**	Here's the patio. Rick measured and found that it's 10 feet wide by 12 feet long. So, the area of the old patio is 120 square feet. But remember, the customer wants to double the length and the width. So, the new patio would be 20 feet by 24 feet. The area of the new patio would be 480 square feet.
		Rick's question to me was, "How can that be? The owner wants to double the dimensions of the patio, but the new area isn't doubled; it's four times as big!"
5	**Carlos:**	The good news is that Rick's calculations are correct. The area of the new patio will be 480 square feet. What he needs to understand is that when the linear dimensions of a shape double, the area quadruples. That is why the area of the new patio is four times the original area! Here is how I explained it to Rick.
6	**Voice-Over Carlos:**	The area of a 1 by 2 foot rectangle is 2 square feet. If you double the linear dimensions to 2 feet by 4 feet, the scale factor is 2. As you can see, the new area is 8 square feet; that is four times the original area, so the area factor is 4. If you triple the linear dimensions to 3 feet by 6 feet, the scale factor is 3, and the new area is 18 square feet. The area is nine times the original, so the area factor is 9. If you quadruple both linear dimensions, the area is 16 times the original.
		Let's put this information into a table and look for a pattern. When the scale factor is 2, the area factor is 4, or 2^2. When the scale factor is 3, the area factor is 9, or 3^2. When the scale factor is 4, the area factor is 16, or 4^2. As each of the two dimensions of a rectangle is multiplied by the same number, the area is multiplied by the square of that number.
7	**Carlos:**	I'm going to ride back to the office with Rick and help him finish his estimate. He's got nothing to worry about. His calculations are correct. If you find yourself in a similar situation, just remember how changing linear dimensions affects area, and you'll have the perfect perspective on the proportion of your patio. *Problem Solved*.

MakingSense