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Process Analysis

Have your teachers ever made you do something crazy like go out on a roof to measure the area of a wall? No? Well, ours have. Our Algebra and English classes were divided up into groups of four to complete a project called process analysis. My group was assigned the task of finding the area of the west wall on the roof of the high school and describing the process we used. First, we needed to estimate how many bricks were used to build the west wall. My group estimated around 2000 bricks. Next, we were asked to test the hypothesis using a process called dimensional analysis.

We began this process by calculating the area of the entire wall, which was 862.29 sq. ft. We accomplished this by measuring the length of the wall, 58.5 feet, and the height of the wall, 14.74 feet, and multiplying these two numbers. (Tip: When measuring the height of the wall, add the measurements of the spaces between the darker colored bricks because the tape measure is too flimsy to reach the top.) After this step, we found the area of the windows and the door that were on the west wall. We did this by measuring the width and the height of each of the windows and the door and finding the area of each. (There were two 3-paned windows at 61.2 sq. ft. each, two 2-paned windows at 40.6 sq. ft each, a single door at 22.2 sq. ft., and the last window at 11.0 sq. ft.) Then we added these areas together. The total area of the windows and door ended up being 236.8 sq. ft.

Once we found these two areas, we subtracted the area of the windows and the door from the area of the entire wall. The remainder was 625.49 sq. ft. This area now includes only the bricks and the mortar.

Prior to this step, we analyzed a brick and found it to be 23.38 sq. inches, but since the area measurements we calculated were in square feet, we needed to convert square inches into square feet. To do this, we divided 23.38 sq. in. (a brick and its surrounding mortar joint) by 144 sq. inches because there are 144 sq. in. in 1 sq. ft. We found that each brick measures 0.162 sq. ft.

We then had to divide the area of bricks and mortar, 625.49 sq. ft., by the measurement of each brick, 0.162 sq. ft., and as a result, we discovered there were 3,861 bricks in the west wall.

This process of dimensional analysis is very useful for estimating how much material is needed for a particular building or job. Our estimate or hypothesis was 2000 bricks. If we used our estimate to order the bricks to build the wall, we would not have had enough bricks. This process could be useful for other jobs such as laying concrete and hanging wallpaper. So, if your teachers ever ask you to go out on a roof, trust them!