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Honors English 9, IGA 1

October 12th, 2004

Process Analysis Paper

Finding the number of bricks in an already-made wall is something people don't do very often. But when the occasion arose to do this, how many people could accomplish this task? Some would simply estimate and leave it at that. Others might try to count all of the bricks. There is a much easier solution many people aren't aware of. When the time came to find the number of bricks which made up the Short Wall at Hilliard Davidson, I wasn't ready. Like the average person, I tried estimating the number of bricks. My guess was around 2500 bricks. I also attempted to count the number of bricks. However, I gave up after realizing that if I measured the walls I could use another process to find the number of bricks. This process is called dimensional analysis.

The initial step in solving how many bricks are in this wall, was to find the length of the entire Short Wall. The measurement turned out to be 101.56 feet long. The next step was to measure the height of the wall. When measured, the height was recorded to be 3.5 feet high. Now that both the length and height of the Short Wall have been measured, the area can be solved for. Area is the measurement of a surface. To find area multiply length and height. In this case, the numbers multiplied to find area were 101.56 feet and 3.5 feet. See diagram #1.

Diagram #1

$$101.56 \text{ ft.} \times 3.5 \text{ ft.} = 355.46 \text{ ft}^2$$

When multiplied, the area was found to be 355.46 ft².

At this point in solving the original problem, doors and/or windows would be subtracted from the area of the wall. However, because the Short Wall doesn't have any windows or doors, it is alright to move on. Because the area of the wall is in square feet and the area of the installed bricks is 23.38 in², it is important to convert area into square inches. The process used in this case is dimensional analysis. Dimensional analysis, also known as unit analysis, is the process used to convert different units. To use dimensional analysis correctly it is necessary for all units to cross out (expect the units being solved for). Start by putting 355.46 ft² (area) in the numerator of the first number. In the denominator of this number place a one. Next find the number of square inches in one square foot and multiply it by the area (355.46 ft²). To find the number of square inches, a picture can be drawn of one square foot. It is known one foot is equal to twelve inches. When twelve inches is multiplied by twelve inches, the answer equals 144 in² (1 ft²). Now that it's known how many square inches equals one square foot, put 144 in² over 1 ft². See diagram #2.

Diagram #2

$$355.46 \text{ ft}^2 / 1 \times 144 \text{ in}^2 / 1 \text{ ft}^2 = 51 \text{ 186.24 in}^2.$$

These two fractions multiplied equals 51 186.24 in² (ft² ÷ ft² cross each other out). Because the original problem called to find how many bricks are in the Short Wall, square inches must be divided by square inches so that the answer is in "Bricks". To accomplish this, put 23.38 in²

(Area of one brick) in the denominator of the next fraction. In the numerator place “1 Brick”.

Following this multiply $51\,186.24 \text{ in}^2$ and $1 \text{ Brick} / 23.28 \text{ in}^2$. See diagram #3.

Diagram #3

$$51\,186.24 \text{ in}^2 / 1 \times 1 \text{ Brick} / 23.38 \text{ in}^2 = 2189.32 \text{ Bricks.}$$

When multiplied across it is apparent the square inches cross out leaving the final answer of 2189.32 Bricks. To answer the original question, 2189.32 Bricks make up the Short Wall.

The process to solve this problem (dimensional analysis) is important and useful for several reasons. One reason is because construction and landscaping companies measure their products in square feet and square yards. Most people don't know off the top of their heads how many square feet and square yards they need, so they guess. When someone guesses the amount of a product needed they end up getting an amount different than that which is needed.

Dimensional analysis is a simple, easy way to understand the process which changes different units. Thus providing the correct answer to you, guaranteed.