6.RP Converting Square Units

Alignments to Content Standards: 6.RP.A.3

Task

Jada has a rectangular board that is 60 inches long and 48 inches wide.

a. How long is the board measured in feet? How wide is the board measured in feet?

b. Find the area of the board in square feet.

c. Jada said,

> *To convert inches to feet, I should divide by 12.*
>
> *The board has an area of 48 in $\times$ 60 in = 2,880 in ^{2}.*
>
> *If I divide the area by 12, I can find out the area in square feet.*
>
> *So the area of the board is 2,880 $\div$ 12 = 240 ft ^{2}.*

What went wrong with Jada's reasoning? Explain.

IM Commentary

Since this task asks students to critique Jada's reasoning, it provides an opportunity to work on Standard for Mathematical Practice 3 Construct Viable Arguments and Critique the Reasoning of Others.

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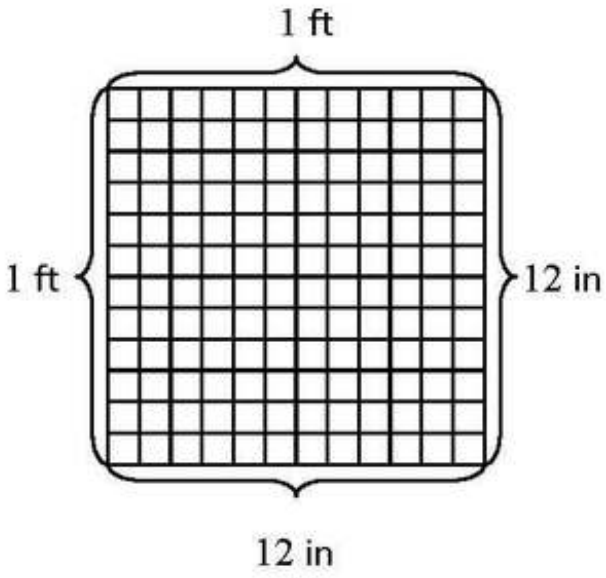
Solution

a. The board is 5 feet long and 4 feet wide.

b. The area of the board is 20 ft^2.

c. While it is true that you convert inches to feet by dividing by 12, that doesn't work for converting square inches to square feet. Because a square foot is 12 inches on each side, there are $12^2 = 144$ square inches per square foot (see the picture).



Thus,

$$2,880 \text{ in}^2 \times \frac{1 \text{ ft}^2}{144 \text{ in}^2} = 2,880 \div 144 \text{ ft}^2 = 20 \text{ ft}^2.$$