7.G Floor Plan

Alignments to Content Standards: 7.G.A.1

Task

Mariko has an 80 : 1 scale-drawing of the floor plan of her house. On the floor plan, the dimensions of her rectangular living room are $1 \frac{7}{8}$ inches by $2 \frac{1}{2}$ inches.

What is the area of her real living room in square feet?

IM Commentary

The purpose of this task is for students to translate between measurements given in a scale drawing and the corresponding measurements of the object represented by the scale drawing. If used in an instructional setting, it would be good for students to have an opportunity to see other solution methods, perhaps by having students with different approaches explain their strategies to the class. Students who can only solve this by first converting the linear measurements will have a hard time solving problems where only area measures are given.

Solutions

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Solution: Scaling up and then finding the area

The dimensions of the real living room in inches are
\[ 80 \times 1 \frac{7}{8} = 150 \]

and

\[ 80 \times 2 \frac{1}{2} = 200. \]

The area of the real living room is \(150 \text{ in} \times 200 \text{ in} = 30,000 \text{ in}^2\).

To convert square inches to square feet, you have to divide by \(12^2 = 144\).

\[ 30,000 \div 144 = 208 \frac{1}{3} \]

So the area of the living room is \(208 \frac{1}{3} \text{ ft}^2\).

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**Solution: Finding the area and then scaling up**

The area of the living room in the floor plan is

\[ 1 \frac{7}{8} \text{ in} \times 2 \frac{1}{2} \text{ in} = \frac{75}{16} \text{ in}^2. \]

Since the lengths scale by 80, the area scales by \(80^2\). So the area of the real living room in square inches is \(\frac{75}{16} \times 80^2 = 30,000\).

To convert square inches to square feet, you have to divide by \(12^2 = 144\).

\[ 30,000 \div 144 = 208 \frac{1}{3} \]

So the area of the living room is \(208 \frac{1}{3} \text{ ft}^2\).