

NWEA Assessment Item Illustrating 7.G.A.1

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Domain: Geometry

7.G.A: Draw, construct, and describe geometrical figures and describe the relationships between them.

Calculator Availability: Yes

Use the information to answer the question.

Tomiko has a 1 : 24 scale drawing of her house. In the drawing, the dimensions of the rectangular kitchen are $5\frac{3}{4}$ inches by $4\frac{1}{4}$ inches.

What is the area, to the nearest square foot, of Tomiko's actual kitchen? Enter the answer in the box.

square feet

Alignment: 7.G.A.1: Solve problems involving scale drawings of geometric figures, including computing actual lengths and areas from a scale drawing and reproducing a scale drawing at a different scale.

Finding the area of the “real room” given scaled dimensions or an architectural plan is a common application of this grade 7 standard. Other examples of scale drawings include photocopies and maps. Students compute or estimate lengths for the real object by computing or measuring lengths from the drawing or description and multiplying by the scale factor. Students should ask questions like: What is the same and what is different about the scale drawings and their original counterparts? While the lengths are not the same, they differ by a constant scale factor. There are multiple paths to a solution in this item. Students could first determine the dimensions of the actual kitchen using the scale provided, and then use those to find the area. Or students may choose to find the area of the room on the drawing first, then apply the scale factor to find the area of the room. With either method, students will need to convert their measurement from square inches to square feet.

Coherence: In grade 3, students began developing the concept of area as tiling and learned that the measurement of rectangular regions is a multiplicative relationship of the number of square units in a row and the number rows.^{3.MD.C} In grade 4, students found the area of rectangles using a formula.^{4.MD.A.3} In grade 5, students developed the concept of volume and related it to multiplication and addition in order to solve problems involving volume of rectangular prisms.^{5.MD.C.5} In grade 6, students tied together the work of decomposing figures and using additive properties to solve problems involving areas of polygons.^{6.G.A.1} This work extends to grade 7, where students are applying their proportional reasoning skills^{7.RP.A.2} to the concept of area and scale drawings of geometric figures.^{7.G.A.1} In high school, students will extend their knowledge to solve more complex design problems.^{HSG-MG.A.3}

Rigor: This item attends to conceptual understanding, procedural skill, and application. Students must understand the concept of a scale drawing. This item requires an application of mathematics in a real-world scenario where students must interpret and reason about the context and how to convert measurement units in order to solve. The procedures of multiplying fractions should be well-established, and the calculator is provided as a tool, which, if used, lessens the procedural complexity.

Answer Key:

Use the information to answer the question.

Tomiko has a 1 : 24 scale drawing of her house. In the drawing, the dimensions of the rectangular kitchen are $5\frac{3}{4}$ inches by $4\frac{1}{4}$ inches.

What is the area, to the nearest square foot, of Tomiko's actual kitchen? Enter the answer in the box.

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