Domain: Ratios and Proportional Relationships

7.RP.A: Analyze proportional relationships and use them to solve real-world and mathematical problems.

Calculator Availability: Yes

This question has two parts. Use the information to answer Part A and Part B.

A dog's hair grew $2\frac{1}{2}$ inches in $12\frac{1}{2}$ weeks. Assume that the hair grows at a constant rate.

Part A
How long will it take for the hair to grow 1 inch? Enter the answer in the box.

	weeks

Part B
How long will the hair grow in 1 week? Enter the answer in the box.

	inches

Alignment: 7.RP.A.1 Compute unit rates associated with ratios of fractions, including ratios of lengths, areas and other quantities measured in like or different units. *For example, if a person walks 1/2 mile in each 1/4 hour, compute the unit rate as the complex fraction 1/2/1/4 miles per hour, equivalently 2 miles per hour.*

Using proportional relationships to solve problems and modeling with mathematics are both foundational for future studies in mathematics and science, and both are used frequently in everyday life. This item challenges students' understanding of the concept of rate by requiring a calculation of rates in two different ways given two mixed numbers.

Coherence: The development of the ratio concept builds on the work of grade 5, when students analyzed patterns and relationships[5.OA.B] and to solve problems involving multiplication and division of fractions.[5.NF.B] In grade 6, students were introduced to the concept of ratios and began calculating unit rates with whole numbers. Also in grade 6, students solved problems involving unit rate, and the equivalent terms *for every*, *for each*, *for each 1*, and *per* were established and used.[6.RP.A] Proportional reasoning builds the foundation for work in grade 8 with linear functions and slope understanding,[8.F.A/B, 8.EE.B] and using quantitative reasoning with units to solve problems.[HSN-Q.A.1]

Rigor: This item attends to conceptual understanding, application, and procedural skill. Students must understand the concept of a rate and reason about how to represent a unit rate in two different ways in a context that is familiar. By grade 7, students have developed a procedure for dividing a fraction by a fraction. The calculator is provided as a tool, which, if used, lessens the procedural complexity of the item.

Answer Key:

This question has two parts. Use the information to answer Part A and Part B.

A dog's hair grew $2\frac{1}{2}$ inches in $12\frac{1}{2}$ weeks. Assume that the hair grows at a constant rate.

Part A
How long will it take for the hair to grow 1 inch? Enter the answer in the box.

| 5 | weeks |

Part B
How long will the hair grow in 1 week? Enter the answer in the box.

| 0.2 | inches |

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