

## Using a Quantitative Reasoning Framework to Help Students Understand Arc Measure Relationships

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**Abstract :** Quantitative reasoning is necessary to robustly understand mathematical concepts ranging from elementary to university levels. Quantitative reasoning involves identifying and representing quantities and the relationships between these quantities. Without reasoning quantitatively, students often resort to memorizing formulas and procedures, which have negative impacts when they encounter mathematical topics in the future. This study investigated how high school students' quantitative reasoning could be fostered within a unit on arc measure and angle relationships. Arc measure, or the measure of a central angle that cuts off a portion of a circle's circumference, is often confused with arclength. In this study, the researcher redesigned an activity to clearly distinguish arc measure and arc length by using a quantitative reasoning framework. Data were collected from high school students to determine if this approach impacted their understanding of these concepts. Initial data indicates the approach was successful in supporting students' quantitative reasoning of these topics. Implications for the work are that teachers themselves may also benefit from considering mathematical definitions from a quantitative reasoning framework and can use this activity in their own classrooms.

**Keywords :** arc length, arc measure, quantitative reasoning, student content knowledge

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