

# RATIOS AND PROPORTIONAL RELATIONSHIPS 7.RP

**Analyze proportional relationships and use them to solve real-world and mathematical problems.**

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  $\frac{1}{2}$  mile in each  $\frac{1}{4}$  hour, compute the unit rate as the complex fraction  $\frac{1}{2} \div \frac{1}{4}$  miles per hour, equivalently 2 miles per hour.*
2. Recognize and represent proportional relationships between quantities.
  - a) Decide whether two quantities are in a proportional relationship, e.g., by testing for equivalent ratios in a table or graphing on a coordinate plane and observing whether the graph is a straight line through the origin.
  - b) Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships.
  - c) Represent proportional relationships by equations. For example, if total cost ( $t$ ) is proportional to the number ( $n$ ) of items purchased at a constant price( $p$ ), the relationship between the total cost and the number of items can be expressed as  $t = pn$ .
  - e) Explain what a point ( $x,y$ ) on the graph of a proportional relationship means in terms of the situation, with special attention to the points  $(0,0)$  and  $(1,r)$  where ( $r$ ) is the unit rate.
3. Use proportional relationships to solve multistep ratio and percent problems. Examples: simple interest, tax, markups and markdowns, gratuities and commissions, fees, percent increase and decrease, percent error.

