

ELG 6.1: Understand ratio concepts and use ratio reasoning to solve problems.

Vertical Progression:

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| 4 th Grade | <p>4.OA.A Use the four operations with whole numbers to solve problems.</p> <ul style="list-style-type: none"> ○ 4.OA.A.2 Multiply or divide to solve word problems involving multiplicative comparison, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem, distinguishing multiplicative comparison from additive comparison. |
| 5 th Grade | <p>5.NF.B Apply and extend previous understandings of multiplication and division to multiply and divide fractions.</p> <ul style="list-style-type: none"> ○ 5.NF.B.3 Interpret a fraction as division of the numerator by the denominator ($a/b = a \div b$). Solve word problems involving division of whole numbers leading to answers in the form of fractions or mixed numbers, e.g., by using visual fraction models or equations to represent the problem. <p>5.MD.A Convert like measurements within a given measurement system.</p> <ul style="list-style-type: none"> ○ 5.MD.A.1 Convert among different-sized standard measurement units within a given measurement system (e.g., convert 5 cm to 0.05 m), and use these conversions in solving multi-step, real world problems. |
| 6 th Grade | <p>ELG 6.1 Understand ratio concepts and use ratio reasoning to solve problems.</p> <ul style="list-style-type: none"> ○ 6.RP.A.1 Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities. For example, “The ratio of wings to beaks in the bird house at the zoo was 2:1, because for every 2 wings there was 1 beak.” “For every vote candidate A received, candidate C received nearly three votes.” ○ 6.RP.A.2 Understand the concept of a unit rate a/b associated with a ratio $a:b$ with $b \neq 0$, and use rate language in the context of a ratio relationship. ○ 6.RP.A.3 Use ratio and rate reasoning to solve real-world and mathematical problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations. ○ 6.RP.A.3a Make tables of equivalent ratios relating quantities with whole-number measurements, find missing values in the tables, and plot the pairs of values on the coordinate plane. Use tables to compare ratios. ○ 6.RP.A.3b Solve unit rate problems including those involving unit pricing and constant speed. For example, if it took 7 hours to mow 4 lawns, then at that rate, how many lawns could be mowed in 35 hours? At what rate were lawns being mowed? ○ 6.RP.A.3c Find a percent of a quantity as a rate per 100 (e.g., 30% of a quantity means 30/100 times the quantity); solve problems involving finding the whole, given a part and the percent. ○ 6.RP.A.3d Use ratio reasoning to convert measurement units; manipulate and transform units appropriately when multiplying or dividing quantities. |
| 7 th Grade | <p>ELG 7.1 Analyze proportional relationships and use them to solve real-world and mathematical problems.</p> <ul style="list-style-type: none"> ○ 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. <i>For example, if a person walks $1/2$ mile in each $1/4$ hour, compute the unit rate as the complex fraction $1/2 \div 1/4$ miles per hour, equivalently 2 miles per hour.</i> ○ 7.RP.A.2 Recognize and represent proportional relationships between quantities. ○ 7.RP.A.2a 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. |

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- **7.RP.A.2b** Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships.
- **7.NS.A.2c** Represent proportional relationships by equations.
- **7.RP.A.2d** 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.
- **7.RP.A.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.

Students will demonstrate command of the ELG by:

- Making and using tables of equivalent ratios to solve problems. Using positive and negative numbers to represent real-life quantities and explaining a number's relationship to zero in various situations.
- Solving real-world problems about cost and speed using unit rates.
- Solving percent problems when asked to find the whole, find the part, or find the percent.
- Converting between measurement units.
- Using rate and ratio language to describe relationships between two quantities always labeling units.
- Using equivalent ratios, tape diagrams, double number line diagrams and equations to analyze ratio relationships.

Vocabulary:

- double number line diagram
- equivalent
- miles per hour (mph)
- percent
- rate
- ratio
- tape diagram
- unit conversion
- unit rate

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Sample Instructional/Assessment Tasks:

1) Standard(s): 6.RP.A.3.b

Source: PARCC 6th Grade EOY Practice Test

Item Prompt:

Task 1:

Chad drove 168 miles in 3 hours.

Part A

How many miles per hour did Chad drive? Enter your answer in the box.

miles per hour

Part B

Chad will drive 672 more miles. He continues to drive at the same rate. How many hours will it take Chad to drive the 672 miles? Enter your answer in the box.

hours

Part C

Chad stopped and filled the car with 11 gallons of gas. He had driven 308 miles using the previous 11 gallons of gas. How many miles per gallon did Chad's car get? Enter your answer in the box.

miles per gallon

Part D

Chad's car continues to get the same number of miles per gallon. How many gallons of gas will Chad's car use to travel 672 miles? Enter your answer in the box.

Gallons

Correct Answer:

Part A: 56; Part B: 12; Part C: 28; Part D: 24

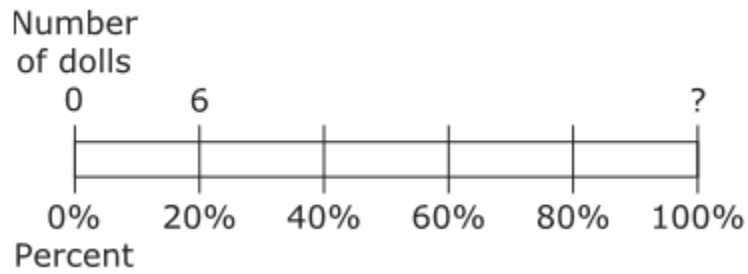
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2) Standard(s): 6.RP.A.3.c

Source: PARCC 6th grade PBA Practice Test

Item Prompt:

Anita brings 6 dolls to her grandma's house. These dolls represent 20% of Anita's doll collection, as shown in the diagram.



What is the total number of dolls in Anita's doll collection?
Enter your answer in the box.

Correct Answer:

30 dolls