GRADE

7

D91 Pathway to the Common Core Standards Mathematics

In grade seven, students will further develop their understanding of rates and ratios, using tables, graphs, and equations to solve real-world problems involving proportional relationships. Students will also work on quickly and accurately solving multi-step problems involving positive and negative rational numbers—any number that can be made by dividing one integer by another, such as ½, 0.75, or 2. Additionally, students will expand their knowledge of geometry and apply the properties of operations to solve real world problems involving the measurement of multi-dimensional objects. Activities in these areas will include:

- Determining whether two quantities are in a proportional relationship and using knowledge of rates, ratios, proportions, and percentages to solve multi-step problems
- Identifying the unit rate of change (the constant rate at which the value of a variable changes) in tables, graphs, equations, and verbal descriptions
- Calculating the unit rates associated with ratios of fractions, including quantities measured in different units (for example, the ratio of ½ a mile for every ¼ of an hour means that you travel 2 miles in an hour)
- Solving problems using equations to find the value of one missing variable
- Applying the properties of operations to generate equivalent mathematical expressions
- Solving multi-step word problems by adding, subtracting, multiplying, and dividing positive and negative rational numbers in any form (including whole numbers, fractions, or decimals)
- Understanding that numbers cannot be divided by 0
- Converting rational numbers to decimals using long division
- Describing situations in which positive and negative quantities combine to make 0
- Finding the area of two-dimensional objects and the volume and surface area of three-dimensional objects

Partnering with your child's teacher

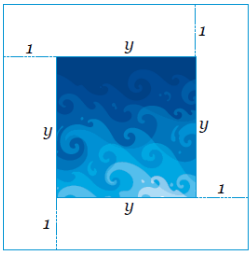
Don't be afraid to reach out to your child's teacher—you are an important part of your child's education. Ask to see a sample of your child's work or bring a sample with you. Ask the teacher questions like:

- Where is my child excelling? How can I support this success?
- What do you think is giving my child the most trouble? How can I help my child improve in this area?
- What can I do to help my child with upcoming work?

Here are just a few examples of how students will learn about and work with expressions and equations in grade seven

Grade Six Mathematics	Grade Seven Mathematics	Grade Eight Mathematics
• Write and evaluate numerical expressions involving whole number exponents (such as $5+3^2$)	• Re-write an expression in different forms to show different solutions to a problem or how quantities are related	• Know and apply the properties of integer exponents (positive numbers, negative numbers, or 0) to write equivalent expressions (such as $4^2 \cdot 4^3 = 4^5$, where "•" means to multiply)
• Read, write, and evaluate expressions in which letters stand for numbers. For example, "*subtract y from 5*" can be written 5-y	• Use variables to represent quantities and construct simple equations and inequalities (for example, 5x +2 > 10) to solve problems	• Graph proportional relationships, identifying the unit rate as the slope (how steep or flat a line is)
• Understand that solving an inequality or an equation such as 2+x=12 means answering the question, *"what number does x have to be to make this statement true?"*	• Solve multi-step word problems involving positive and negative numbers	• Solve linear equations (equations that make a straight line when they are graphed, such as y=2x+ 1)
• Represent two quantities that change in relationship to one another (for example, weight increasing along with height)	• Understand that solving an inequality or an equation such as ¼ (x+5) = 21 means answering the questions, *"what number does x have to be to make this statement true?"*	

Example of a problem involving mathematical expressions



In expressing the number of one foot square tiles needed to border a square pool with a length of y (where y represents a whole number), students might write 4y+1+1+1+1, 4y + 4, or 4 (y + 1). All are different ways to express the same value.

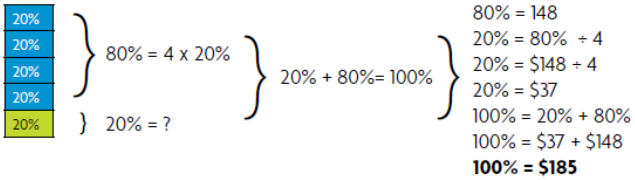
Here are just a few examples of how students will develop an understanding of ratios and proportions in grade seven.

Grade Six Mathematics	Grade Seven Mathematics	Grade Eight Mathematics
• Understand the concept of a ratio and use the correct language to describe it	• Analyze proportional relationships and use them to solve real-world problems	• Understand the connections between proportional relationships, lines, and linear equations
• Understand the concept of a unit rate (the rate per unit, or a ratio with a denominator of 1) and use the correct language to describe it	• Calculate the unit rates associated with ratios of fractions, such as the ratio of ½ a mile for every ¼ of an hour	• Graph proportional relationships, interpreting the unit rate as the slope of the graph
• Use ratio and rates to solve real-world problems	• Recognize and represent proportional relationships in various ways, including using tables, graphs, and equations	• Use physical models, transparencies, or other tools to show that *similar* objects have the same shape but different sizes (for example, a small square magnified into a larger square)
	• Identify the unit rate in tables, graphs, equations, and verbal descriptions	

Example of a problem involving proportions

Problem: After a 20% discount, the price of a skateboard is $148. What was the price before the discount?

Solution: After a 20% discount, the price is 80% of the original price. So 80% of the original price is $148. Students use this information to find the value of 20% and 100% of the original price.



Helping your child on the path to success...

1. Ask your child to calculate the unit rates of items purchased from the grocery store. For example, if 2 pounds of flour cost $3.00, how much does flour cost per pound?

2. Use store advertisements to engage your child in working with numbers. For example, if a store advertises 30% off, have your child estimate the dollar amount of the discount, as well as the sale price of an item.

3. Have students use four 4's and any of the four arithmetic operations to write the numbers from 0 to 20 (for example, 44-44= 0; 4• 4- 4 • 4 = 0 How do you get 1? 4/4 + 4 -4 = 1).

4. Encourage your child to stick with it whenever a problem seems difficult. This will help your child see that everyone can learn math.

5. P raise your child when he or she makes an effort, and share in the excitement when he or she solves a problem or understands something for the first time.

Council of the Great City Schools