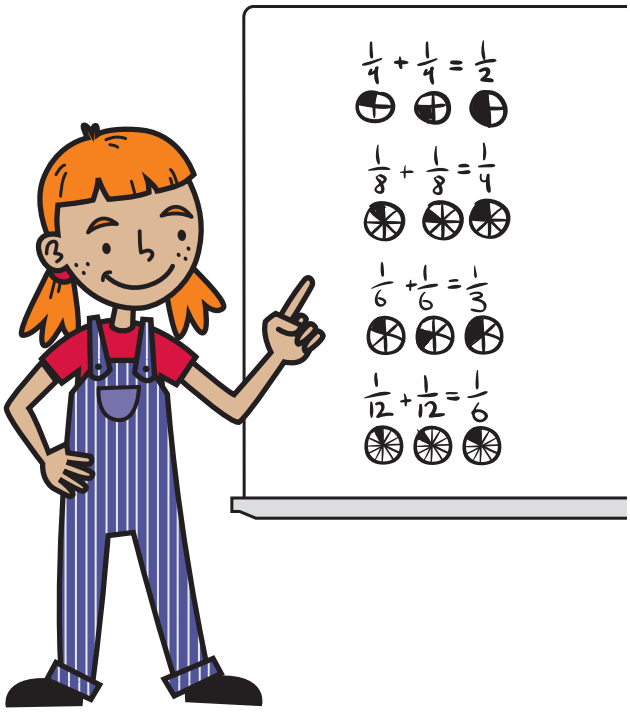
Bridges in Mathematics
Grade 5 Unit 5

Multiplying & Dividing Fractions

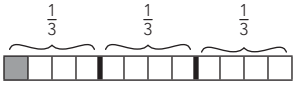
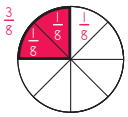


In this unit your child will:

- Multiply fractions by whole numbers ($\frac{1}{3} \times 12 = 4$)
- Use rectangular arrays to show multiplication of a fraction by a fraction ($\frac{1}{3} \times \frac{3}{4} = \frac{1}{4}$)
- Divide a whole number by a fraction ($4 \div \frac{1}{3} = 12$)
- Divide a unit fraction (a fraction with a 1 in the numerator) by a whole number ($\frac{1}{3} \div 4 = \frac{1}{12}$)

Your child will learn and practice these skills by solving problems like those shown below. Keep this sheet for reference when you're helping with homework. Use the free Math Vocabulary Cards app for additional support: mathlearningcenter.org/apps.

PROBLEM	COMMENTS
Jorge is having 9 friends over for a party, and he wants to make them each a gift bag. He wants to give 5 stickers to his little brother and to put an equal number of stickers in each gift bag and have no stickers left over. Which kind of stickers should he buy? (Hint: Can you remember a divisibility rule?) kind of sticker | stickers per package truck | 165 bug | 140 outer space | 180 He should get the bug stickers. How many stickers will each friend get? Each friend will get 15 stickers.	To solve this problem, students will first need to subtract the 5 stickers for the little brother from the total number of stickers in each package. Then they need to determine whether the remaining number of stickers is evenly divisible by 9. They can do this by actually dividing the numbers by 9, or they can recall the divisibility rule for 9, which states that any number is divisible by 9 if the sum of the digits in the number is divisible by 9. So, 135 is divisible by 9, because 1 + 3 + 5 = 9, and 9 is of course evenly divisible by itself.
Find the products. $\frac{1}{4}$ of 16 = 4 $\frac{1}{3}$ of 18 = 6 $\frac{1}{5}$ of 20 = 4	To solve problems like these, students will divide the whole number by the number in the denominator of the unit fraction. The work they do in class will help them understand that $\frac{1}{5}$ of 20 can be written mathematically as $\frac{1}{5} \times 20$. This helps them connect the problems they are solving contextually with multiplication of whole numbers by fractions.

PROBLEM	COMMENTS
Mikhal is reading a book with 56 pages. She has read $\frac{5}{8}$ of it. Her friend Janis is reading a book with 66 pages. She has read $\frac{5}{6}$ of it. Who has read more pages? How do you know? 56 ÷ 8 = 7 and 5 × 7 = 35, so Mikhal has read 35 pages. 66 ÷ 6 = 11 and 5 × 11 = 55, so Janis has read 55 pages. Janis has read 20 more pages than Mikhal.	This student used a process of first dividing the total number of pages by the number in the denominator and then multiplying the result by the number in the numerator. This is a sensible and efficient way to multiply a whole number by a fraction. They could also first multiply by the number in the numerator and then divide by the denominator, but those calculations are more difficult. Some students might also see that since $\frac{1}{8}$ of 56 is 7 and $\frac{1}{6}$ of 66 is 11, Janis must have read more, since each person read 5 of those equal parts (5 groups of 7 pages by Mikhal and 5 groups of 11 pages by Janis).
Rewrite the pair of fractions with a common denominator. Then use a <, >, or = to compare them in two expressions. $\frac{3}{5}$ and $\frac{5}{8}$ 8, 16, 24, 32, 40, 48 5, 10, 15, 20, 25, 30, 35, 40 $\frac{3}{5} = \frac{24}{40}$ and $\frac{5}{8} = \frac{25}{40}$ That means $\frac{3}{5} < \frac{5}{8}$ and $\frac{5}{8} > \frac{3}{5}$.	Students rewrite the two fractions with a common denominator so that they can compare them. This can also be a first step in solving problems that call for adding or subtracting fractions with different denominators. In this example, the student found the least common multiple of 5 and 8 (40) and rewrote each fraction with that common denominator. (Note: The least common multiple is the smallest number that is divisible by 5 and 8.)
Solve the division problems. Use multiplication to check your answer. $\frac{1}{3} \div 4 = \frac{1}{12}$ $4 \times \frac{1}{12} = \frac{1}{3}$ $\frac{1}{6} \div 3 = \frac{1}{18}$ $3 \times \frac{1}{18} = \frac{1}{6}$	Students are introduced to division of unit fractions by whole numbers by thinking about dividing unit fractions like $\frac{1}{3}$ into some number of equal parts. So, for example, they might represent $\frac{1}{3} \div 4$ in this way:  "When you break each third into 4 equal parts, each of those smaller pieces is $\frac{1}{12}$ of the whole, so $\frac{1}{3} \div 4 = \frac{1}{12}$." They often encounter these problems in context. For example, "Four friends have a ribbon that is $\frac{1}{3}$ of a yard long. If they cut it into equal parts so that each friend gets a piece that is the same length, how much of a yard did each person get?"
Jim was sharing a pizza with some friends. He took $\frac{3}{8}$ of the pizza, but he only ate $\frac{2}{3}$ of the pizza he took. How much of the whole pizza did Jim eat?  Jim took 3 eighths. So he had 3 pieces and each one was $\frac{1}{8}$ of the whole pizza. But he only ate $\frac{2}{3}$ of what he took. So he ate only 2 eighths, and that is equal to $\frac{1}{4}$ of the whole pizza. Jim ate $\frac{1}{4}$ of the pizza.	The student used a picture and logical reasoning to think about this problem and find the answer. The problem can also be represented symbolically like this: $\frac{3}{8} \times \frac{2}{3}$. Students who know to multiply across the top and bottom and then simplify can determine that $\frac{3}{8} \times \frac{2}{3} = \frac{6}{24}$ and $\frac{6}{24} = \frac{1}{4}$.

FREQUENTLY ASKED QUESTIONS ABOUT UNIT 5

Q: I don't remember much about fractions. How can I help with this homework?

A: Fractions can be very challenging for students and adults alike, and you don't have to know all the answers to help. Students do a lot of sense-making in class by using pictures and logic to think about fractions, so invite your child to talk about what has been happening in class. Also work together to draw pictures to make sense of the story problems. If you get stuck, work together to write a note to the teacher about where you got stuck and why.