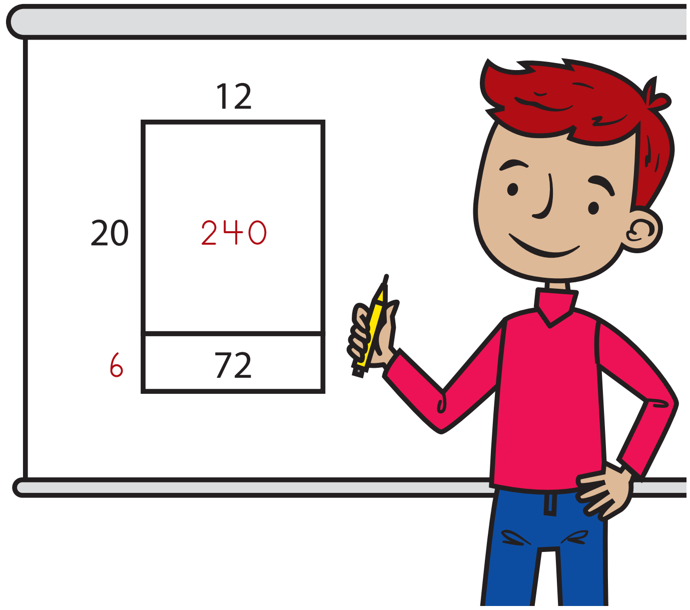
Bridges in Mathematics
Grade 5 Unit 7

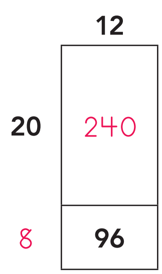
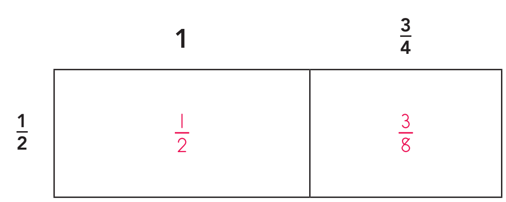
Division & Decimals



In this unit your child will:

- Multiply and divide multi-digit numbers
- Perform addition, subtraction, multiplication, and division with fractions
- Solve story problems with fractions

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
Fill in the blanks on each array. Then write two equations—one multiplication and one division—to match the array.  $12 \times 28 = 336$ $336 \div 28 = 12$  $\frac{1}{2} \times 1\frac{3}{4} = \frac{1}{2} + \frac{3}{8} = \frac{7}{8}$ $\frac{7}{8} \div \frac{1}{2} = 1\frac{3}{4}$	Students continue to use the array model to show multiplication and division problems. The array model also illustrates the inverse relationship between multiplication and division; in other words, it helps students see that division is the opposite of multiplication, and that can be useful in solving division problems with both whole numbers and fractions. For multi-digit numbers, the array (rectangle) is broken into partial products by place value. For mixed numbers, the array is broken into partial products by whole number and fraction parts.
Evaluate the expressions. $24 \times (\frac{3}{4} \times 2) = 24 \times \frac{1}{4} \times 3 \times 2 = 6 \times 3 \times 2 = 36$ $\frac{2}{5} \times (8 \times 5) = \frac{2}{5} \times 5 \times 8 = 2 \times 8 = 16$	Multiplication can be performed in any order. Students can also express each fraction as the product of a whole number and a unit fraction ($\frac{1}{4}$, $\frac{1}{5}$) if they like. This can make it easier to simplify the expressions. These problems are meant to give students practice multiplying fractions and whole numbers in a thoughtful, strategic way.

PROBLEM	COMMENTS
Rashawn and his little brother Devante both like to run. On Saturday Rashawn ran $12\frac{1}{4}$ miles. Devante ran $\frac{1}{3}$ as far as Rashawn. How many miles did Devante run? $4\frac{1}{12}$ of a mile $\frac{1}{3}$ of 12 is 4. $\frac{1}{3}$ of $\frac{1}{4}$ is $\frac{1}{12}$. I added 4 and $\frac{1}{12}$ to get $4\frac{1}{12}$ miles.	Students might approach this problem by thinking about multiplying the two fractions or by dividing $12\frac{1}{4}$ by 3. Both are mathematically sound and reasonable ways to think about the problem situation. In this example, the student thought separately about the whole number (12) and fraction part ($\frac{1}{4}$) of the total, divided each by 3, and added the results to calculate $\frac{1}{3}$ of $12\frac{1}{4}$.
Solve each equation. $1\frac{3}{5} - \frac{7}{12} = 1\frac{36}{60} - \frac{35}{60} = 1\frac{1}{60}$ $\frac{5}{9} + 2\frac{2}{3} = \frac{5}{9} + 2\frac{6}{9} = 2\frac{11}{9} = 3\frac{2}{9}$ $\frac{2}{3} \times \frac{3}{4} = \frac{6}{12} = \frac{1}{2}$ $\frac{1}{4} \div 6 = \frac{1}{24}$	These problems represent what fifth graders are expected to be able to do in terms of computation with fractions. Note that we don't expect fifth graders to divide fractions by fractions. They are, however, expected to be able to divide unit fractions by whole numbers and vice versa, as shown in the fourth equation. A unit fraction is a fraction with 1 in the numerator (top number).
Solve. Show your work. 1048 ÷ 37 $\left.\begin{array}{r}1\\2\\5\\10\\10\end{array}\right\\}$ 28 R12 $\begin{array}{r} 37\overline{)1048} \\ -\ 370 \\ \hline 678 \\ -\ 370 \\ \hline 308 \\ -\ 185 \\ \hline 123 \\ -\ 74 \\ \hline 49 \\ -\ 37 \\ \hline 12 \end{array}$ $37 \times 10 = 370$ $37 \times 10 = 370$ $37 \times 5 = 185$ $37 \times 2 = 74$ $37 \times 1 = 37$	This algorithm for dividing multi-digit numbers is quite similar to the more familiar standard algorithm, but it offers students a bit more flexibility because students can pick and choose which multiples they want to work with and can use each one more than one time. For example, they subtract 370 twice and work only with 37 x 10, 37 x 5, and 37 x 2, which are all quite straightforward to compute.

FREQUENTLY ASKED QUESTIONS ABOUT UNIT 7

Q: Why do students learn an algorithm for long division that is different from the method I learned?

A: The way many people learned to do long division is accurate, elegant, and reliable. However, it is not the only way to divide large numbers, and we find that the procedure can become tedious when students struggle to determine the maximum number of times the divisor goes into the part of the dividend they are dividing. For example, to solve the problem shown at right, students must figure out how many times 26 goes into first 96 and then 182. Such calculations are tedious for even those students who are skilled in mental multiplication. The method students are taught in this unit allows them to use the multiplication combinations for the divisor that come quickly to them. In many cases, it is more efficient than the way many of us were taught. Have your child help you try it with a few problems like the one shown here (962 ÷ 26) and others.

$$\begin{array}{r} 37 \\ 26\overline{)962} \\ -\ 78 \\ \hline 182 \\ -\ 182 \\ \hline 0 \end{array} \qquad \begin{array}{r} 26 \\ \times\ 3 \\ \hline 78 \end{array} \qquad \begin{array}{r} 26 \\ \times\ 7 \\ \hline 182 \end{array}$$