

LESSON

• Lesson: Finding a Fraction of a Whole Number

A. Remind students that any mention of a fraction must be given meaning by saying what it is a fraction of.

B. Next, remind them how we find a fraction of a number. Examples:

i. How much is $\frac{4}{7}$ of \$35?

Think: I am looking for 4 sevenths of \$35. I know that 1 seventh of \$35 is \$5. Therefore 4 sevenths of \$35 is \$20.

ii. How much is $\frac{3}{8}$ of 104 miles?

I divide 104 by 8. This quotient is 13. So if 1 eighth of 104 miles is 13, then 3 eighths of 104 is 3 times 13, or 39.

iii. What is $\frac{5}{6}$ of 13 pounds?

In order to find 1 sixth of 13 pounds, we must divide 13 by 6. But this time, the quotient isn't a nice whole number, it's $2\frac{1}{6}$.

Now we find 5 sixths of 13 pounds by multiplying 5 times $2\frac{1}{6}$.

This can be done mentally: 5×2 is 10, and 5 times $\frac{1}{6}$ is $\frac{5}{6}$. So the product is $10\frac{5}{6}$.

C. Now talk to the class about the sameness in all of these examples. For each of them, we first divide the whole numbers by the denominator of the fraction—to find out what 1 seventh or 1 fifth or 1 sixth or 1 “whatever” of the number is.

Then we multiply that unit amount ($\frac{1}{2}$, $\frac{1}{3}$, $\frac{1}{4}$, $\frac{1}{5}$, etc. are called unit fractions) by the numerator of the original fraction.

This process can be used to find a particular fraction of any whole number—and it makes sense. Helping students to understand a process is very different from having them memorize a rule which has no meaning to them.

As we progress they will be able to understand the general process using arbitrary numbers (algebra!), which is much easier to write and to “see”.

Example: What is $\frac{j}{k}$ of t minutes?

1 kth of t minutes is $t \div k$.

So j kths of t minutes is j times $t \div k$.

In symbols, the answer is $j \times (t \div k)$ or $(j)(\frac{t}{k})$ or $\frac{jt}{k}$.

D. Guide a class discussion to find answers to these questions:

- i. What is $\frac{2}{3}$ of 96 people?
- ii. What is $\frac{15}{8}$ of 56 tons?
- iii. What is $\frac{7}{10}$ of \$4300?

E. Explain that a fraction of a number is written as a product. It is understood to be the fraction times the number. Each of these quantities can be expressed in three different ways:

- i. $\frac{2}{3}$ of a dozen or $\frac{2}{3}$ times 12 or $\frac{2}{3} \times 12$
- ii. $\frac{3}{4}$ of a yard or $\frac{3}{4}$ times 36 inches or $\frac{3}{4} \times 36$ inches
- iii. $\frac{5}{8}$ of \$96 or $\frac{5}{8}$ times \$96 or $\frac{5}{8} \times \$96$
- iv. $\frac{5}{6}$ of an hour or $\frac{5}{6}$ times 60 minutes or $\frac{5}{6} \times 60$ minutes
- v. 25% of 80 people or $\frac{25}{100}$ times 80 people or $\frac{1}{4} \times 80$ people

100. Write each of these fractions of numbers as products using the multiplication symbol; then do the multiplication and write the result as a single number.

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| a. $\frac{2}{5}$ of 85 tickets | b. $\frac{4}{7}$ of 28 ounces | c. $\frac{3}{8}$ of 56 miles |
| d. $\frac{5}{6}$ of 138 sq. ft. | e. $\frac{7}{12}$ of 156 students | f. 45% of \$9800 |