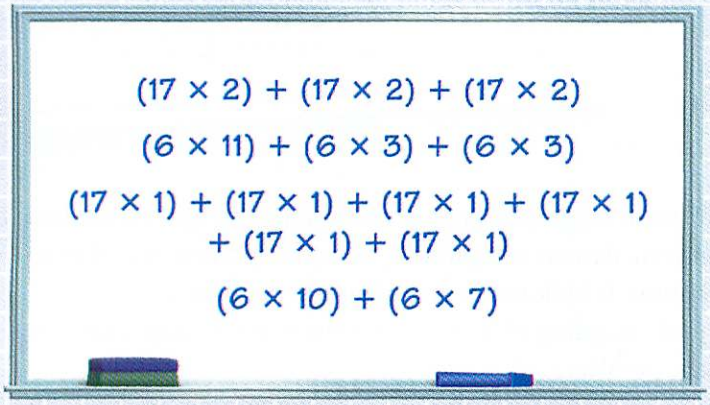
Dialogue Box

Solving 17 × 6

Students have been working in pairs to think of ways that they can solve the problem 17 × 6 by breaking it into smaller problems. As the teacher watched them work, she noticed that they came up with a number of different ways to break up the problem. She lists some of these on the board and then brings the students together for a discussion.



Teacher: Here are some of the ways I noticed you using to break 17 × 6 into easier problems. All of these are correct, and I'm wondering how you chose ways to break up 17 × 6 that helped you solve the problem. Were you thinking of smaller problems that you already knew to help you solve 17 × 6? What did you do to make this problem easier?

Richard: I started with 17 × 2 because I knew that the answer is 34. Then all I had to do was add 34 + 34 + 34.

Venetta: I think 6 × 11 = 66 is easy, and then all I had to do was add 6 more 6s. I did 3 groups of 6 and then 3 more groups of 6.

Teacher: Many of you know the multiples of 11 and 3 × 6. Who can tell me another way that made it easy for you?

Steve: 17 × 1.

Teacher: It is easy. What do you have to do next to finish solving the problem?

Steve: You still have to add six 17s together. That might take a long time. But it would work!

Teacher: That's right, it would work, but you're pointing out that it leaves you with some fairly difficult addition. One question everyone can think about when you're breaking problems apart is this: What do you know that can help you solve a pretty big chunk of the problem? Here's another question: Do you need to break the problem apart into many pieces, or can you find an efficient way to use only two or three pieces? When you look at all the ways that are listed here, which do you think are both easy and efficient ways to solve the problem?

Cheyenne: I think 6 × 10 plus 6 × 7 is pretty efficient because I know most of the 10 times tables. The 7s are a little harder, but 6 × 7 is easy for me.

Teacher: Exactly. You all know multiples of 10, and you can do 6 × 7 in your head. You can be more efficient when you use what you already know.

By asking students to compare different ways they broke problems apart, this teacher helps students consider how to use what they know to solve more difficult problems easily and efficiently. These students understand how to break a multiplication problem into smaller problems. Some students are also using their knowledge of the commutativity of multiplication—they find it easier to think of 17×6 as 6×17. It is important that students understand that there are many ways to break up a multiplication problem. As the teacher points out, all of their methods are correct. However, they can also think about which ways of breaking up the problem are most helpful.

Venetta knows how to solve 6×11; she also knows that she needs "6 more 6s," which she thinks of as 3 groups of 6 and another 3 groups of 6. However, breaking 6×17 into these three parts leaves her with the addition problem, $66 + 18 + 18$, which might not be easy to solve.

Steve also notices that he has not made the problem easier to solve when he breaks it up into $(17 \times 1) + (17 \times 1) + (17 \times 1) + (17 \times 1) + (17 \times 1) + (17 \times 1)$.

Cheyenne breaks the problem into two parts that are each easy for her to solve. She has to add only two numbers to find the solution to the original problem. Another student, who knows all the 12s multiplication combinations well, might break the problem into $(12 \times 6) + (5 \times 6)$, which also results in a relatively easy addition to complete the problem.

As students continue to solve problems with larger numbers by breaking them into smaller problems, this teacher encourages them to use problems that they can solve easily, such as multiplication combinations they know and multiplying by 10. She will continue to ask them to compare solution methods and to think about which ways are easy and efficient to carry out.