The Speed of Vedic Division

Lecture 8

There is more to Vedic mathematics than division, although we've seen much of it in this course already.

In this lecture, we explore strategies for doing division problems on paper that come to us from **Vedic mathematics**. With this approach, as we generate an answer, the digits of the answer play a role in generating more digits of the answer.

We first look at the processes of long and short division. Short division works well for 1-digit division and when dividing by a number between 10 and 20, but for numbers of 21 or greater, Vedic division is usually better. Vedic division is sort of like the subtraction method for multiplication applied to division.

Let's start with the problem 13,571 ÷ 39. The Vedic approach makes use of the fact that it's much easier to divide by 40 than 39. Dividing by 40 is essentially as easy as dividing by 4. If we divide 13,571 by 4, we get the 4-digit answer 3392.75. (We consider this a 4-digit answer because it has 4 digits before the decimal point.) If we're dividing 13,571 by 40, we simply shift the decimal point to get a 3-digit answer: 339.275.

With Vedic division, we start off as follows: 4 goes into 13, 3 times with a remainder of 1. The 3 goes above the line and the 1 goes next to the 5 below the line. Now, here's the twist: Instead of dividing 4 into 15, we divide 4 into 15 + 3; the 3 comes from the quotient digit above the line. We now have 15 + 3 = 18, and 4 goes into 18, 4 times with a remainder of 2. The 4 goes above the line, and the 2 goes next to the 7 below the line. Again, instead of dividing 4 into 27, we divide 4 into 27 + 4 (the quotient digit above the line), which is 31. We continue this process to get an answer to the original problem of 347 with a remainder of 38.

To see why this method works, let's look at the problem 246,810 ÷ 79. Essentially, when we divide by 79, we're dividing by 80 – 1, but if the process subtracts off three multiples of 80, it needs to add back three to compensate, just as we saw in the subtraction method for multiplication. The idea behind the Vedic method is that it's easier to divide by 80 than 79. For this problem, 80 goes into 246, 3 times, so we subtract 240, but we were supposed to subtract 3 × 79, not 3 × 80, so we have to add back 3 before taking the next step. Once we do this, we're at the same place we would be using long division.

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Sometimes, the division step results in a divisor that's greater than 10. If that happens, we carry the 10s digit into the previous column and keep going. For 1475 ÷ 29, we go up 1 to 30, so 3 is our divisor; 3 goes into 14, 4 times with a remainder of 2. The 4 goes above the line and the 2 goes next to the 7. Next, we do 3 into 27 + 4, which is 31; 3 goes into 31, 10 times with a remainder of 1. We write the 10 above the line, as before, making sure that the 1 goes in the previous column. When we reach the remainder step, we have to make sure to add 15 + 10, rather than 15 + 0. The result here is 50 with a remainder of 25.

If the divisor ends in 8, 7, 6, or 5, the procedure is almost the same. For the problem 123,456 ÷ 78, we go up 2 to get to 80 and use 8 as our divisor. Then, as we go through the procedure, we double the previous quotient at each step. If the original divisor ends in 7, we would add 3 to reach a round number, so at each step, we add 3 times the previous quotient. If the divisor ends in 6, we add 4 times the previous quotient, and if it ends in 5, we add 5 times the previous quotient. If the divisor ends in 1, 2, 3, or 4, we go down to reach a round number and *subtract* the previous quotient multiplied by that digit. In other words, the multiplier for these divisors would be –1, –2, –3, or –4. This subtraction step sometimes yields negative numbers; if this happens, we reduce the previous quotient by 1 and increase the remainder by the 1-digit divisor.

To get comfortable with Vedic division, you'll need to practice, but you'll eventually find that it's usually faster than short or long division for most 2-digit division problems. ■

Important Term

Vedic mathematics: A collection of arithmetic and algebraic shortcut techniques, especially suitable for pencil and paper calculations, that were popularized by Bhāratī Krishna Tirthajī in the 20th century.

Suggested Reading

Tekriwal, *5 DVD Set on Vedic Maths.*

Tirthajī, *Vedic Mathematics.*

Williams and Gaskell, *The Cosmic Calculator: A Vedic Mathematics Course for Schools, Book 3.*

Problems

Do the following 1-digit division problems on paper using short division.

1. 123,456 ÷ 7

2. 8648 ÷ 3

3. 426,691 ÷ 8

4. 21,472 ÷ 4

5. 374,476,409 ÷ 6

Do the following 1-digit division problems on paper using short division *and* by the Vedic method.

6. 112,300 ÷ 9