Épreuve de section européenne

Robert Record's Multiplication

In 1542, the Welshman Robert Record published The Ground of Arts, in which he showed how to multiply two numbers between 5 and 10. Here is the multiplication of 8 by 7 :

First set your digits one over the other :

8
7

Then from the uppermost downwards, and from the nethermost upwards, draw straight lines, so that they make a St. Andrew's cross :

8
7

Then look how many each of them lacks of 10*, and write that against each of them at the end of the line, and that is called the difference.*

8 2
7 3

Multiply the two differences, saying, "two times three make six", that you must ever set down under the differences.

8 2
7 3

6

Subtract one difference from the other digit (not from his own),as the lines of the cross warn you, and write it under the digits. You can take one or another, for all is like : if you subtract 3 *from* 8 *or* 2 *from* 7*, it remains* 5*. So* 7 *multiplied by* 8 *is* 56*.*

8 2
7 3

5 6

Adapted from *Mathematics in the times of the Pharaohs* by Richard J. Gillings, MIT Press, 1972.

Questions

1. Using Record's method, multiply 6 by 9. Do the same with the Egyptian method.

2. In Record's last explanation, we can read : You can take one or another, for all is like. Why is it true ?

3. Prove that Record's method is true, by choosing two digits a and b and showing that the final line contains the product ab.