

Lesson Objective:

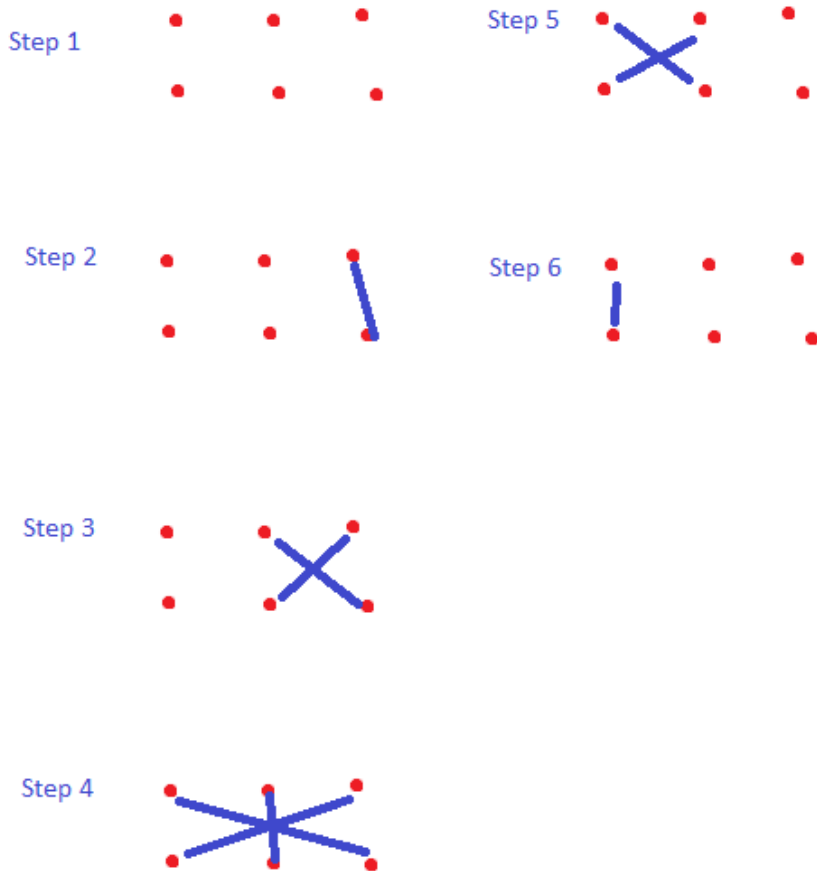
To be able to multiply any 3-digit numbers (no calculator, no paper, no pencil)

Example 1:

Let us start with two-digit numbers

$$145 \times 123$$

Remember the following patterns for 3 digit multiplication with another 3 digit number



Apply the above pattern to the problem as shown below

Arrange numbers as shown in Figure 1

Step 1

1	4	5
1	2	3

22

Step 2

1	4	5
1	2	3

15

Multiply these 2 numbers

Step 3

1	4	5
1	2	3

Multiply and add
 $4 \times 3 = 12$
 $2 \times 5 = 10$
 $12 + 10 = 22$

22 15

Step 4

$3 + 5 + 8 = 16$

1	4	5
1	2	3

16 22 15

Step 5

1	4	5
1	2	3

6 16 22 15

Step 6

1	4	5
1	2	3

1 6 16 22 15

Add carry to previous digit

17835

Answer is 17835

Example 2:

112 X 113

Step 1

1 1 2

1 1 3

Step 2

1 1 2

1 1 3

6

Step 3

1 1 2

1 1 3

5 6

Step 4

1	1	2		
1	1	3		
	6	5	6	

Step 5

1	1	2		
1	1	3		
	2	6	5	6

Step 6

1	1	2		
1	1	3		
1	2	6	5	6

Adjust carries (in this case there are no carries)

12656

Example 3:

$$745 \times 143$$

Step 1

$$\begin{array}{r} 7 \quad 4 \quad 5 \\ 1 \quad 4 \quad 3 \end{array}$$

Step 2

$$\begin{array}{r} 7 \quad 4 \quad 5 \\ 1 \quad 4 \quad 3 \\ \quad \quad \quad 15 \end{array}$$

Step 3

$$\begin{array}{r} 7 \quad 4 \quad 5 \\ 1 \quad 4 \quad 3 \end{array}$$

32 15

Step 4

7 4 5

1 4 3

42 32 15

Step 5

7 4 5

1 4 3

32 42 32 15

Step 6

7 4 5

1 4 3

7 32 42 32 15

Adjust carries:

106535

