Chapter- 5

MULTIPLICATION

STUDY NOTES

*** Revision, Multiplication of a 4-digit Number by a 1-digit Number**

*** Multiplication of Two 2-digit Numbers without carry over**

*** Multiplication of a 3-digit Number by a 2-digit Number**

*** Word problems**

*** Lattice Multiplication**

*** Estimation**

1. Revision, Multiplication of a 4-digit Number by a 1-digit Number

EXPLANATION

Revise your multiplication tables and multiply the following.

➢ **For example:**

7 × 9 = _____ 7 × 6 = _____

5 × 7 = _____ 8 × 4 = _____

Solution:

Recall multiplication tables to fill in the blanks.

7 × 9 = 63 7 × 6 = 42

5 × 7 = 35 8 × 4 = 32

	T	O	
	3	4	← MULTIPLICAND
×		2	← MULTIPLIER
	6	8	← PRODUCT

REMEMBER

The number which is multiplied is known as MULTIPLICAND

The number by which it is multiplied is known as MULTIPLIER

The answer or result of a multiplication is known as PRODUCT

➢ **For example:**

1) Find the product: 3 2 1 4 × 2

Solution:

Th	H	T	O	
3	2	1	4	2 × 4 ones = 8 ones — Write 8 in the ones column.
				2 × 1 tens = 2 tens — write 2 in the tens column.
×			2	2 × 2 hundreds = 4 hundreds — Write 4 in the hundreds column.
6	4	2	8	2 × 3 thousands = 6 thousands — Write 6 in the thousands column.

Answer: 6 4 2 8

2) Find the product: 2 0 5 8 x 4

Solution:

Th	H	T	O
	(2)	(3)	
2	0	5	8
×			4
8	2	3	2

STEP 1 : 4 ones × 8 ones = 32 ones — Write 2 in the ones column and carry 3 to tens column.

STEP 2 : 4 ones × 5 tens = 20 tens + 3 tens = 23 tens — Write 3 in the tens column and carry 3 to.

STEP 3 : 4 ones × 0 hundreds = 0 hundreds + 2 hundreds = 2 hundreds — Write 2 in the hundreds column.

STEP 4 : 4 ones × 2 thousands = 8 thousands — Write 8 in the thousands column.

Answer: 8 2 3 2

REMEMBER

When we multiply two numbers, the order in which we multiply them does not matter. The product remains the same.

$$8 \times 6 = 48$$

$$6 \times 8 = 48$$

2. Multiplication of Two 2-digit Numbers without carry over

EXPLANATION

➢ **For example:**

	T	O
	2	3
×	1	2
	4	6
+	2	3	0
	2	7	6

STEP 1 : 3 ones × 2 ones = 6 ones **Write 6 under ones column.**

STEP 2 : 2 tens × 2 ones = 4 tens **Write 4 under tens column.**

STEP 3 : NOW PUT '0' UNDER ONES COLUMN.

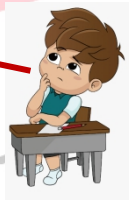
STEP 4 : 3 ones × 1 tens = 3 tens **Write 3 under tens column.**

STEP 5 : 2 tens × 1 tens = 4 hundreds **Write 2 under hundreds column.**

STEP 6 : **Add** 46 + 230 = 276

COMMON ERROR

* Forgets to put '0' in ones place while multiplying with the tens digit.



3. Multiplication of a 3-digit Number by a 2-digit Number

EXPLANATION

➢ **For example:**

	H	T	O
	(1)	(1)	
	4	2	3
×		1	6
	2	5	3	8
+	4	2	3	0
	6	7	6	8

STEP 1 :

- 6 ones × 3 ones = 18 ones **Write 8 under ones column and carry 1 to the tens column.**
- 6 ones × 2 tens = 12 tens + 1 tens = 13 tens **Write 3 under tens column and carry 1 to the hundreds column.**
- 6 ones × 4 hundreds = 24 hundreds + 1 hundred = 25 hundreds **Write 5 under hundreds column and 2 in the thousands column.**

STEP 2 : NOW PUT '0' UNDER ONES COLUMN.

STEP 3 :

- 1 ten × 3 ones = 3 tens **Write 3 under tens column**
- 1 ten × 2 tens = 2 hundreds **Write 2 under hundreds column**
- 1 ten × 4 hundreds = 4 thousands **Write 4 under thousands column.**

STEP 4 : **Add** 2 5 3 8 + 4 2 3 0 = 6 7 6 8

4. Word problems

EXPLANATION

➢ **For example:**

Simple steps for solving story sums:

1.Read the story sums carefully and understand the given information....

2.Identify and list the facts.....

3.Figure out exactly what the problem is asking for....

4.Eliminate the extra information....

5.Draw a diagram.....

6.Solve the story sum and check your answer.....

You can recall the following hints to remember the steps.

READ-->FIND -->DECIDE -->SOLVE-->CHECK

➢ **For example:**

1. There are 54 sweets in a box. How many sweets are there in 9 boxes ?

Solution:

Number of sweets in one box = 5 4

Number of sweets in 9 boxes = 5 4

× 9

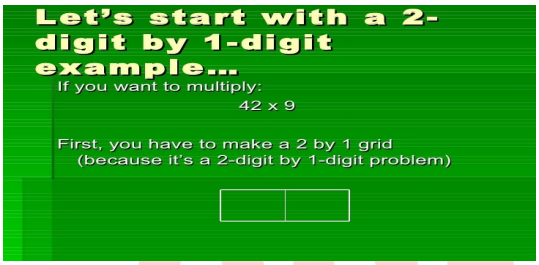
4 8 6

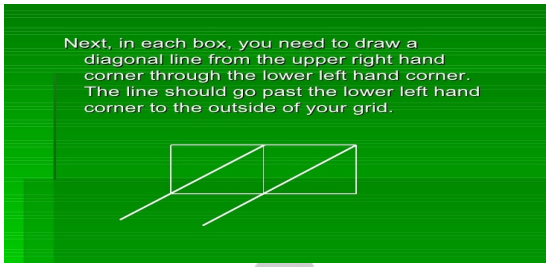
So 486 sweets are there in 9 boxes.

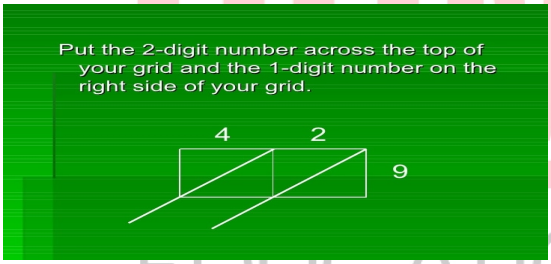
5. Lattice Multiplication

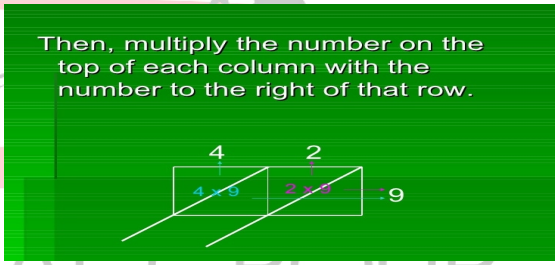
EXPLANATION

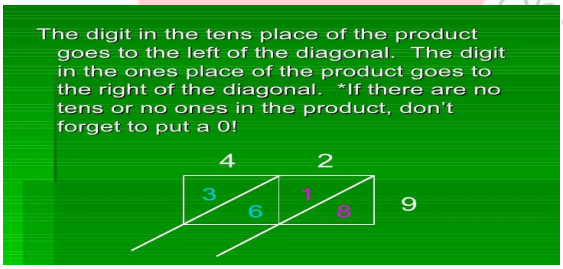
Lattice multiplication, also known as Chinese multiplication, is a **written method of multiplying numbers**. It's usually used when solving problems, which include multiplying 2-digit by 2-digit numbers. But it can also be used when working with larger multi-digit numbers, too.

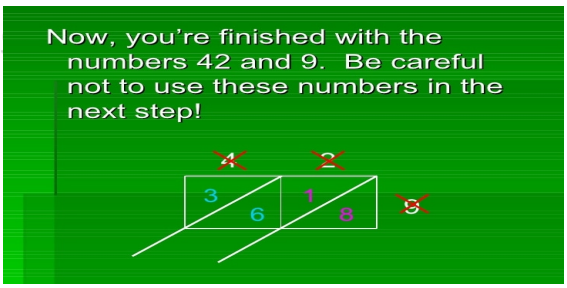


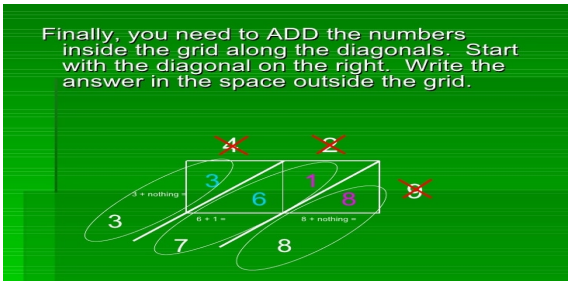


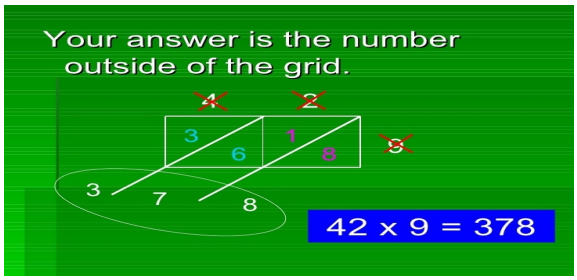










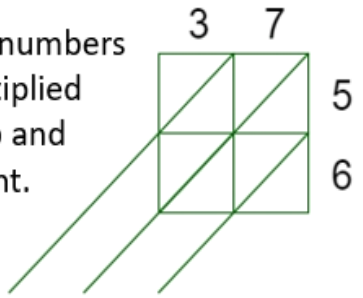


➢ **For example:**

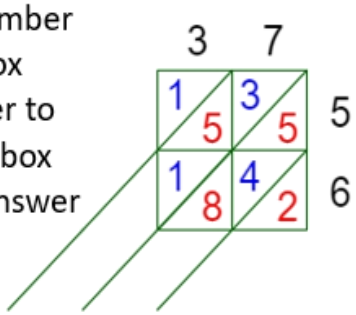
Lattice Multiplication

$37 \times 56 =$

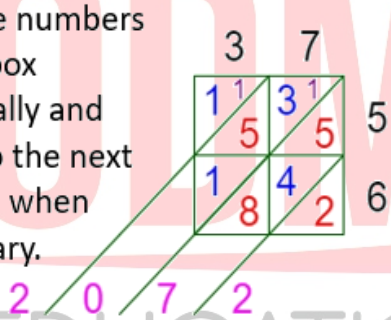
Write the numbers to be multiplied on the top and on the right.



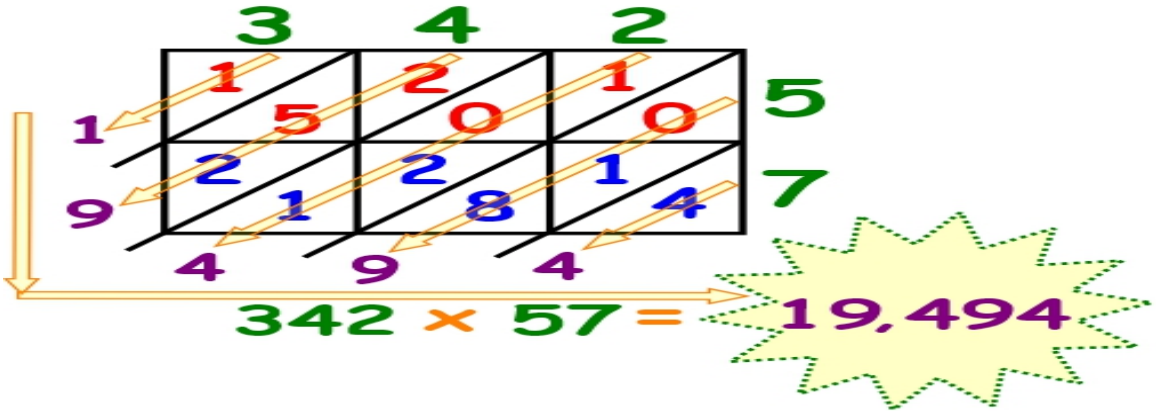
Multiply the number on top of the box with the number to the right of the box and write the answer in the box

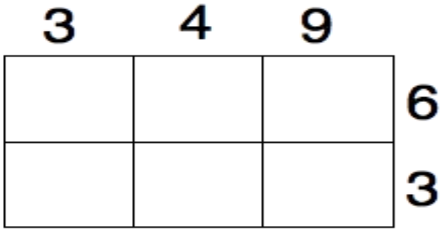


Add the numbers in the box diagonally and carry to the next column when necessary.



$37 \times 56 = 2072$

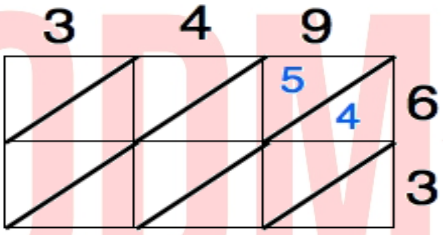




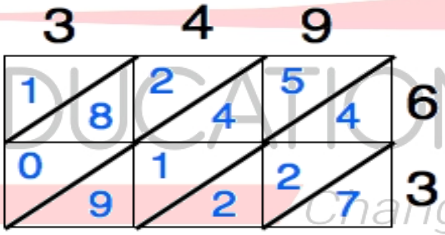
349 x 63 =

Because there are 3 digits by 2 digits, draw up a box like this.

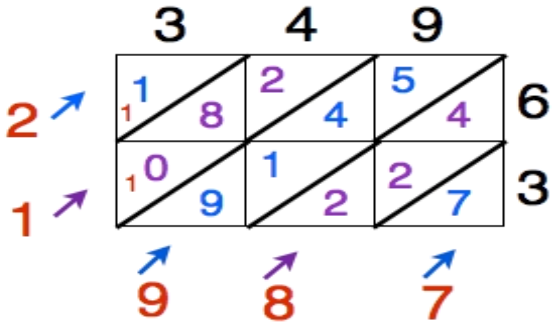
Now draw in diagonals for each box. These will contain the partial products.



Begin multiplying: 6x9=54
Write in corresponding square as shown



Continue multiplying the other numbers: 6x4=24 etc.. Notice if it is a single digit answer, you write 09 (see 3X3)



Now add the diagonals. If you need to carry a number, add it to the next group of diagonals.

Now you have the answer: 349 x 63 = 21,987

6. Estimation

EXPLANATION

To estimate the result of multiplication (product), round the numbers to some close numbers that you can easily multiply mentally. One method of estimation is to round all factors to the biggest digit (place value) they have.

In real life, estimation is part of our everyday experience. When you're shopping in the grocery store and trying to stay within a budget, for example, you estimate the cost of the items you put in your cart to keep a running total in your head.

Estimate means to find something close to the correct answer.
Estimation of numbers is the process of approximating or rounding off the numbers in which the value is used for some other purpose in order to avoid the complicated calculations.
When it comes to estimating in math, there is a general rule for you to follow. This general rule tells you to look at the digit to the right of the digit you want to estimate, and if it is less than 5 then you round down, and if it is greater than 5, you round up.
If it is less than 5, you round down and if it is more than 5, you round up

< 5

> 5

Rules to round off a number to the nearest 10

* We will consider the ones digit of the given number.
* If it is 5 or more, then add 1 (one) to the tens digit and put zero (0) at the ones place.
* If the ones digit is less than five (5), put zero (0) at the ones place. No change is made in the tens digit.

Rules to round off a number to the nearest 100

* We will consider the tens digit of the given number.
* If the tens digit is 5 or more, we put zero (0) at the ones and tens place and add 1 (one) to the hundreds digit.
* If the tens digit is 5 or less, we put zero (0) at the ones and tens place and no change is made in the hundreds digit and keep as it is.

Rules to round off a number to the nearest 1000

* We will consider the hundreds digit of the given number.
* If the hundreds digit is 5 or more, we put zero (0) at the ones, tens and hundreds place and add 1 (one) to the thousands digit.
* If the hundreds digit is 5 or less, we put zero (0) at the ones, tens and hundreds place and no change is made in the thousands digit and keep as it is.

REMEMBER

When we Round off the following numbers to the nearest 10	When we Round off the following numbers to the nearest 100	When we Round off the following numbers to the nearest 1000
There will be zero (0) in ones place only.	There will be zero (0) in tens and also ones place.	There will be zero (0) in hundreds, tens and also ones place.

- **For example:**

1) 2489 x 15

Rounding off to the nearest 10, we get ---

2490 x 20 = 49800

Actual product = 2489 x 15 = 37335

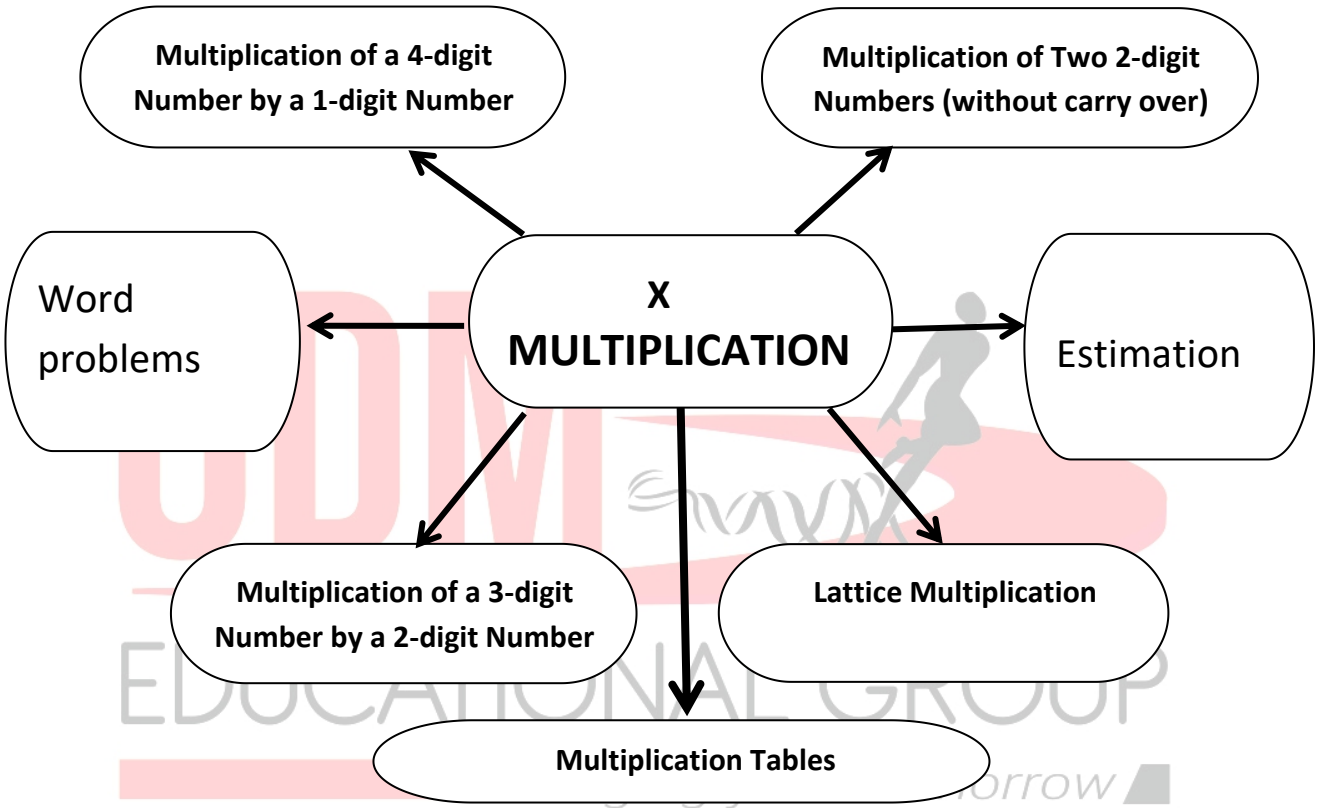
2) 4632 x 34

Rounding off to the nearest 10, we get ---

4630 x 30 = 138900

Actual product = 4632 x 34 = 157488

MIND MAP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