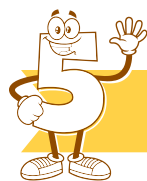# 5

Learn & Explore

MATHEMATICS

ELEMENTS
LEARNING SYSTEM

Benchmarks

Grade 4-5

Numbers, Data & Measurements

[Number] Students will be able to demonstrate knowledge of place value (5-digit to 7-digit numbers); represent whole numbers with words, diagrams, number lines, or symbols; order and compare numbers.

They will add and subtract numbers up to 6digit numbers; multiply (up to 5-digit numbers with 3-digit) and divide (up to 5 digit up to 2 digit number) Solve problems involving odd and even numbers, addition, subtraction, multiplication and division of numbers (involving missing numbers, money, quantities and measures), round numbers to nearest tens, hundreds and thousands and make estimates.

[Measurements] Students will be able to measure, compare and convert mass and time from one standard unit to another; read, write and convert time in 24 hour and 12 hour notation.

They would also solve problems involving mass/weight and time; solve problems

[Data & Stat] Read and interpret data from tables, pictographs, bar graphs, tally charts, block graphs, line graphs, pie charts and Carroll diagrams.

Organise and represent data using tables, pictographs, bar graphs, tally charts, block graphs, line graphs, pie charts and Carroll diagrams to answer questions.

Solve problems in context in relation to averages of quantities, measures and numbers. Describe the probability of an event; represent the probability of an event including real world problems.

Fractions

Recognise fractions as parts of wholes or collections; represent fractions using words, numbers; compare and order simple fractions; add and subtract simple like, unlike fractions, including those set in problem situations.

Demonstrate knowledge of decimal place value (up to three decimal place) compare, order, and round decimals (to the nearest whole number and up to two decimal place); add, subtract, multiply and divide decimals, including those set in real world problems (including money, quantities or measures).

Geometry

[Geometry] Students will be able to use properties to describe and compare quadrilaterals; identify three dimensional shapes and relate three dimensional shapes with their two dimensional representations.

They will also identify and draw types of angles up to 180 degrees and lines of symmetry in 2-D shapes; compare and order angles by size; identify circumference of a circle.

[Measurements] Students will be able to measure, compare and convert lengths and capacity

They would also solve problems involving length, capacity;

Solve problems involving perimeter and area of parallelogram, triangle, square, rectangle and rectilinear shapes.

Algebra

Students will be able to analyse and complete number patterns; find the missing number or operation in a number sentence.

MISTAKES + ALLOW - × = THINKING TO HAPPEN % <

Numeric Adventures: From Counting to Calculations

Learning Objectives:

- Count, read and write up to 9,999,999 (7-digit numbers)
- Recognize place value up to 6D and 7D numbers
- Add and subtract up to 6-digit numbers mentally and in written form
- Estimate the answer to an addition and subtraction question. (using various approaches)
- Multiply up to 5-digit numbers with

- 1-digit, 2-digit, and 3-digit numbers in written form.
- Divide up to 5-digit numbers by 1-digit and 2-digit numbers in written form.
- Identify divisibility rules for 7 and 11 and use them on up to 5-digit numbers.
- Recognize order of operations and use it to solve mathematical operations
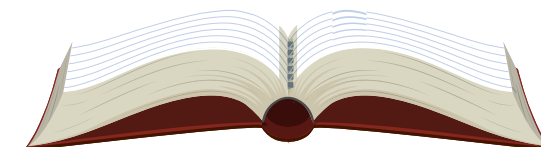
Vocabulary:
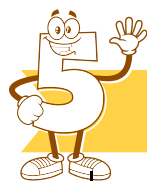
Million	Primes	Composites	Parenthesis	Estimation

Prime Factorization	Divisibility Test	Lattice

6 & 7 Digit Numbers

Start with reviewing the 5 digits numbers.

6 digits number
Introduce the concept of 6-digit numbers for example: 831,542

H Thousand	T Thousand	Thousand	Hundred	Ten	One
8	3	1	5	4	2

Thousands

Ask if anyone can write this number in words. Write it on the board.

Break down the number into its place values:

831,000   +   542

Eight hundred thirty one thousand, five hundred and forty-two

900000   +   038

Nine hundred thousand, thirty eight

Ask if they can write :

One hundred five thousand, two hundred and fifty three in numbers.

H Thousand	T Thousand	Thousand	Hundred	Ten	One
1	0	5	2	5	3

Ask students to make arrow cards for any eight 6 digits numbers.

Write those numbers in words.

7 digits number

Ask if they can write: "One hundred five thousand, two hundred and fifty-three" in numbers.9,220,176

Million	H Thousand	T Thousand	Thousand	Hundred	Ten	One
9	2	2	0	1	7	6

1,000,000   +   831,000   +   542

One million, eight hundred thirty one thousand, five hundred and forty two

4,000,000   +   000000   +   038

Four million, thirty eight

Ask them to write it in numbers

Seven Million, One hundred eighty five thousand, two hundred and fifty three

=   7,000,000   +   185,000   +   253

= 7,185,253

Ask students to make arrow cards for any eight 7 digits numbers.

Write those numbers in words.

Solve **Question 1** from **Exercise 1**

A game for four players

You will need:

- Game board: Page 21 - 30 (Game boards for Grade 5 Maths)
- A 1-6 dice
- A different colored counter for each player

- Both players place their counters on square 1, marked on the game board.
- Players take turns to roll the dice and move forward that number of spaces on the game board.
- If a player lands on a shaded square with a number displayed in large print, the player checks to see if the number contains a digit that matches their dice score. If it does, the player performs one subtraction to change the digit to zero. The player then moves forward the number on the dice again.
- If a player lands on an unshaded square, or if the number on the game board does not contain a digit that matches the number on the dice, play passes to the other player.
- Players may challenge an incorrect calculation. If the calculation is incorrect, the player misses their next turn.
- The winner is the first player to reach or pass square 64.

Example: 3456 on the square and 5 on the dice. The 5 is in the tens place, so we need to subtract 5 tens (50) to reduce the tens digit to zero.
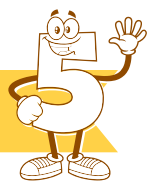
Mental Addition:

Give two random 5 & 6 digits numbers and ask students mentally add or subtract them.

- Ask them to share their answer and approach.
- Write two numbers on boards for e.g.,

$$2,903,909$$
$$+\ 6,181,290$$

Now for estimation we will roundup to nearest million or hundred thousand.

Rounding to million

Mentally round to 3 million   2,903,909   =   3,000,000

Mentally round to 6 million + 6,181,290   =   + 6,000,000

9,000,000

Rounding to hundred thousand

Mentally round to 2 million 9 hundred thousand   2,903,909 = 2,900,000

Mentally round to 6 million 2 hundred thousand + 6,011,290 = +6,200,000

9,100,000

Operation	Answer
829,120 + 921,332	
102,931 + 82,312	
3,532,426 + 4,501,823	
1,129,000 + 2,002,123	
1,273,132 - 947,243	
8,827,000 - 7,424,892	
648,322 - 131,922	
128,349 - 120,010	

Write 2 numbers and ask them to add them mentally and share their findings.

Repeat it for practice.

Mental Subtraction:

Follow same steps to teach subtraction.

Solve them mentally.

Review pattern on multiplication grid.

Ask students to observe and identify patterns in the multiplication of the following numbers:

- Multiples of 2: 2, 4, 6, 8...
- Multiples of 3: 3, 6, 9, 12...
- Multiples of 5: 5, 10, 15, 20...
- Multiples of 6: 6, 12, 18, 24...
- Multiples of 10: 10, 20, 30, 40...

Encourage students to share their findings and guide them in realizing divisibility patterns.

Give the students random numbers
- Ask them to use find which numbers can divide it.
- Encourage them to use the patterns they found.
- Teacher repeats devising pattern 2 to 11.

Revisit the multiplication grid and highlight the divisibility patterns.

Find the numbers which can divide following number using divisibility patterns they found.

- 110
- 39
- 201
- 40
- 801

A number is divisible by

2	When the last digit will be divisible by 2, i.e., 0, 2, 4, 6...
3	Take the sum of all digits until you get a single digit, and that digit will be divisible by 3. For example, 273: 2 + 7 + 3 = 12 12: 1 + 2 = 3. As 3 is divisible by 3, 273 is divisible by 3.
5	If the last digit is 0 or 5, then the number is divisible by 5. For example, 655 is divisible by 5.
7	Double the last digit and subtract it from the number formed by previous digits. If the difference is divisible by 7, then the number is also divisible by 7. For example, 4578: 457 − (8 x 2) = 457 − 16 = 441. But it is still too big, so repeat the steps. 441: 44 − (1 x 2) = 44 − 2 = 42, and 42 is divisible by 7. So, 4578 is also divisible by 7.
10	If the number ends with 0, then it is divisible by 10.
11	If the difference between the sum of digits at odd positions and the sum of digits at even positions is 0 or a multiple of 11, then the number is divisible by 11. For example, 82907: Sum of digits at odd positions = 8 + 9 + 7 = 24 Sum of digits at even positions = 2 + 0 = 2 Difference is = 24 − 2 = 22, which is divisible by 11. So, 82907 is divisible by 11.

Ask the students to take five 4 digits and 5 digits numbers. Then, instruct them to apply divisibility rules to determine if each number is divisible by 2, 3, 5, 7, 10, and 11

Solve **Question 5** from **Exercise 1**

Area Method and Lattice Method

Area Method

- Ask them to recall multiplication using area method.
- Ask for volunteer to explain it fo class.
- Writing some examples on board to explain.

213 x 52

	200	10	3
50	200×50	10×50	3×50
2	200×2	10×2	3×2

	200	10	3
50	10000	500	150
2	400	20	6

213 x 52 = 10000 + 500 + 400 + 150 + 20 + 6

= 11076

Lattice Method

- Now ask them can they do same with lattice multiplication.
- Review it for product of 5 digits with 1, 2 and 3 digit numbers.

213 x 52

= 11076

52109 x 803

= 41843527

785 x 1220

= 957700

Practice area method and lattice method.

- 311 x 42
- 20181 x 7
- 50291 x 65
- 75751 x232
- 32534 x 761

Begin by reviewing and reinforcing the concept of place value in multiplication.

Lets multiply 291 x 12 ,however as 12 =10+ 2 We will first multiply 291 x 10 then 291 x 2 and then add their result. Then we will do direct multiplication.

Lets see some other examples using long multiplication:

Therefore:

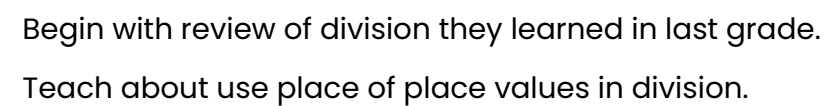63462 x 8 = 507,696

Therefore:

73522 x 49 = 3,602,578

Therefore:

15304 x 713 = 10,911,752

Practice these questions:

- 19212 x4
- 43151 x 9
- 23184 x 30
- 44319 x 75
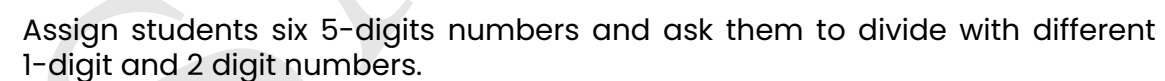- 96952 x 82
- 62491 x 324
- 52678 x 837
- 15331 x 941

Long Division Algorithm

Begin with review of division they learned in last grade.

Teach about use place of place values in division.

4194 ÷ 9 = 466

22168 ÷ 17 =1304

Solve **Question 6 and 7** from **Exercise 1**

Assign students six 5-digits numbers and ask them to divide with different 1-digit and 2 digit numbers.

BODMAS

Start by reviewing the DMAS rule (Division, Multiplication, Addition, Subtraction). This rule guides us on the sequence in which mathematical operations should be performed. It's like having an order in which we do things.

Next, let's talk about brackets. Brackets are those handy symbols we use in math to group numbers or operations together, just like we use brackets in a sentence to make things clear.

Take a look at these two expressions:

- $(2 + 3) \times 4$
- $2 + (3 \times 4)$

Notice that we have the same numbers here, just arranged differently with brackets. Now, let's do the math:

|	
$= (2 + 3) \times 4$	$= 2 + (3 \times 4)$
$= (5) \times 4 = 5 \times 4$ **solving brackets first**	$= 2 + (12)$
$5 \times 4 = 20$	$= 2 + 12$

See how the placement of the brackets changes the result? It's important to use brackets correctly to get the right answer.

Now, let's talk about the standard order of operations BODMAS:

- First, we do the operations inside brackets (if there are any).
- Then, we move on to multiplication and division from left to right.
- Finally, we do addition and subtraction from left to right.
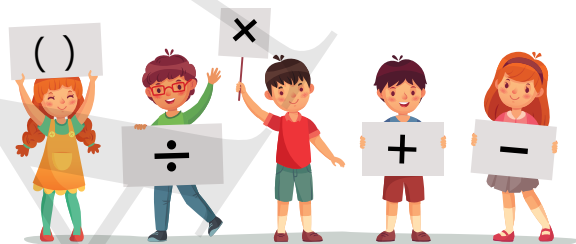
Ask students to practice these.

a) 5+(6-2)×3
b) 3×(8-2)+4÷2
c) 4.5+(2.3×1.2)-0.7
d) 9÷3+(4×2)-5
e) 4.5+(2.3×1.2)-0.7
f) 6÷2+9×(4-2)

Encourage them to formulate their own expressions and practice solving them using the order of operations.

Solve **Question 8** from **Exercise 1**

Question 1: Add following numbers and write the answer in place value and words.

2289131 + 319123

```
  2 2 8 9 1 3 1
+   3 1 9 1 2 3
---------------
  2 6 0 8 2 5 4
```

M	H Th	T Th	Th	H	T	O
2	6	0	8	2	5	4

= Two million, six hundred eight thousand, two hundred and fifty four.

a) 456,789 + 123,456
b) 2,345,678 + 7,890,123
c) 987,654 + 6,543,210
d) 12,345 + 987,654
e) 8,765,432 + 123,456
f) 3,210,987 + 7,654,321
g) 9,876,543 + 45,678
h) 1,234,567 + 8,765,432
i) 6,789,012 + 123,456
j) 7,939,002 + 702,381

Question 2: Subtract and write the answer in place value and words.

a) 123,456 - 45,678
b) 987,654 - 321,987
c) 9,876,543 - 8,765,432
d) 7,890,123 - 6,789,012
e) 7,654,321 - 234,567
f) 8,765,432 - 123,456
g) 9,999,999 - 987,654
h) 6,543,210 - 567,890
i) 8,888,888 - 666,666
j) 9,765,432 - 543,210

Question 3: Multiply following using lattice and area method.

a) 95314 x 5
b) 31491 x 8
c) 51993 x 7
d) 59301 x 23
e) 78770 x 92
f) 40081 x 70
g) 63246 x 37
h) 32751 x 27
i) 36714 x 53

Question 4: Multiply using long multiplication algorithm.

a) 95314 x 6
b) 42609 x 7
c) 51726 x 123
d) 73841 x 41
e) 91108 x 56
f) 34437 x 79
g) 78453 x 25
h) 32548 x 417
i) 44560 x 937
j) 77539 x 810
k) 98765 x 912
l) 61339 x 483

Question 5: Apply divisibility rules to determine if each number is divisible by 2, 3, 5, 7, 10, and 11.

a)   12,346   b)   23,457   c)   45,678

d)   56,789   e)   67,890   f)   78,901

g)   90,123   h)   12,345   i)   43,210

Question 6: Divide following.

a)   4)$\overline{90324}$ b)   3)$\overline{29184}$ c)   5)$\overline{41895}$

d)   5)$\overline{55775}$ e)   7)$\overline{46095}$ f)   7)$\overline{54908}$

g)   1)$\overline{30710}$ h)   3)$\overline{41385}$ i)   2)$\overline{68646}$

Question 7: Divide following.

a)   70)$\overline{1567}$ b)   17)$\overline{3970}$ c)   23)$\overline{2369}$

d)   14)$\overline{5754}$ e)   15)$\overline{1299}$ f)   22)$\overline{9288}$

g)   10)$\overline{4181}$ h)   12)$\overline{4509}$ i)   16)$\overline{4028}$

Question 8: Solve following.

a)   6÷2+(4×3.5)   b)   8÷2+5×(6−4)   c)   9÷3+(4−2)

d)   6−(4×2)+7   e)   3.5×(4+2)−1.2   f)   6.8÷(2+1.3)+0.7

g)   12−(48÷2)+0.6   h)   10−(2.7×1.3)+0.8

Question 9: Answer the following questions.

- In a class of 30 students, if each student possesses 4 textbooks, how many textbooks are there in total?

- At a store, three different types of fruit baskets are available. Each fruit basket contains 6 apples, 4 bananas, and 2 oranges. If the store sells 10 of each type of fruit basket, how many apples were sold in total?

- A company consists of 5 departments, with each department having 15 employees. If 3 employees from each department are promoted to managerial positions, how many managers are there in total?

- Within a library, there are 50 books, and each book consists of 10 chapters. How many chapters are there in total within the library's collection of books?

- Inside a box, there are 12 small bags, and each small bag contains 8 candies. How many candies are there in total within the box?

References

https://www.youtube.com/watch?v=eGxwkbP7KS0

https://www.youtube.com/watch?v=KTTfQmC-_jw