Form 2 Mathematics Notes

Strand 1: NUMBER CONCEPT

By the end of this topic students should be able to:

i. **Use place value chart to:**
   a. **Write** numbers in words (included decimal numbers)
   b. **Identify** value and place value of any numbers
   c. **Expand** numbers (included index notation)
   d. **Write** numbers in compact form (ordinary or numerical form)
   e. **Express** numbers in similar or equivalent form

ii. **Explain** strategy for identifying the smallest and largest whole numbers within a set of given number

iii. **Use** the symbol < or > when comparing numbers

iv. **Identify** prime numbers

v. **Determine** the prime factors of a numbers

vi. **Revise** the concept of index notation and concise way of representing numbers

vii. **Define** the term integer and discuss where they occur in everyday life

viii. **Convert** between fraction, percentage, and decimal

ix. **Define** square and square roots with examples

x. **Calculate** square of a numbers and a square roots of a numbers

xi. **List** and **calculate** LCM (lowest common multiple)

1. Use place value chart to:

A. WRITE NUMBERS IN WORD (INCLUDED DECIMAL NUMBERS)

- To write numbers in words you must draw a place value charts as shown below to help you

BILLIONS			MILLIONS			THOUSANDS			ONES		
HB	TB	B	HM	TM	M	HTh	Tth	Th	H	T	0

(where H is for hundreds, T is for tens, O is for ones)

- Put the given numbers on the place value chart before writing in words

Examples 1: Write 82,320,905,735 in words.

(let's put the number in the place value chart)

BILLIONS			MILLIONS			THOUSANDS			ONES		
HB	TB	B	HM	TM	M	HTh	Tth	Th	H	T	0
	8	2	3	2	0	9	0	5	7	3	5

- 82 billion, 320 million, 905 thousand, 735 ones

Write in words: eighty-two billion, three hundreds twenty million, nine hundreds and five thousand, seven hundred and thirty-five

Example 2: Write these numbers in words

a. 521432318
b. 4324
c. 76321500
d. 89567

(remember to draw place value charts to help you)

	BILLIONS			MILLIONS			THOUSANDS			ONES		
	HB	TB	B	HM	TM	M	HTh	Tth	Th	H	T	0
a.				5	2	1	4	3	2	3	1	8
b.									4	3	2	4
c.					7	6	3	2	1	5	0	0
d.								8	9	5	6	7

SOLUTIONS

a. 521 million, 432 thousand, 318 ones
ANS: five hundred twenty-one million, four hundred thirty-two thousand, three hundreds and eighteen.

b. 4 thousand, 324 ones
ANS: four thousand, three hundred and twenty-four

c. 76 million, 321 thousand, 500 ones
ANS: seventy-six million, three hundred twenty-one thousands and five hundred

d. 89 thousand, 567 ones
ANS: eighty-nine thousands and five hundred and sixty-seven

B. WRITE DECIMAL NUMBERS IN WORDS

- To write decimal numbers in words you will first read it before writing in words
- To read decimal you must:
  i. Read the whole number part if there is one
  ii. Read the decimal points as AND
  iii. Read the numbers to the right of the decimal point as you would a whole number
  iv. Read the place value of the last digit
  v. Write all that you've read in words

Examples: write these numbers in words (hint: place value chart may help you)

a. 13.578
b. 3.2
c. 276.44

	ONES				TENTHS	HUNDREDTHS	THOUSANDTHS
	H	T	O	.			
a.		1	3	.	5	7	8
b.			3	.	2		
c.	2	7	7	.	4	4	

SOLUTIONS

a. Thirteen **AND** five hundred seventy-eight thousand**ths**
   Or
   Thirteen **point** five seven eight
b. Three **AND** two ten**ths**
   Or
   Three **point** two
c. Two hundred seventy-seven **AND** forty-four hundred**ths**
   Or
   Two hundred seventy-seven **point** four four.

C. IDENTIFY VALUE AND PLACE VALUE OF ANY NUMBERS

Place value tells you the **VALUE** of each digit in a numbers.

Examples : identify the place value and the value of the digit **9** in 71,**9**05,346,521.

BILLIONS			MILLIONS			THOUSANDS			ONES		
HB	TB	B	HM	TM	M	HTh	Tth	Th	H	T	0
	7	1	**9**	0	5	3	4	6	5	2	1

Place Value: the digit **9** is in the **hundred million place**

Value of **9** is **9 Hundred million** or 900000000

D. EXPAND NUMBERS (INCLUDED INDEX NOTATION)

- Expand numbers mean writing numbers in expanded form. It can be written using index notation form

Example 1: Write **6738024** in the expanded form using index notation

MILLIONS			THOUSANDS			ONES		
HM 100000000 (10^8)	TM 10000000 (10^7)	0M 1000000 (10^6)	HTh 100000 (10^5)	Tth 10000 (10^4)	Th 1000 (10^3)	H 100 (10^2)	T 10 (10^1)	0 1 (10^0)
		6	7	3	8	0	2	4

Expanded Form: 6000000 + 700000 + 30000 + 8000 +20 + 4

To use index notation:

6738024 = 6 x1000000 + 7 x 100000 + 3 x 10000 + 8 x 1000 + 2 x 10 + 4

Index notation: $6 \times 10^6 + 7 \times 10^5 + 3 \times 10^4 + 8 \times 10^3 + 2 \times 10^1 + 4 \times 10^0$

Example 2: write 841752 in expanded form using index notation

MILLIONS			THOUSANDS			ONES		
HM 100000000 (10^8)	TM 10000000 (10^7)	0M 1000000 (10^6)	HTh 100000 (10^5)	Tth 10000 (10^4)	Th 1000 (10^3)	H 100 (10^2)	T 10 (10^1)	0 1 (10^0)
			8	4	1	7	5	2

Expanded Form: 800000 + 40000 + 1000 + 700 +50 + 2

To use index notation:

6738024 = 8 x 100000 + 4 x 10000 + 1 x 1000 +7 x 100 + 2 x 10 + 4

Index notation: $8 \times 10^5 + 4 \times 10^4 + 1 \times 10^3 + 7 \times 10^2 + 5 \times 10^1 + 2 \times 10^0$

E. WRITE NUMBERS IN COMPACT FORM (ODDINARY OR NUMERICAL FORM)

Examples: Write the following in compact forms

a. $4 \times 10^5 + 2 \times 10^4 + 7 \times 10^3 + 5 \times 10^2 + 3 \times 10^1 + 9 \times 10^0$

SOLUTION

- 400000 + 20000 + 7000 + 500 + 30 + 9

Compact form: 427539 (ANS)

b. 3000000 + 40000 + 900 + 1

SOLUTION

- **Compact form:3040901(ANS)**

F. EXPRESS NUMBERS IN SIMILAR OR EQUIVALENT FORMS

Equivalent representation of the same numbers

Example: 1.75million is equivalent or the same with 1¾ millions and 1750000

- First you can change .75 into fraction by multiply with 100 then simplify and you will found out .75 is equal to ¾ in fraction. (depending your multiplication from the place value of each decimal point shows in place value chart)
- Therefore 1.75 million can be written as 1¾millions then you can write in compact form and found out 1750000 million.

ii. EXPLAIN STRATEGY FOR IDENTIFYING THE SMALLEST AND LARGEST WHOLE NUMBER WITH IN A SET OF GIVEN NUMBER.

STRATEGY: ORDERING

- In ordering there are **ASCENDING ORDERS** and **DESCENDING ORDERS**
  Ascending orders; ordering set of number from smallest to largest.
  Example: Order this set of numbers in Ascending orders
  5,9,13,3,7,1
  Solution: 1,3,5,7,9,13
  Descending order: ordering set of number from largest to smallest.
  Example: Order this set of number in Descending orders
  5,9,13,3,7,1
  Solution: 13,9,7,5,3,1
  Example: from the set of numbers below identify the smallest and the largest number.
  382,156,251,87,79,490
- Used ordering method to help you, but you either use Ascending or Descending order because they will give out the same answer.
  Ascending order: 79,87,156,251,382,490
  Solution
  Smallest number**: 79,** Largest number: **490**

  Descending order: 490,382,251,156,87,79

  Solution

  Smallest number: **79,** Largest number: **490**

iii. USE SYMBOL < OR > WHEN COMPARING NUMBERS

Symbol **<** means **Less than**
Symbol **>** means **greater than**

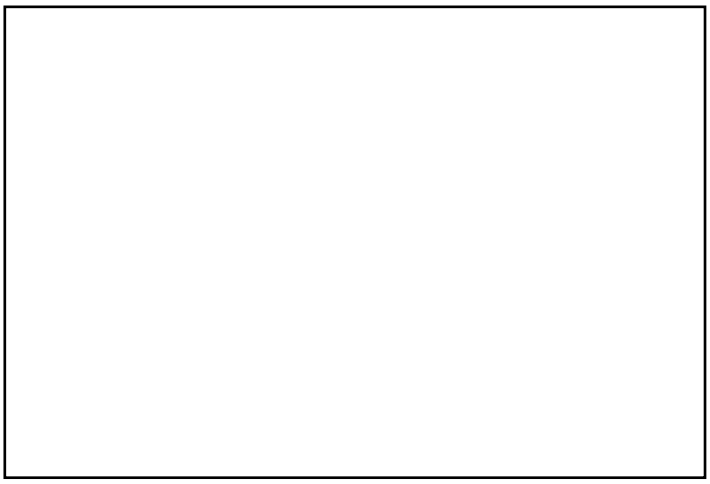
- You may compare numbers using < or >.
  Example: Compare 88 and 32 using symbol < or >
  Solution
  Let's say 88 is greater than 32, therefore we will use symbol of greater than.
  88 > 32
  Or
  Let's say 32 is less than 88, therefore we will use symbol of less than
  32 < 88

iv. IDENTIFY PRIME NUMBERS

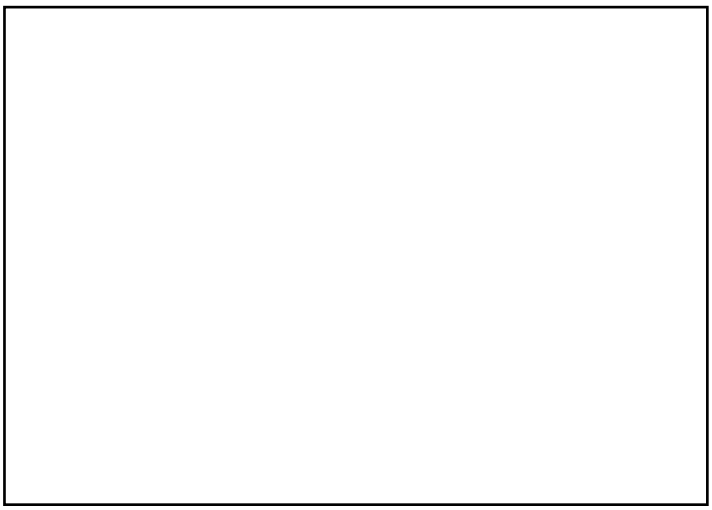
- A prime number has only two factors, 1 and itself
  Example: the first ten prime numbers are
  2,3,5,7,11,13,17,19,23,29…. (they're numbers that has only two factor which is 1 and itself)

v. DETERMINE PRIME FACTORS OF A NUMBER

- Every non – prime numbers can be expressed as a PRODUCT of PRIME FACTORS
  Example: Find the prime factorization of 96 (factor tree may help you)
  Factor tree:



- From the factor tree, picked or circle all the prime numbers shown in it and that is your answer.
  Solution: 2 x 2 x 2 x 2 x 2 x 3
  Example 2: find prime factorization of 36
  Factor tree:



  Solution: 2 x 2 x 3 x 3

vi. REVISE THE CONCEPT INDEX NOTATION CONCISE WAY OF REPRESENTING NUMBERS

➢ Let's study index notation.
Example 1; 3 x 3 can be written in index form

- **3^2** (where 3 is the base and ^{2} is the index), three squared or three to the second power

Example 2; 5 x 5 x 5 = 5^3 (five cubed or five to the third power)

Example 3: Write the following multiplication in index form and evaluate them

a. 4 x 4 x 4

Solution:

4^3 (index form)

Evaluation = 4 x 4 x 4

=16 x 4 = **64**

b. 2 x 2 x 2 x 2 x 2 x 2

Solution:

2^6 (index form)

Evaluation = 2 x 2 x 2 x 2 x 2 x 2

4 x 2 x 2 x 2 x2

8 x 2 x 2 x2

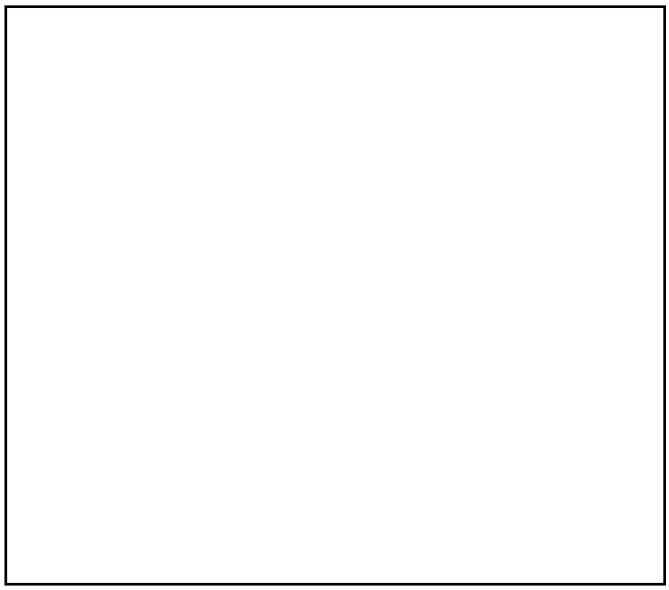
16 x 2 x 2

32 x 2

= 64

Example 4: Find prime factorization of 72 and write your answer in form of index notation

Factor tree:



Solution: 2 x 2 x 2 x 3 x 3

vii. DISCUSS THE TERM INTERGER AND DISCUSS WHERE THEY OCCUR IN EVERYDAY LIFE

- Integer are the set of whole numbers and their opposites

Example:

Whole numbers	4	8	25
Opposites	-4	-8	-25

➢ Integer has a **positive (+)** and **negative (-) numbers**

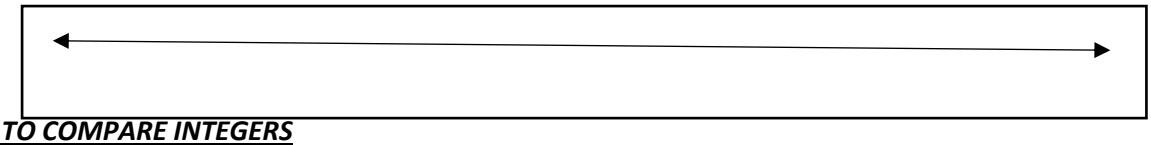
Positive numbers: are numbers that are greater than zero

Negative numbers: are numbers that ae less than zero

Note : **Zero is neutral. It has no sign. Zero is neither positive nor negative.**

You can show positive and negative numbers on a number line

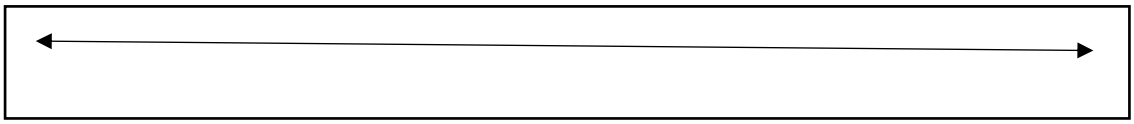
Example:



HOW TO COMPARE INTEGERS

- The right numbers are always greater than the left number on the number lines. You will use symbol < or > to compare intergers

  Examples:



-4 < -2 (-4 less than -2)

-2 < +3 (-2 less than +3)

+3 < +5 (+3 less than +5)

+5 > +2 **(+5 greater than +2)**

viii. Convert between fraction, percentage and decimals

- To convert fraction to percentage you must multiply with 100⁄1 then simplify if available

  Example: convert 3⁄5 to percentage

  3⁄5 x 100⁄1 = **300⁄5** then simplify and your answer is **60%**

- To convert percentage to fraction you must multiply with 1/10 ten simplify if available
- **Example**; Convert 37%to fraction

  1] 37/1 ×1/100 =**37/100**

  2] 35%=35×1/100=35/100=**7/20** (in simplest form**)**

- To convert fraction to decimal you must divide the numerator by denominator

  Example; Convert 3/8 as decimal

  = **0 .375**

Therefore 3/8, write as **0.375** in decimal form.

- To covert percentage to decimal you must divide by 100 [÷100]

  Example; Convert 93% to decimal.

  93%= 93÷100 =**0 .93**

- To convert decimal to percentage you must multiply with 100[×100]

  Example; Convert 0.825 to percentage

  0.825 ×100 = 825%

ix. DEFINE SQUARE AND SQUARE ROOTS WITH EXAMPLES

- When a number is multiplied by itself, the product is the square of the number.
  Example: 6 x 6 = 36. Written in square is $6^2 = 36$
- Let's say 6^2 is equal 36 or 36 is the square of 6.
- When the product of two indentical factors is a second numbers. The factor is the square root of the number.
- Symbol for square root is √
  Examples:
  - √36 = 6.

  Let's say square root of 36 is equal to 6.
  - √49 = 7

Let's say 49 is the square of 7, therefore 7 is the square root of 49.

x. CALCULATE SQUARE ROOT OF A NUMBER AND A SQUARE OF A NUMBER

Example 1: Find the square roots of the following

a. √4 = **2**

b. √9 = **3**

Example 2: Find the square number of the following

a. 16 = 4 x 4 = $\mathbf{4^2}$

b. 100 = 10 x 10 = $\mathbf{10^2}$

xi. LIST AND CALCULATE LCM (LOWEST COMMON MULTIPLE) OF A TWO NUMBERS

Multiples: are the products of the number and other factor

Example: List the first seven multiples of 2 and multiple of 3

Multiples of 2	Multiples of 3
2 x 1 = 2 2 x 2 = 4 2 x 3 =6 2 x 4 = 8 2 x 5 = 10 2 x 6 = 12 2 x 7 = 14	3 x 1 = 3 3 x 2 = 6 3 x 3 = 9 3 x 4 = 12 3 x 5 = 15 3 x 6 = 18 3 x 7 = 21
Multiples of 2 are: 2,4,6,8,10,12,14	**Multiples of 3: 3,6,9,12,15,18,21**

- To find LCM of a two or more numbers, you must first **list the multiples** of numbers then their **lowest common** multiple is your answer.

  Example: Find the LCM of 4 and 8

Multiples of 4	Multiples of 8
4 x 1 = 4 4 x 2 = 8 4 x 3 =12 4 x 4 = 16 4 x 5 = 20 4 x 6 = 24 4 x 7 = 28	8 x 1 = 8 8 x 2 = 16 8 x 3 = 24 8 x 4 = 32 8 x 5 = 40 8 x 6 = 48 8 x 7 = 56
Multiples of 4 are: 4,8,12,16,20,24,28	**Multiples of 8: 8,16,24,32,40,48,56**

- There are 3 **common** multiples of 4 and 8, they're **8, 16, 24**
  = the lowest common multiple is **8**, therefore the **lowest common multiple** of 4 and 8 is **8.**

PS: Kataki 'o fetu'utaki mai ki he'eku fika teefoni kapau 'oku 'ikai ke ai ha me'a 'e mahino kiate koe he note. (7204467)