TOPIC: WHOLE NUMBERS
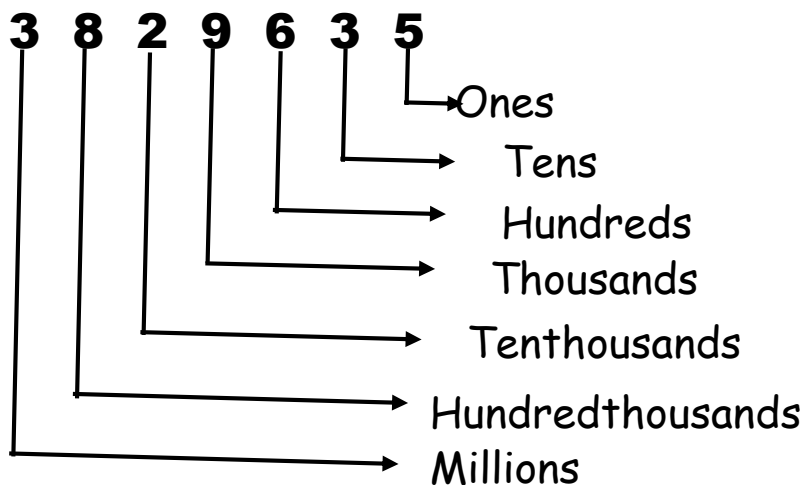
CONTENT: Finding place values and values
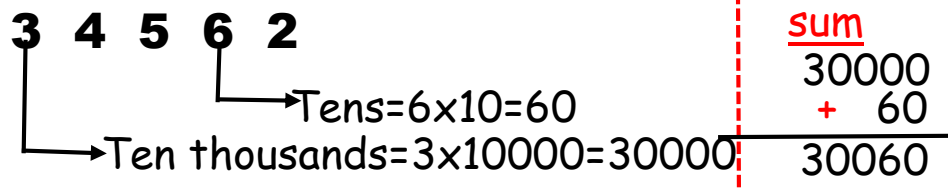
Examples

Identify the place value of each digit in the number below

3 8 2 9 6 3 5

→ Ones

→ Tens

→ Hundreds

→ Thousands

→ Tenthousands

→ Hundredthousands

→ Millions

Find the value of each digit in the number below

3 8 2 9 6 3 5

→ Ones=5x1=5

→ Tens=3x10=30

→ Hundreds=6x100=600

→ Thousands=9x1000=9,000

→ Tenthousands=2x10000=20,000

→ Hundredthousands=8x100000=800,000

→ Millions=3x1000000=3,000,000
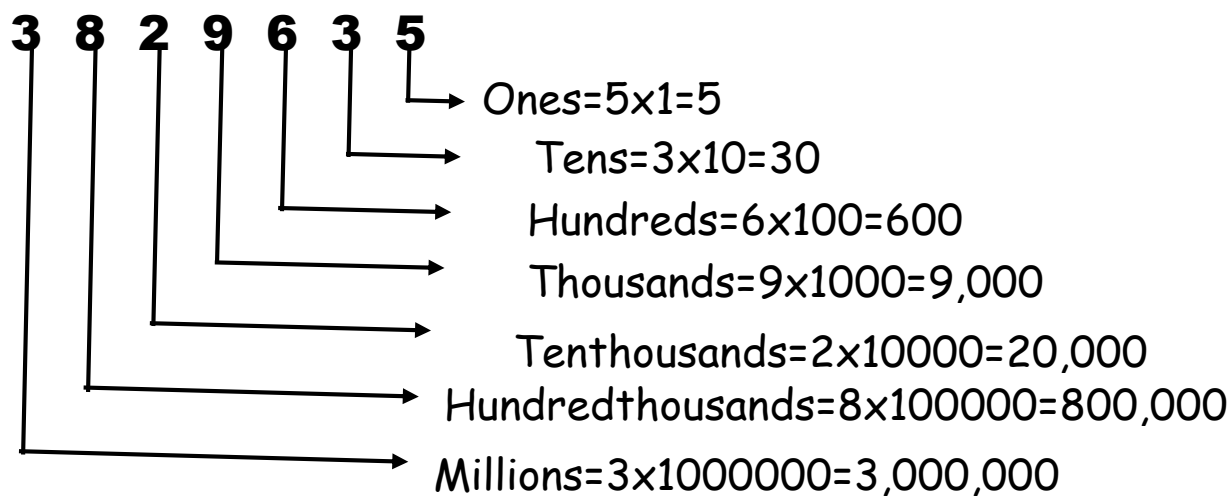
Find the sum of the values of 3 and 6 in the number 34562

3 4 5 6 2

→ Tens=6x10=60

→ Ten thousands=3x10000=30000

sum

30000

+   60

─────

30060

─────

Find the product of the values of 4 and 6 in the number 4062

4 0 6 2

→ Tens=6x10=60

→ Thousands=4x10000=40000

Product

=40000 x 60

=240000

Find the product of the value of 8 and the place value of 3 in the number 53862

5 3 8 6 2

→ Hundreds=8x100=800

→ Thousands=1000

Product

=800 x 1000

=800000

ACTIVITY

1. Find the place value of each of the digits with a ring in the following numbers.

a) 4⑦6 5   b) ⑤6 9 3 8   C) 4 0⑥5 7

2. Find the value of each of the digits with a ring in the following numbers.

a) 3⑦4   b) 4②5 8 9   c) ④6 9 594

3. Find the sum of the values of 4 and 6 in the number 63478.

4. Workout the product of the values of 3 and 5 in the number 3765.

6. Represent the following numbers on an abacus.

a) 4302   b) 3205   c) 2520

TOPIC: WHOLE NUMBERS

CONTENT: Writing whole numbers in words and in figures

Examples

Write the following numbers in words

a) 8 2 9 6 3 5

Thousands	Units
829	635

829,635= Eight hundred twenty nine thousand six hundred thirty five.

- -

b) 99035

Million	Thousands	Units
	99	035

99,035=Ninety nine thousand thirty five.

- -

c) 40215

Million	Thousands	Units
	40	215

40,215=Forty thousand two hundred fifteen.

2. Write the following in figures

a)   Forty nine thousand fifteen.

$$
\begin{array}{r}
49000 \\
+15 \\
\hline
49015 \\
\hline
\end{array}
$$

b)   Ninety six thousand forty.

$$
\begin{array}{r}
96000 \\
+40 \\
\hline
96040 \\
\hline
\end{array}
$$

Million	Thousands	Units
	3	048

3048=Three thousand forty eight.

1. Write the following numbers in words.

a) 4 7 6 5   b) 5 6 9 3 8   C) 40657   d) 55009

2. Write the following in figures.

a) Forty six thousand eighty five.

b) Seventy two thousand two hundred fifty thirteen.

c) Ninety hundred four thousand nineteen.

TOPIC: WHOLE NUMBERS

CONTENT: Forming numbers using digits

Examples

1.Given the digits 3,4,6 write down all the 3-digit numbers formed using the digits above.
=346,364,436,463,634,643

2.Given the digits 0,4,1 write down all the 3-digit numbers formed using the digits above.

=104,140,403,430

3. Given the digits 2,4,1 and6

a)Write down the smallest 4-digit number that can be formed using the above digits.

=1246

b)Write down the largest 4-digit number that can be formed using the above digits.

=6421

4. Given the digits 2,0,4 and1

a)Write down the smallest 4-digit number that can be formed using the above digits.

=1024

b)Write down the largest 4-digit number that can be formed using the above digits.

=4210

Activity

1.Given the digits 5,9and 6 write down all the 3-digit numbers formed using the digits above.

2.Given the digits 0,6and 7 write down all the 3-digit numbers formed using the digits above.

3. Given the digits 9,8,1 and2

a)Write down the smallest 4-digit number that can be formed using the above digits.

b)Write down the largest 4-digit number that can be formed using the above digits.

c)Find the sum of the smallest and the largest numbers formed.

4. Given the digits 3,8,0 and2

a)   Write down the smallest 4-digit number that can be formed using the above digits.

b) Write down the largest 4-digit number that can be formed using the above digits.

c) Find the sum of the smallest and the largest numbers formed.

TOPIC: WHOLE NUMBERS

CONTENT: <u>Writing whole numbers in expanded form using place values and values</u>

Examples

1. Expand the following using place values

a.)   9812

TH	H	T	0
9	8	1	2

9812=(9x1000) + (8x100) + (1x10) + (2x1)

b)   23012

TTH	TH	H	T	0
2	3	0	1	2

=(2x10000) + (3x100) + (0x10) + (1x10)+ (2x1)

2. Expand the following using values

a)   927

H	T	0
9	2	7

=(9x100) + (2x10) + (7x1)

=900 + 20 + 7

b) 4812

TH	H	T	0
4	8	1	2

=(4x1000) + (8x100) + (1x10) + (2x1)

=4000 + 800 +10 + 2

Activity

1.Expand the following using place values.

a)   234   b) 3427   c) 7924

2.Expand the following using values.

a)   534   b) 7269   c) 68934

TOPIC: WHOLE NUMBERS

CONTENT: <u>Writing whole numbers in expanded form using powers of ten</u>

Examples

1 Expand the following using place values

a)   9812

10^3	10^2	10^1	10^0
9	8	1	2

$9812 = (9 \times 10^3) + (8 \times 10^2) + (1 \times 10^1) + (2 \times 10^0)$

- -

b)   23512

10^4	10^3	10^2	10^1	10^0
2	3	5	1	2

$= (2 \times 10^4) + (3 \times 10^3) + (5 \times 10^2) + (1 \times 10^1) + (2 \times 10^0)$

- -

a)   927

10^2	10^1	10^0
9	2	7

$= (9 \times 10^2) + (2 \times 10^1) + (7 \times 10^0)$

- -

Activity

1. Expand the following using powers of ten.

a)   234   b) 3427   c) 7924

c)   534   d) 7269   c) 68934

TOPIC: WHOLE NUMBERS

CONTENT: Rounding off whole numbers

Examples

1. Round 578 off to the nearest tens.

```
  5 7 8̶
   +1 0
  5 8 0
```

b) 3 6 4

```
  3 6 4̶
   +0 0
  3 6 0
```

2. Round 5378 off to the nearest hundreds

```
  5 3 7̶ 8̶
   +1 0 0
  5 4 0 0
```

b) 3 6 3 8

```
  3 6 3̶ 8̶
   +0 0 0
  3 6 0 0
```

3. Round 5378 off to the nearest thousands

```
  2 5̶ 6̶ 7̶ 8̶
   +1 0 0 0
  2 6 0 0 0
```

b) 2 3 9̶ 7̶ 8̶

```
   +0 0 0 0
  2 3 0 0 0
```

Activity

1. Round off the following to the nearest tens

    a)   234   b) 3427   c) 7929

2. Round off the following to the nearest hundreds.

a)   534   b) 7269   c) 68934

3. Round off the following to the nearest thousands.

    a)   8421   b) 8269   c) 12934

4. Round off 236578 to the nearest ten thousands.

TOPIC: **WHOLE NUMBERS**

CONTENT: <u>Writing natural numbers in Roman Numerals</u>

Basics of Roman Numerals

1	5	10	50	100	500	1000
I	V	X	L	C	D	M

4 =IV	6=VI	9=IX	2=II	3=III
40 =XL	60=LX	90=XC	20=XX	30=XXX
400 =CD	600=DC	900=CM	200=CC	300=CCC
			2000=MM	3000=MMM

1.Convert 96 into Roman numerals

    96 = 90 + 6

    96= XCVI

2.Convert LIX in Hindu Arabic numerals

    LIX = 50 + 9

        = 59

Activity

1.Write the following numbers in Roman Numerals

a) 54   b) 49   c) 99   d) 955   e) 415

2.Write the following Roman Numerals into Hindu Arabic Numerals

a) LIX   b) XCIX   c) LXXXIV   d) MDCIV

3.Alex is XLIX years old. Express his years in Hindu Arabic numerals

TOPIC : WHOLE NUMBERS

CONTENT: BASES

Names of different bases

BASES	NAMES
Base two	Binary base
Base three	Ternary base
Base four	Quaternary base
Base five	Quinary base
Base six	Senary base
Base seven	Septernary base
Base eight	Octal base
Base nine	Nonary base
Base ten	Denary base/Decimal base

Converting non-decimal bases to decimal base(base ten) and decimal base to non-decimal base;

1.Convert 213_{four} to base ten

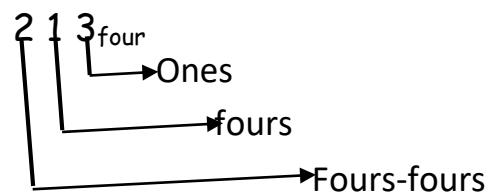| 4^2	4^1	4^0
2	1	3

$= (2 \times 4^2) + (1 \times 4^1) + (3 \times 4^0)$

$= (2 \times 4 \times 4) + (1 \times 4) + (3 \times 1)$

$= 32 + 4 + 3$

$= 39_{ten}$

Alternative two(using place values)

$2\ 1\ 3_{four}$

Ones

fours

Fours-fours

$= (2 \times 4 \times 4) + (1 \times 4) + (3 \times 1)$

$= 32 + 4 + 3$

$= 39_{ten}$

2. Change 13_{ten} into binary system

B	NO	REM
2	13	1
2	6	0
2	3	1
2	1	1
	0	

$13_{ten} = 1101_{ten}$

3. Change 304_{five} into base three

5^2	5^1	5^0
3	0	4

$= (3 \times 5^2) + (0 \times 5^1) + (4 \times 5^0)$

$= (3 \times 5 \times 5) + (1 \times 4) + (3 \times 1)$

$= 75 + 0 + 4$

$= 79_{ten}$

$304_{five} = 2221_{three}$

$= 79_{ten}$ to base three

B	NO	REM
3	79	1
3	26	2
3	8	2
3	2	2
	0	

$= 2221_{three}$

4. Convert the following into base ten (decimal base)

a) 1011_{two} b) 1101_{two} c) 101_{two} d) 111_{two}

d) 121_{three} e) 202_{five} f) 301_{four} g) 123_{five}

5. Convert 19_{ten} into base two

6. Convert 212_{four} into base five

5. Convert 10_{ten} into base two

6. Convert 101_{two} into base

7. Change 103_{four} into binary base

8. Convert 26_{ten} into base two

9. Express 103_{four} into base ten.

Finding the unknown base

1. Given that $21_n = 13_{ten}$, Find base n

n^1	n^0
2	1

$= 13$

$(2 \times n^1) + (1 \times n^0) = 13$

$2n + 1 = 13$

$2n + 1 - 1 = 13 - 1$

$2n = 12$

$\dfrac{2n^1}{2_1} = \dfrac{12^6}{2_1}$

$n = 6$

n is base six

---

2. Given that $32_y = 43_{five}$, Find base y

y^1	y^0		5^1	5^0
3	2	=	4	3

$(3 \times y^1) + (2 \times y^0) = (4 \times 5^1) + (3 \times 5^0)$

$(3 \times y) + (2 \times 1) = (4 \times 5) + (3 \times 1)$

$3y + 2 = 20 + 3$

$3y + 2 = 23$

$3y + 2 - 2 = 23 - 2$

$3y = 21$

$\dfrac{3y^1}{3_1} = \dfrac{21^7}{3_1}$

$y = 7$

y is base seven

---

3. Given that $203_y = 35_{ten}$, Find base y

y^2	y^1	y^0
2	0	3

$= 35$

$(2 \times y^2) + (0 \times y^1) + (3 \times y^0) = 35$

$2y^2 + 0 + 3 = 35$

$2y^2 + 3 = 35$

$2y^2 + 3 - 3 = 35 - 3$

$2y^2 = 32$

$\dfrac{2y^2}{2_1} = \dfrac{32^{16}}{2_1}$

$y^2 = 16$

$\sqrt{y^2} = \sqrt{16}$

$y = 4$

y is base four

<u>**Evaluation activity**</u>

1. Given that $23_k = 15_{ten}$, find the value of k
2. If $24_h = 40_{five}$, find base h
3. Given that $32_n = 17_{ten}$, find base n
4. If $23_p = 11_{ten}$, find the value of p
5. Given that $23_x = 1101_{two}$, Find the value x
6. Given that $101_r = 17_{ten}$, find base r
7. If $202_g = 26_{seven}$, find the value of g
8. Given that $203_y = 35_{ten}$, find the value of y

<u>**Addition and subtraction of numbers in non-decimal bases**</u>

Examples

1.Workou : 1101_{two}
$\underline{\quad +111_{two}}$
$\underline{10100_{two}}$

2.Subtract: 101_{two}
$\underline{\quad -11_{two}}$
$\underline{10_{two}}$

3.Workout: $3\ 3\ 3_{five}$
$\underline{\quad -2\ 2_{five}}$
$\underline{3\ 1\ 1_{five}}$

Evaluation activity

1.Workout $1010_{two} + 101_{two}$

2.Add $104_{five} + 232_{five}$

3.Subtract $154_{seven} - 36_{seven}$

4.Workout $213_{five} + 122_{five}$

5.Add $342_{six} + 104_{six}$

6. Workout $11_{two} + 1_{two}$

7.Subtract $1110_{two} - 10_{two}$

8.Add $203_{four} + 33_{four}$

9.Workout $110_{three} - 11_{three}$

10.Subtract $204_{five} - 32_{five}$

11.The table below shows addition in base five. Complete it correctly

+	2	3	4
1	3		10
2			
3		11	

Multiplication of numbers in non- decimal bases

Examples

1. Workout: $10_{two} \times 11_{two}$ 2. Workout: $102_{five} \times 13_{five}$

$$
\begin{array}{r}
1\ 0_{two} \\
\times 1\ 1_{two} \\
\hline
1\ 0_{two} \\
+1\ 00_{two} \\
\hline
1\ 10_{two}
\end{array}
$$

$$
\begin{array}{r}
^1 \\
1\ 02_{five} \\
\times 1\ 3_{five} \\
\hline
3\ 1\ 1_{five} \\
+1\ 0\ 20_{five} \\
\hline
1\ 3\ 31_{five}
\end{array}
$$

Evaluation activity

1. Workout $10_{two} \times 11_{two}$

2. Workout $104_{five} \times 32_{five}$

3. Workout $111_{two} \times 11_{five}$

4. Workout $213_{five} \times 22_{five}$

5. Workout $42_{six} \times 14_{six}$

6. Workout $11_{two} \times 11_{two}$

7. Workout $1110_{two} \times 10_{two}$

8. Workout $203_{four} \times 33_{four}$

9. Workout $110_{three} \times 11_{three}$

10. Workout $204_{five} \times 32_{five}$

11. The table below shows multiplication in base five. Complete it correctly.

X	2	3	4
1	2		4
2			
3		14	