



CAVALRY DEFENCE ACADEMY (CDA) Dehradun

NUMBER SYSTEM
ALL TYPES OF NUMBER
IMPORTANT TRICK



$$\frac{(101)_{100}}{\text{larger} \uparrow}$$

$$\begin{array}{r} 3^4 = 81 \\ 4^3 = 64 \end{array}$$

(2³)

3⁴ > 4³

exception

$$\begin{array}{r} 3^3 = 27 \\ 2^3 = 8 \\ 3^2 = 9 \end{array}$$

High Power

$$\frac{(100)_{10}}{\text{also } 10^1 \text{ also } 10^2 \text{ also } 10^3 \text{ also } 10^4}$$

(10¹¹)

large

$$\leq 4$$

large

① Note - always which has a large power it will be larger



One More Question

Answer will be given in

the last of class

4
↓
Question: - we have to make 3 digit number
from 3, 4, 5, 6, 7

total Number - How much
{ (a) Repeat
(b) Cannot be repeated }



Number System

+ 5
+ 4 Small

Basic

Natural numbers: $\rightarrow 1, 2, 3, 4, 5, 6$

$\rightarrow 0, 1, 2, 3, 4, 5, 6, 7$

Whole number

Integers (yona)

$\rightarrow -2, -1, 0, 1, 2$

$\rightarrow -5$ Small
-4

+ > large

$\rightarrow$ small

563 BC

483 BC

Before Christ

AD



Real number :- gives some meaningful figure called Real number

Rational

$$\left(\frac{p}{q} \right)$$

$$\left[\begin{array}{l} p \neq q \\ p \neq 0 \\ q \neq 0 \end{array} \right]$$

Irrational
Can't be written
in the form of p/q



Rational

$$\frac{1}{2} \quad \frac{2}{3}$$



Q which ~~what~~ is ^{not a} ~~the~~ rational number in the following

(a) $\frac{22}{7}$

↓
Rational

(b) 3.14

$$\frac{314}{100}$$

= Rational

(c) π

$$\pi = 3.142 \dots$$

(d) 1.73

$$\frac{173}{100}$$

=

Irrational

$$\sqrt{5}, \sqrt{6},$$

$$\frac{p}{q} =$$



100%

$2.12\overline{32}$ $2.1232\ldots$
Rational Irrational
 2.1232222 $2.1232\ldots$

~~$\frac{10}{3}$~~ $\frac{1}{3}$

$= \cdot \overline{333333}$

$\frac{4}{2} = 2$

$\frac{6}{5} = \frac{12}{10}$

$\frac{1}{3} = 0.3333$

$\cdot 32156\ldots$

$\mathbb{Z}$



When divided

(a) repeat

(b) divided

$$\frac{1}{3} = .3333$$

$$\frac{8}{5} = .16$$

(c) not rep
number

$$\Rightarrow 1.325965000\ldots$$

Irrational number

$$\sqrt{7}$$

$$\sqrt{3}$$

$$= 1.732\ldots$$

$$\sqrt{2} = 1.414\ldots$$



① Prime number $\rightarrow$ divisible by self and only.

2, 3, 5, 7, 11

Question to be asked

- ① Only a even prime number - 2
 - ② Total prime number from 1 to 50 - 15
 - ③ Total prime number from 1 to 100 $\rightarrow$ 25
- (2, 3, 5, 7, 11, 13, 17, 19, 23, 29, 31, 37, 41, 43, 47)



Composite Number

which are not prime numbers
they are composite numbers

3, 4, 6, 8, 9, 10, 12,

(Other than prime numbers)



Decimal numbers

which has point
 0.23 2.95

Mixed numbers

$$3\frac{4}{5}, 3 + \frac{4}{5}$$

$$1\frac{1}{3} \Rightarrow 1 + \frac{1}{3}$$

Signed numbers $\Rightarrow$ $+6, +2, -1, -9$



Question :- $\cdot \overline{121212}$ in th P/q form

Bar above
the digit
means Repeating

$$\frac{\cdot \overline{12}}{\cdot \overline{12}} = \frac{4}{\underline{\underline{33}}}$$

Answer

$$\frac{\cdot \overline{66}}{\cdot \overline{66}} = \frac{\underline{\underline{66}}}{\underline{\underline{99}}}$$



Question :- $\cdot \overline{121212}$ in th P/q form

Bar above
the digit
means Repeating

$$\frac{12}{99} = \frac{4}{33}$$

Answer

$$\cdot \overline{2666}$$

$$\cdot \overline{66} = \frac{66}{99}$$

$$\frac{42}{90}$$

$$\frac{6}{10} \times \frac{1}{9}$$

=



Number
13 (thirteen)

digit
2
Three

I write number
from 1-63

How many

Total

digit I have
written

$$1 \rightarrow 9 = 9$$

$$10 \rightarrow 63 = 54$$

$$54 \times 2 = 108$$

$$\frac{108}{117}$$

~~230~~ pages

91 pages



A book has 92 pages how many digits we have to write?

$$1-9 = 9$$

$$10-92 = 83$$

~~total digits~~

Learn

$$1-9 = 9 \text{ digits}$$
$$1-99 = 189 \text{ di}$$

$$\begin{array}{r} 9 \\ \times 2 \\ \hline 18 \\ 246 \\ \hline 255 \end{array}$$



Pages $\rightarrow$ 150 pages
 total digits $\Rightarrow$

$$1 - 99 = 189$$

$$\underline{100} - 50 = 51 \times 3 = 153$$

How many digits needed to write from
 1 to 500

$$1 - \cancel{100} 99 = 189$$

$$100 - 500 = 401$$

$$\begin{array}{r} 1203 \\ \underline{1392} \end{array} =$$



Numbers		digits
1-9	→	9
1-99	→	189
1-999	→	<u>2889</u>

Learn it

and mug up it

I will ask 2

1004



Question-1 1 2 3 4 5 6 7 83 digit

Last number of the series ?

1 — 9 = 9 digits 9 number

10 — 83 = 74 37

46th number

1, 2, 3, 4, 5, 6 — — — 46 (83rd digit) =



Home Work

① How many digits needed for following

(a) 512 (b) 910 (c) 542 (d) 132

(e) 1012 (f) 1510 (g) 1720 (h) 1910

② find the last number of series

(a) 123456... - 119th digit

(b) 123456... - 210th digit

(c) 123456... - 92nd digit



H.W

Question:- How many key strokes
are needed type numbers
from 1 to ~~999~~ 1000?

~~1-99~~ → 189

~~1-999~~ → 2889

40

Ans

2893

2

Can be
asked
like this





To learn^H or keep in mind

$$10^0 = 1$$

$$10^1 = 10$$

$$10^2 = 100$$

$$10^3 = 1000$$

$$10^4 = 10000$$

~~शक्ति~~ power
~~300~~ zero

~~शक्ति~~ power
(n+1) digits

digits

201

206 = 7 keep a mark

10^{200}



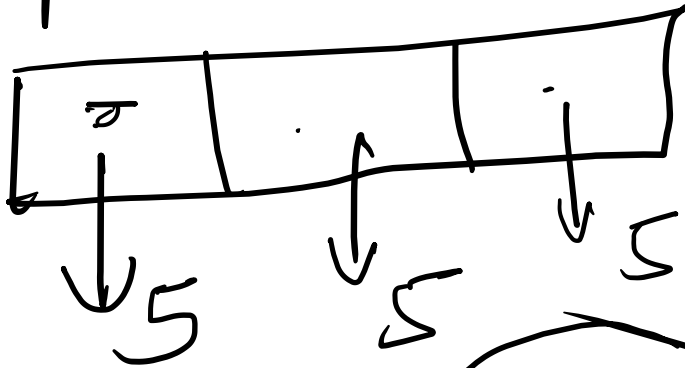
H W

How many numbers of 3 digits

can we make with from

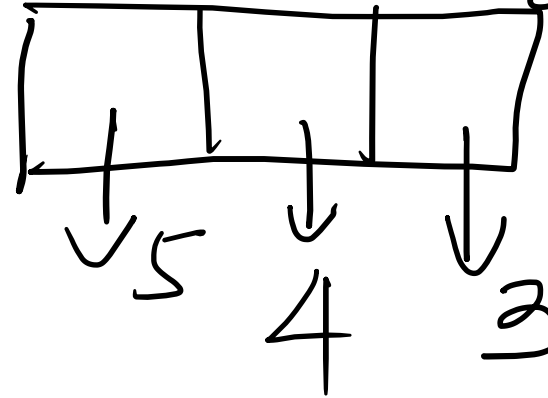
3, 4, 5, 6, 7

(a) Repetition allowed



$$5 \times 5 \times 5 = \underline{\underline{125}} \text{ type}$$

(b) Repetition not allowed



$$5 \times 4 \times 3 = \underline{\underline{60}} \text{ type}$$

Three



H 6

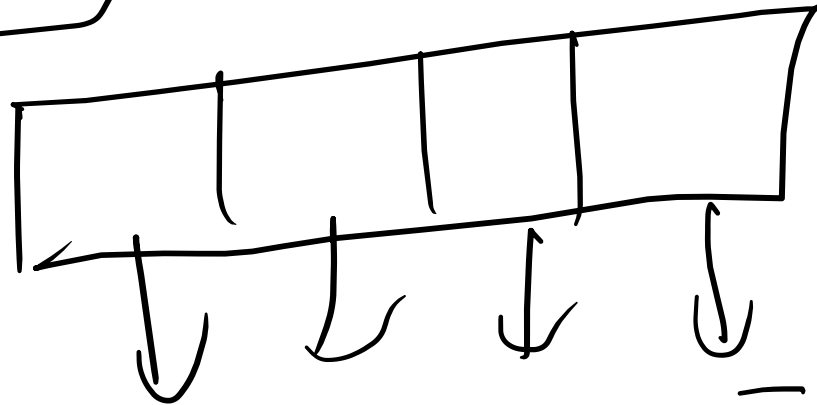
we have to make 4 digit numbers
from 0, 3, 5, 7, 8

Repetition allowed

03)

3|

\$



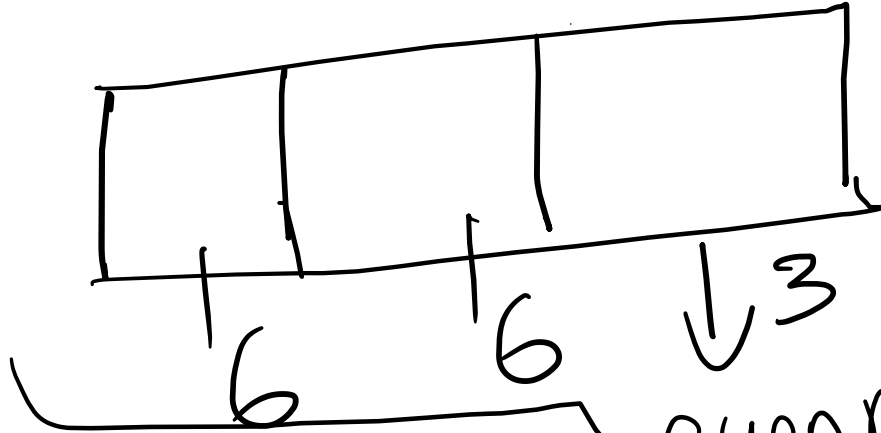
$$4 \times 5 \times 5 \times 5$$

$$= \underline{\underline{500}}$$



H 6

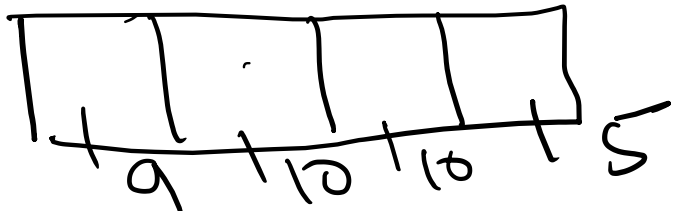
① How many three digit even numbers from 1, 2, 3, 4, 6, 7



$$6 \times 6 \times 3 = 108$$

②

all odd numbers of four digit
1000 - 9999 →



~~even numbers~~

odd numbers of four digit
0, 1, 2, 3, 4, 5, 6, 7, 8, 9

$$9 \times 10 \times 10 \times 5 = 4500$$

odd numbers



(a) $1000 - 9999 \rightarrow$ find all odd numbers
 $0, 1, 2, 3, 4, 5, 6, 7, 8, 9$
 $9 \times 10 \times 10 \times 5 = \underline{\underline{4500}}$

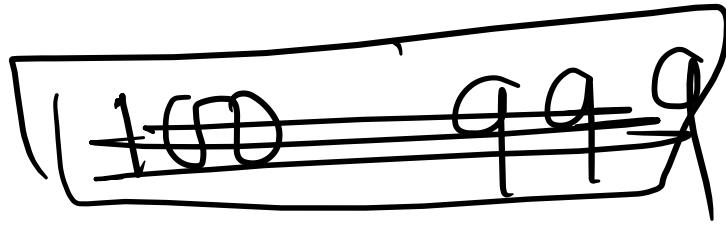
Diagram for (a): A rectangular box divided into four equal sections. Below the first three sections are the numbers 9, 10, and 10 respectively. Below the fourth section is the number 5. An arrow points from the expression $1000 - 9999$ to the box.

(b) $1000 - 9999 \rightarrow$ find all even numbers
 $= \underline{\underline{4500}}$

Diagram for (b): A rectangular box divided into four equal sections. Below the first three sections are the numbers 9, 10, and 10 respectively. Below the fourth section is the number 5. An arrow points from the expression $1000 - 9999$ to the box.



H.W.



H.W. 2^{29}

We 0, 1, 2, 5, 6, 7, 9 and find how many 5 digit
odd even number and six digit odd number
and 3 and four digit odd and even
number can be made?

(b) How many 4 digit number can be made
which is divisible by 5.