

UNIT-14 DIVISION BY VEDIC METHODS



● Division by Vadic Methods

In previous classes we have learnt the multiplication by ancient Indian mathematical methods which are more easier and interesting than the method of multiplication in these days.

Now in this process we will try to learn about the important methods. Nikhilam method and Pravartya method of division.

We have learnt about the terms divisor, dividend, quotients and remainder in previous classes.

Nikhilam method (based on base process) :

We use this process at where the dividend is near to the base 10, 100, We find a supplementary dividend by using dividend from base and we do the division process by using the supplementary dividend. The method is following:

- Step 1 - To find supplementary dividend of the dividend from base supplementary is called supplementary dividend.
- Step 2 - We divide the divisor in left hand side and right hand side with respect to the digits of dividend. Here, left hand side will work as quotient and right hand side will work as remainder.
- Step 3 - The first digit of divisor will be first digit of quotient.
- Step 4 - We multiply the first digit of quotient by supplementary dividend. We write this product below the second digit of the divisor.
- Step 5 - Now we add the second digit of the divisor to first digit of the product. This sum will be second digit of the quotient. We proceed this process till that not find remainder.

Example : Divide 123 by 9.

Solution : **Step 1.** Dividend = 9, base = 10 Supplementary dividend = $10 - 9 = 1$

Step 2.

$$\begin{array}{r}) 12 \mid 3 \end{array}$$

Step 3.

$$\begin{array}{r} 9 \quad 12 \mid 8 \\ 1 \quad \downarrow \\ 1 \mid \end{array}$$

$\frac{9}{1} = \frac{\text{Dividend}}{\text{Supplementary dividend}}$

Step 4.

$$\begin{array}{r} 9 \quad 12 \mid 3 \\ 1 \quad 1 \mid 3 \\ 13 \mid 4 \end{array}$$

$1 \times 1 = 3$
$3 + 3 = 6$

qiptoent = 13, remainder = 60

Example : Divide 10182 by 89

Solution : Dividend = 89, base = 100, Supplementary dividend = $100 - 89 = 11$

$$\begin{array}{r} 89 \mid 101 \quad 82 \\ 11 \mid \downarrow \\ + 1 \quad 1 \\ \hline 113 \quad 125 \\ + 1 \quad 11 \\ \hline 114 \quad 36 \end{array}$$

qiptoent = 114, remainder = 36

Exercise 14 (A)

1. Divide the following questions by Nikhilam method:

(a) 927 by 9

(b) 101164 by 9

(c) 111 by 73

(d) 1111 by 89

(e) 12345 by 8888

(f) 11001 by 88

(g) 2002002 by 89998

(h) 1011 by 23

Pravartya Method:

This method is also working at near to the base of dividend as in Nikhilam method. This method is also used for those whose dividend is greater than base. In this method Supplementary dividend is negative (dividend > base).

Example : Divide 1228 by 12

Solution : **Step 1.** Dividend = 12, base = 10, Supplementary dividend = $10 - 12 = -2$

Step 2. $12 \overline{) 122} \mid 8$

Step 3. $\begin{array}{r} 12 \\ -2 \\ \hline \end{array} \begin{array}{r} 122 \\ \downarrow \\ 1 \end{array} \mid 8$

$$\frac{12}{-2} = \frac{\text{Dividend}}{\text{Supplementary dividend}}$$

Step 4. $\begin{array}{r} 12 \\ -2 \\ \hline \end{array} \begin{array}{r} 122 \\ -2 \\ \hline 10 \end{array} \mid 8$

$$1 \times -2 = -2$$

After that

$$2 - 2 = 0$$

Step 5. $\begin{array}{r} 12 \\ -2 \\ \hline \end{array} \begin{array}{r} 122 \\ -2 \\ \hline -0 \end{array} \mid 8$

$$-2 \times 0 = 0$$

After that

$$2 - 0 = 2$$

Step 6. $\begin{array}{r} 12 \\ -2 \\ \hline \end{array} \begin{array}{r} 122 \\ -2 \\ \hline -0 \end{array} \mid 8$

quotient = 102

remainder = 4

Example : Divide 12345 by 112.

Solution : Dividend = 112, base = 100, Supplementary dividend = $100 - 112 = -12$

$\begin{array}{r} 112 \\ -1-2 \\ \hline \end{array} \begin{array}{r} 123 \\ -1-2 \\ \hline -2 \end{array} \mid 45$

$$\bullet 1 \times (-1-2) = -1-2$$

After that

$$2 - 1 = 1$$

$$\bullet 1 \times (-1-2) = -1-2$$

After that

$$3 - 2 - 1 = 0$$

$$\bullet 0 \times (-1-2) = 00$$

After that

$$4 - 2 = 2$$

and

$$5 - 0 = 5$$

quotient = 110,

remainder = 25

Exercise 14 (B)

1. Divide the following questions by Nikhilam method:

- | | |
|-------------------|------------------|
| (a) 1234 by 160 | (b) 43999 by 828 |
| (c) 13045 by 112 | (d) 13045 by 988 |
| (e) 11111 by 1012 | (f) 7685 by 672 |
| (g) 2341 by 819 | (h) 5012 by 818 |

We learn:

- Students are aware with the methods of division.
- Students have learnt the division by Pravart method.
- Students have learnt to solve the problems of daily life by Nikhilam and Pravart method.

Answers

Exercise 14 (A)

- | | |
|--------------------------------------|-------------------------------------|
| 1. (a) quotient = 103, remainder = 0 | (b) quotient = 11240, remainder = 4 |
| (c) quotient = 1, remainder = 38 | (d) quotient = 12, remainder = 43 |
| (e) quotient = 1, remainder = 3457 | (f) quotient = 125, remainder = 1 |
| (g) quotient = 22, remainder = 22046 | (h) quotient = 43, remainder = 22 |

Exercise 14 (B)

- | | |
|--------------------------------------|------------------------------------|
| 1. (a) quotient = 7, remainder = 114 | (b) quotient = 53, remainder = 115 |
| (c) quotient = 116, remainder = 53 | (d) quotient = 13, remainder = 201 |
| (e) quotient = 10, remainder = 991 | (f) quotient = 11, remainder = 293 |
| (g) quotient = 2, remainder = 703 | (h) quotient = 13, remainder = 201 |