DIVISION

1.

Divisibility Rules

Numbers is divisible.

① By 2 : If the number is Even NO.

② By 3 : Sum Root is divisible by 3. (Digit Sum)

③ By 4 : If the last '2' digits are divisible 4.

④ By 5 : If the Number ends with '0' or '5'

⑤ By 6 : If the Number is divisible by both 2 & 3

⑥ By 7 : Check directly. (there is a solution thou')

⑦ By 8 : If the last '3' digits are divisible by 8.

⑧ By 9 : If Digit Sum is divisible 9.

⑨ By 10 : If the Number ends with '0'

⑩ By 11 : Difference b/n Sum of even digits & Sum of odd digits is multiple of 11. or 0.
~~or difference is~~

⑪ By 12 : Check for divisibility by 3 & 4.

⑫ By 13 : Delete the last digit from given number. Subtract '9' times deleted digit from given rest NO. if result is divisible by 13. Then the NO. is divisible by 13.

2. Specific case : Divisible by 7

S1 : 'x' units place by 2 = Result

S2 : Sub. Result from remaining Number.

S3 : Check the answer in 'S2', divisible by 7. Then the NO. is divisible by 7.

Eg: ① $\frac{595}{2}$ $\frac{5}{1}$

S1 : units place -5.
$5 \times 2 = 10$

S2 : $59 - 10 = 49$.

S3 : $49/7 = 7$.

Hence 595 is divisible by '7'

2. 948

948
×2
94-16 = 78.

'78' Not divisible by 7
Hence 948 Not divisible 7.

3. 1792

179|2
×2
179-4 = 175
×2
17-10 = 7

Divisible by 7.

3. Division by 5

$\frac{\text{DIVIDEND}}{\text{DIVISOR}} = Q + R$

Eg: ① $\frac{45}{5} = \frac{45 \times 2}{5 \times 2} = \frac{90}{10} = 9.$

Q = 9, R = 0.

Eg: ② $\frac{97}{5} = \frac{97 \times 2}{5 \times 2} = \frac{194}{10} = 19.4 = 19\frac{4}{10} = 19\frac{2}{5}$

Q = 19, Remo = 4

Eg: ③ $\frac{582}{5} = \frac{582 \times 2}{5 \times 2} = \frac{1164}{10} = 116.4 = 116\frac{4}{10} = 116\frac{2}{5}$

Q = 116 R = 2

Eg: ④ $\frac{748}{5} = \frac{748 \times 2}{5 \times 2} = \frac{1496}{10} = 149.6 = 149\frac{6}{10} = 149\frac{3}{5}$

Q = 149 R = 3.

Eg: ⑤ $\frac{1483}{5} = \frac{1483 \times 2}{5 \times 2} = \frac{2966}{10} = 296\frac{6}{10} = 296\frac{3}{5}.$

Q = 296 R = 3.

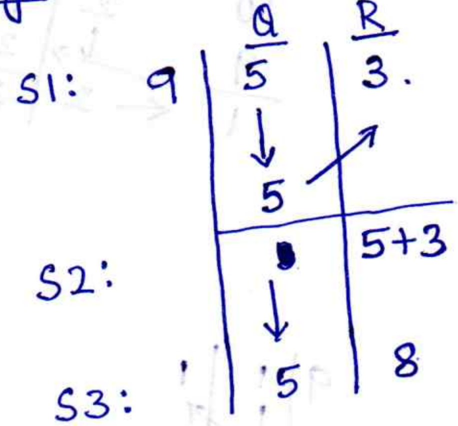
4. Division by 9

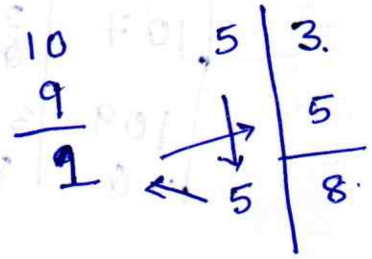
S1 : First digit is written 'as-is' in answer part.

S2 : Add 2nd digit to the answer part written in 1st step (S1)

S3 : Repeat until last digit (right most digit) in the answer part is the remainder. Rest of the digits form the quotient.

① Eg: 53 ÷ 9.





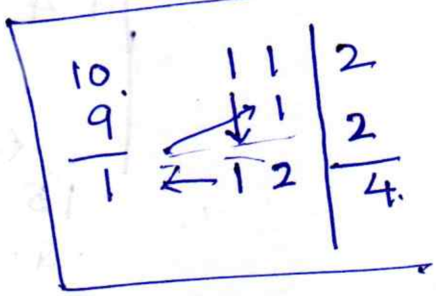
Q = 5 R = 8.

Verfication : SR(Dividend) = SR(Q) x SR(divisor) +SR(R)

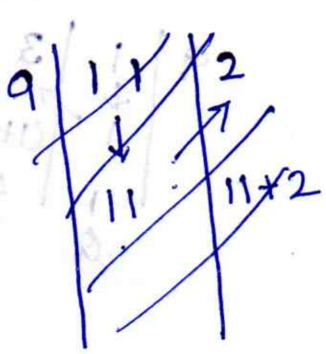
$8 = 5 \times 9 + 8$

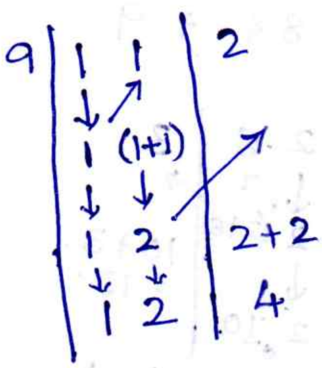
$= 45 + 8$

$= 9 + 8 = 8$



Eg: 2 112 × 9.

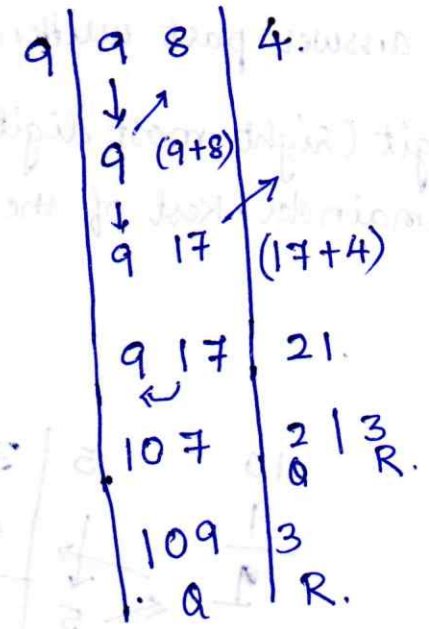


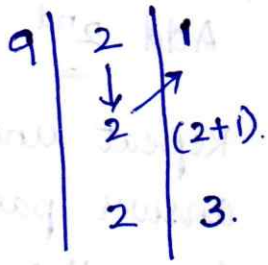


Q = 12 R = 4

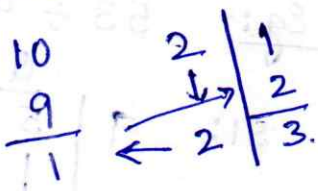
Eg: 3

984 ÷ 9.

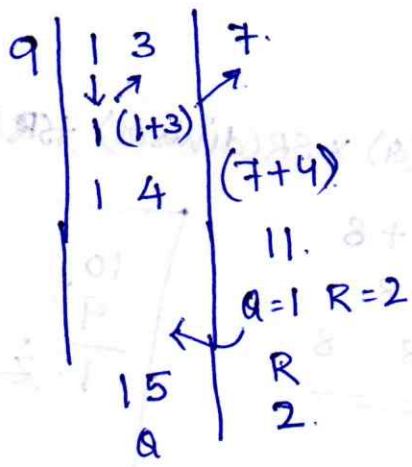


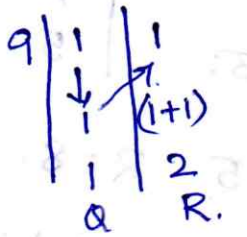


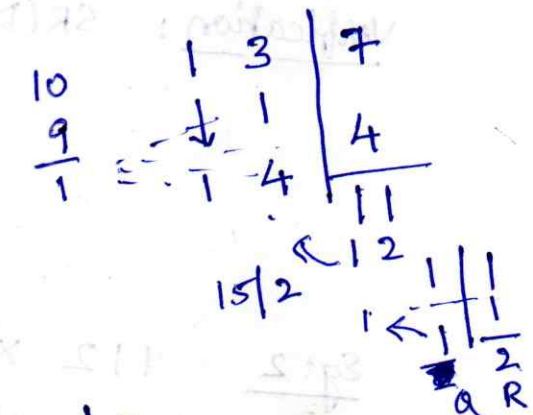
Q = 2 R = 3.



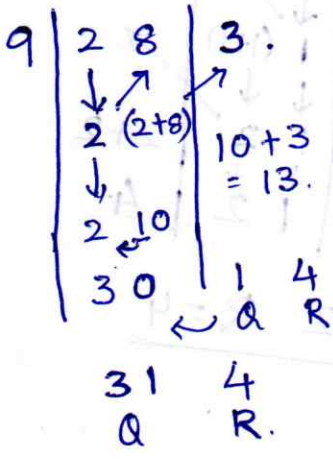
Eg: 4 137 ÷ 9.

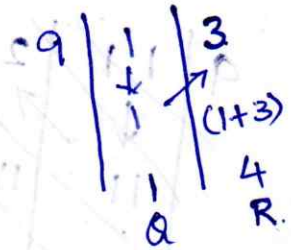






Eg: 5 283 ÷ 9





5. Base Method (Division)

Dividend.

Base

Divisor

Difference

Quotient | Remainder

S1: Divide the Number in 2 parts RHS & LHS.

RHS → Contain No. of zeros in the base.

LHS → Quotient. / RHS → Remainder.

Eg: ① Divide 23 by 9.

No. 9.

RHS → 1 digit (base 10)

(difference 1)

(since one zero).

10

9

1

2 | 3.

① → 2

② × 2

2 | 5

Q | R.

Eg: ② 31 ÷ 9.

10

9

1

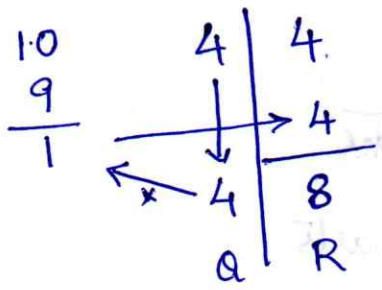
3 | 1

3.

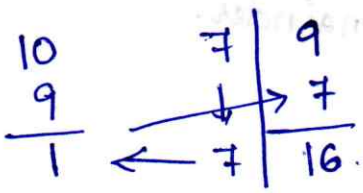
3 | 4

Q | R.

Eg: ③ Divide 44 by 9.

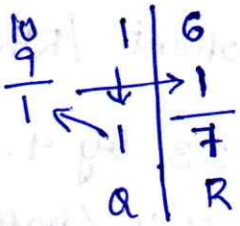


Eg: ④ $79 \div 9$

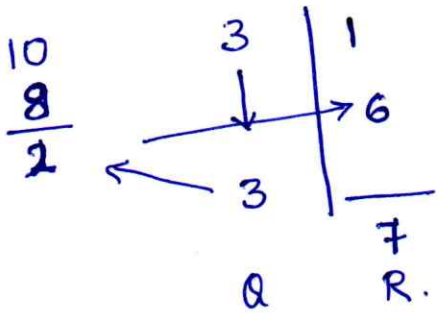


$8 \leftarrow Q \quad 7 \leftarrow R$

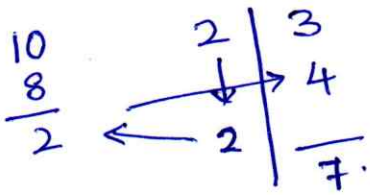
$Q = 8 \quad R = 7$



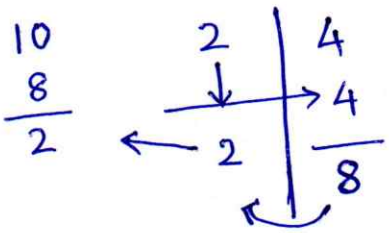
Eg: ⑤ $31 \div 8$



Eg: ⑥ $23 \div 8$

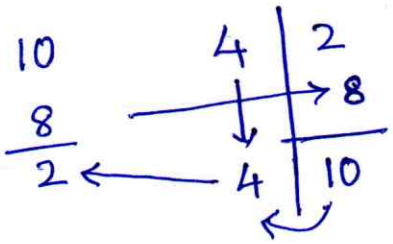


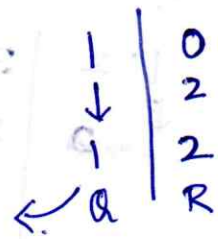
Eg: ⑦ Divide 24 by 8



3 0

Eg: ⑧ Divide 42 × 8.

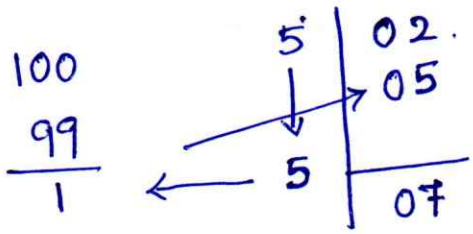




52

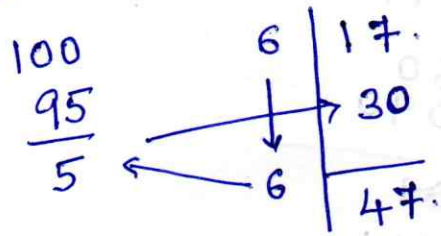
6. Divide by bigger divisors. (Base Method)

Q. Divide 502 by 99.



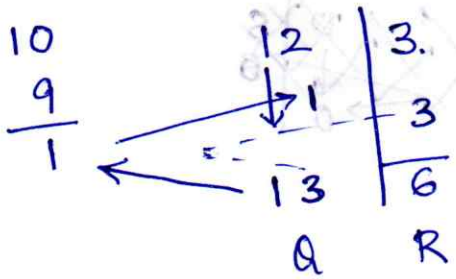
Q=5 R=7

Q. Divide 617 by 95

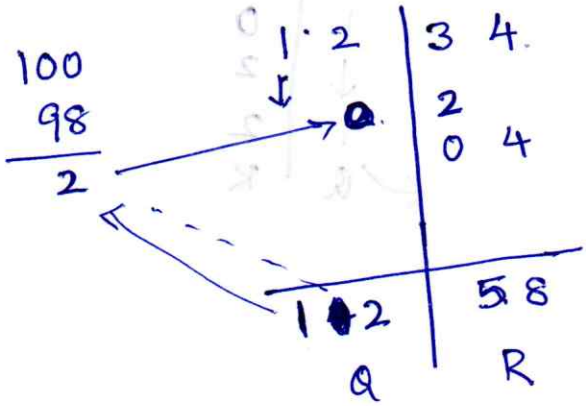


Q R

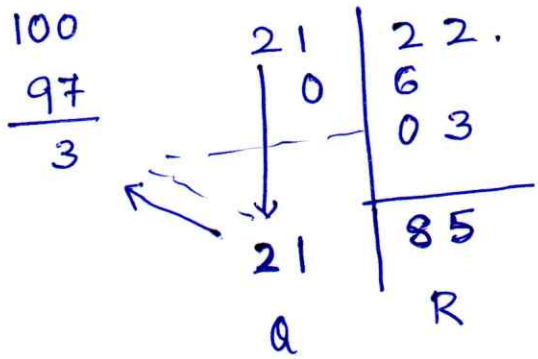
Q. Divide 123 by 9



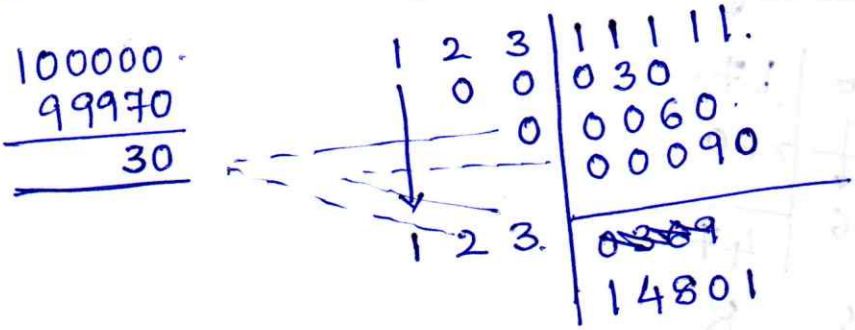
Q. Divide 1234 by 98



Q. Divide 2122 by 97.

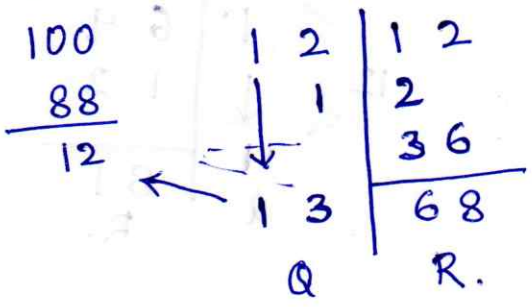


Q. 12311111 by 99970.

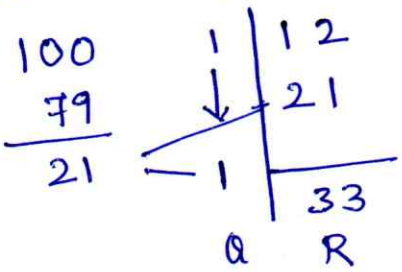


Addional Examples

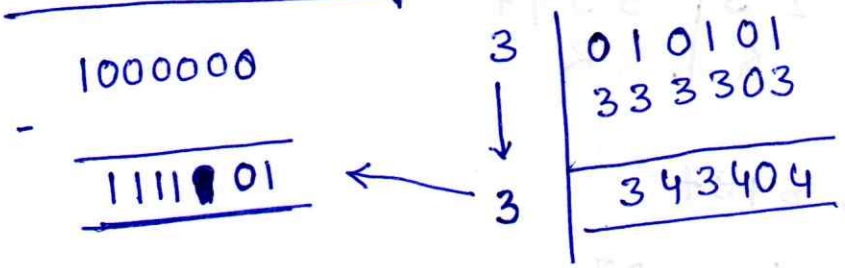
a. 1212 by 88



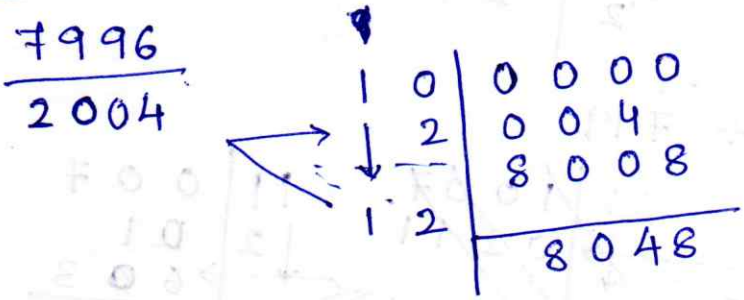
b. 112 by 79.



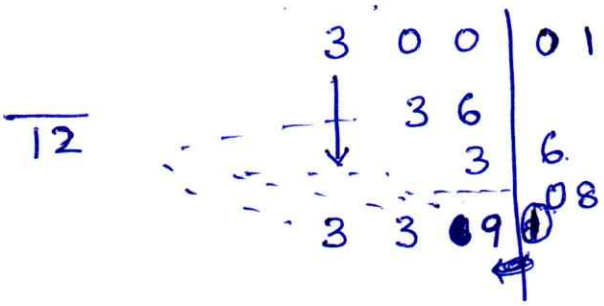
c. 3010101 by 8888899

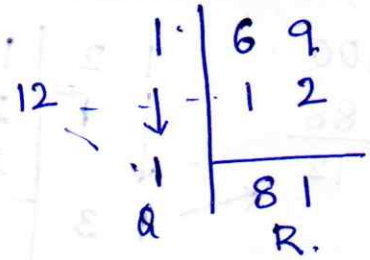


d. Divide 100000 by 7996



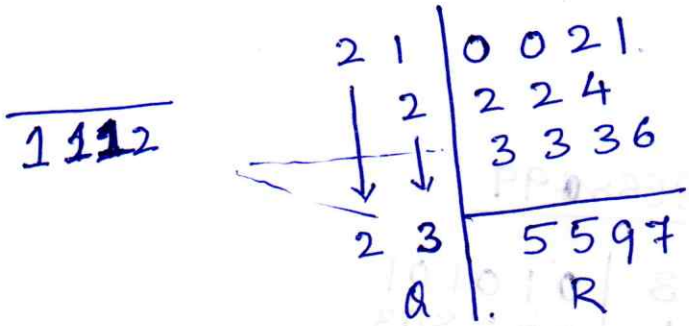
e. 30001 ÷ by 88



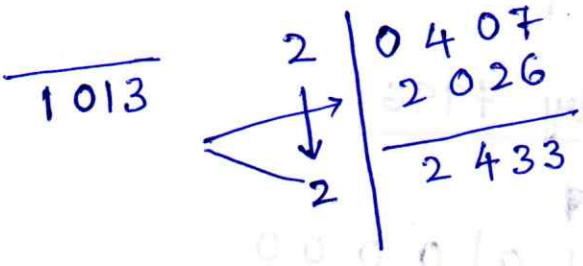


339 | 169
1 | 81
340 | 81.

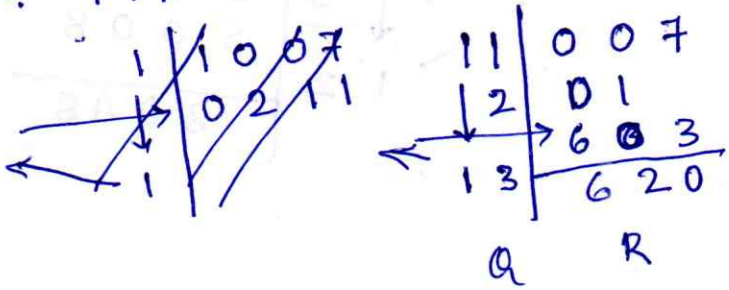
f. 210021 ÷ by 8888



g. 20407 ÷ 8987



h. 11007 ÷ 799.



i. 2211 by 88

12

2 2	1 1
2	4
4	8
2 4	99

12 | 99

24 ① 11

25 | 11.

j. 111301 ÷ 897

103

111	301
10	3
2	06
123	309
	970

- 897

① 73

124 | 73

Q | R

K. 30122 ÷ 87

13

301	22
39	9.
3	6 9.
33 ⑬	1
	281

343 | Q 3 | R 20.

346 | 20.

2	81
13	26
2	107

3 + 13

1	07
1	13
1	20

EXERCISE

PART A :

a. Divide 102 by 74

b. Divide 10113 by 898

c. Divide 102030 by 7999

d. Divide 1005 by 99.

PART B :

a. Divide 431 by 98.

b. Divide 10301 by 97.

c. Divide 12000 by 889

d. Divide 111099 by 8987

e. Divide 30111 by 87.

06. Paravartya Yojayet – transpose & Apply

a. Divide 3966 by 113

100
113
-13

3 9	6 6.
-3 ↓	-9
	-6 -8
3 6	-6
	-6 -4 -2

b. Divide 1296 by 113.

100
113
-13

1 2	9 6.
-1 ↓	-3
	-1 -3
1 1	5 3

c. Divide 2688 by 120

100
-120
-2-0

2 6	8 8.
-4 ↓	-0
	-4 -0
2 2	4 8

d. Divide 113968 by 1023.

1000
-1023
-023.

1 1 3	9 6 8
-0 -3 ↓	-3
-0	-2 -3.
+1 1 1	-0 -2 -3.
1 1 1	4 0 5
Q	R.

e. Divide 1999 by 180

100
- 180
-8 -0

1 9	9 9
-8	-0
	-8 -0
1 1	1 9

-ve in a.

f. Divide 14189 by 102

100
102
- 02

2 zeros
2 digits

1 4 1	8 9
-0 -2	
-0	-8
1 4 (-1)	+0 +2
	1 1

(140-1) = 139 | 11

10
1 4 -1
1 3 9

g. Divide 110999 by 1321

1000
1321
-3-2-1

1 1 0	9 9 9
-3 -2	-1
+6	+4 +2
	-12 -8 -4
1 -2 4	0 3 5

(100-20)+4 = 84

10
1 -2 4
0 8 4

h. Divide 1693 by 131

131
-3 -1

1 6	9 3
-3	-1
	-9 -3
1 3	-1 0
1 2	+121

i. 14520 ÷ 111

111	145 | 20.	
-1-1	-1-1 | -3.	
	-3 | -1 -1	
	131 | -2 -1	
	111	
	130 | -21	
	90	

j. Divide 16379 by 1222.

	16 | 379.	
-2-2-2.	-2 | -2 -2.	
	| -8 -8 -8	
	14 | -7 -3.1	
		-700 + -30 + 1
		-729.
	13 | 1222 - 729	
		= 493

07. Substitution Method

In substitution method, we take the difference as below.

Eg: 827 → 173 (Base).
diff

→ (200 - 30 + 3).

k. Eg: Divide 10030 by 827.

8. Normal

827	100 | 30	
173	17 | 3	
	1 | 73	
	11 | 8 | 63	

Substitution method

827	10 | 030.	
2-33.	2 | -33.	
	| 4 -6 +6	
	12 | 106	

827	10 | 030.	
173	1 | 73	
	11 | 173.	
		9.33
	12 | -827	
		106

l. Divide 10000 by 819

Normal

819
1801 (corrected: 181)

1	0	0 0 0.
↓	1	8 1
		1 8 1
1	1	9.9 1
		− 8 1 9
		172

12 | 172

Subst:

200 − 200 + 1 (corrected: 200 − 30 + 1)

2 −21

1	0	0 0 0.
↓	2	−2 1
		4 −4 1
1	2	2 −3 1

200 − 30 + 2
= 172.

08. Division by altering divisor

(m). Divide 1459 by 242.

Special case

* Bring 242 closer to 100.

 Eg: By diving $\frac{242}{2} = 121$.

* We divide by 121 first
 & the Q → ÷ by 2.

121
−2 −1

1	4	5 9
↓	−2	−1
		−4 −2
1	2	0. 7

Q

2) 1 2 | 0 7.

6 (Q) | 7 (R).

n. Divide 1112 by 33.

* closer to Base (100) − 33 (×3) = 99.

100
99
01

1 1	1 2
0	1
1 1	0 1
	2.3

×3

33 | 23

o. Divide 12657 by 791.

* 791 to 10 or 100.

÷7 = 113.

100.
−113
−1−3.

1 2 6	5 7.
−1 −3	−3
−1	−2 −6.
1 1 2	
7) 112	0.1
16	01.

p. Divide 1389 by 61.

* closer to 100 − 61 (×2) = 122.

−2 −2

1 3	8 9.
−2	−2
	−2 −2
11	4.7
× 2	
22	47

EXERCISE

PART A

a. Divide 1389 by 113.

b. Divide 145516 by 1321.

c. Divide 136789 by 12131.

d. Divide 246406 by 112

PART B

a. Divide 13592 by 114

b. Divide 25430 by 1230.

c. Divide 15549 by 142

d. Divide 101156 by 808 (Diff. 192.

200 − 10 + 2

2 −1 2

PART C

a. Divide 4949 by 601 (601 × 2 = 1202)

b. Divide 14799 by 492 (492/4 = 123).

09. Quick ways of division

a. Division by 14

S ① ÷ by 2

S ② ÷ by 7.

Split the divisor & divide by each.

Eg ①: Divide 784 by 14.

S1: $\frac{784}{2} = 392$

S2: $\frac{392}{7} = 56$

Eg ②: Divide 1148 by 14.

S1: $\frac{1148}{2} = 574$.

S2: $\frac{574}{14} = 41$.

b. Division by 16 (2 × 8).

Eg ①: 96 ÷ 16.

S1: $\frac{96}{2} = 48$.

S2: $\frac{48}{8} = 6$.

c. Verify the below Answers.

• (i) 1430 ÷ 22. → Q = 65 & R = 0.

SR(Dividend) = SR(Q) × SR(Divisor) + SR(R)

8 = 2 × 4

8 = 8

Hence Ans. is correct.

(ii) $21289 \div 2365 \rightarrow Q = 9$ & $R = 4$.

$$4 = 7 \times 9 + 4$$
$$= 63 + 4$$
$$= 9 + 4$$

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