

NS7-52 Long Division

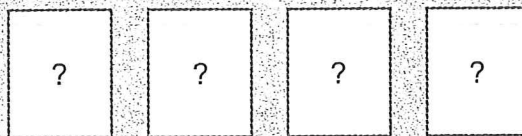
Problem: Divide 95 objects into 4 groups ($95 \div 4$).

Here is a base ten model of the problem.



$95 = 9 \text{ tens} + 5 \text{ ones}$

$$95 \div 4$$



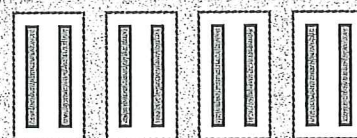
Solve the problem using **long division**.

Step 1: Write the numbers like this:

$$\begin{array}{r} 4 \overline{)95} \\ \text{the number of groups} \quad \text{the number you are dividing} \end{array}$$

Step 2: How can you divide 9 tens blocks equally into the 4 groups?

You can divide 8 of the 9 tens blocks into 4 equal groups of size 2:



There are 2 tens blocks in each group. $\rightarrow 2$

There are 4 groups.

$$\begin{array}{r} 2 \\ 4 \overline{)95} \end{array}$$

$$\begin{array}{r} 2 \\ 4 \overline{)95} \\ 8 \end{array}$$

$2 \times 4 = 8$ tens blocks placed

1. How many groups are you going to make? How many tens blocks can you put in each group?

a) $4 \overline{)91}$

groups _____

number of tens in
each group _____

b) $3 \overline{)84}$

groups _____

number of tens in
each group _____

c) $6 \overline{)75}$

groups _____

number of tens in
each group _____

d) $2 \overline{)93}$

groups _____

number of tens in
each group _____

2. Find out how many tens can be placed in each group. Then multiply to find out how many tens have been placed.

a) $\begin{array}{r} \square \\ 5 \overline{)91} \\ - \end{array}$

b) $\begin{array}{r} \square \\ 3 \overline{)82} \\ - \end{array}$

c) $\begin{array}{r} \square \\ 4 \overline{)98} \\ - \end{array}$

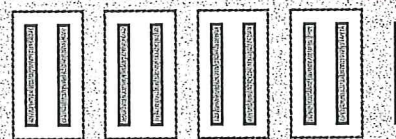
d) $\begin{array}{r} \square \\ 5 \overline{)99} \\ - \end{array}$

e) $\begin{array}{r} \square \\ 9 \overline{)93} \\ - \end{array}$

Step 3: How many tens blocks are left?

$$\begin{array}{r} 2 \\ 4 \overline{)95} \\ -8 \\ \hline 1 \end{array}$$

Subtract to find out.



There are $9 - 8 = 1$ left over.

3. For each question, carry out the first **three** steps of long division.

a) $\begin{array}{r} \square \\ 7 \overline{)87} \\ - \end{array}$

b) $\begin{array}{r} \square \\ 3 \overline{)84} \\ - \end{array}$

c) $\begin{array}{r} \square \\ 2 \overline{)83} \\ - \end{array}$

d) $\begin{array}{r} \square \\ 4 \overline{)63} \\ - \end{array}$

e) $\begin{array}{r} \square \\ 6 \overline{)99} \\ - \end{array}$

f) $\begin{array}{r} \square \\ 5 \overline{)94} \\ - \end{array}$

Step 4: There is 1 tens block left over, and there are 5 ones in 95.

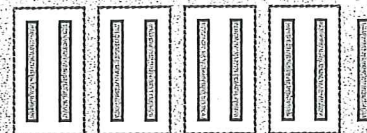
So there are 15 ones left in total. Write the 5 beside the 1 to show this.

$$\begin{array}{r} 2 \\ 4 \overline{) 95} \\ \underline{- 8} \\ 1 \end{array}$$



$$\begin{array}{r} 2 \\ 4 \overline{) 95} \\ \underline{- 8} \\ 15 \end{array}$$

There are still this many ones to place.



There are still 15 ones to place in 4 group.

4. Carry out the first four steps of long division.

a)
$$\begin{array}{r} \\ 5 \overline{) 85} \\ \underline{-} \\ \end{array}$$

b)
$$\begin{array}{r} \\ 7 \overline{) 97} \\ \underline{-} \\ \end{array}$$

c)
$$\begin{array}{r} \\ 4 \overline{) 92} \\ \underline{-} \\ \end{array}$$

d)
$$\begin{array}{r} \\ 2 \overline{) 75} \\ \underline{-} \\ \end{array}$$

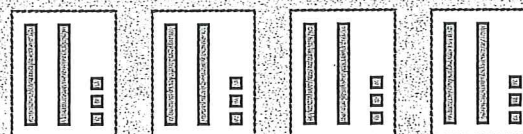
e)
$$\begin{array}{r} \\ 2 \overline{) 73} \\ \underline{-} \\ \end{array}$$

Step 5: How many ones can you put in each group?

Divide to find out:

$$\begin{array}{r} 2 \\ 4 \overline{) 95} \\ \underline{- 8} \\ 15 \end{array}$$

$15 \div 4 = 3 \text{ R } 3$



How many ones are left over

5. Carry out the first five steps of long division.

a)
$$\begin{array}{r} \\ 5 \overline{) 61} \\ \underline{-} \\ \end{array}$$

b)
$$\begin{array}{r} \\ 4 \overline{) 47} \\ \underline{-} \\ \end{array}$$

c)
$$\begin{array}{r} \\ 2 \overline{) 86} \\ \underline{-} \\ \end{array}$$

d)
$$\begin{array}{r} \\ 3 \overline{) 63} \\ \underline{-} \\ \end{array}$$

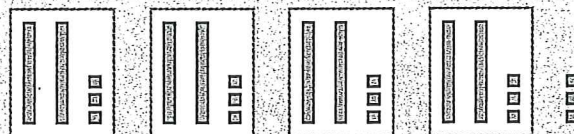
e)
$$\begin{array}{r} \\ 5 \overline{) 81} \\ \underline{-} \\ \end{array}$$

Steps 6 and 7: Find the number of ones left over.

$$\begin{array}{r} 2 \\ 4 \overline{) 95} \\ \underline{- 8} \\ 15 \\ \underline{- 12} \\ 3 \end{array}$$

There are $3 \times 4 = 12$ ones placed.

There are $15 - 12 = 3$ ones left over.



Long division and the model both show that $95 \div 4 = 23$ with 3 left over.

6. Carry out all the steps of long division on grid paper.

a) $6 \overline{) 81}$

b) $4 \overline{) 52}$

c) $3 \overline{) 95}$

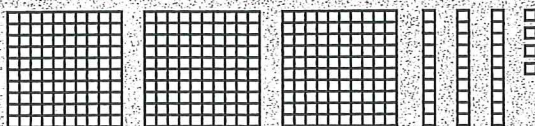
d) $3 \overline{) 82}$

e) $4 \overline{) 64}$

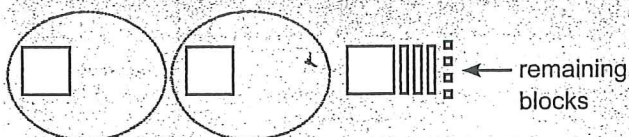
f) $7 \overline{) 8}$

The diagram shows how to divide 334 objects into 2 groups using a base ten model and long division.

Base ten model of 334:

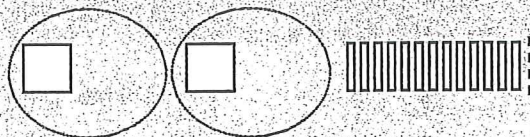


Step 1: Divide the hundreds into 2 groups.



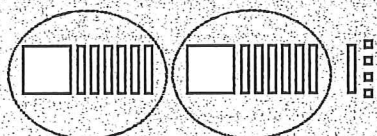
1			1 hundreds block in each group
2	3	3	4
-	2		2 hundreds placed
-	1		1 hundred left over

Step 2: Regroup the remaining hundreds as tens.



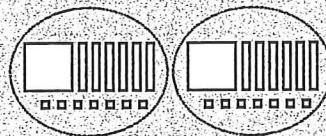
1			
2	3	3	4
-	2		
-	1	3	13 tens

Step 3: Divide the tens into 2 groups.



1	6		6 tens in each group
2	3	3	4
-	2		
-	1	3	
-	1	2	12 tens placed
-		1	1 ten left over

Step 4: Regroup and divide the remaining ones.



1	6	7	
2	3	3	4
-	2		
-	1	3	
-	1	2	
-		1	4
-		1	4
-			0

7. Divide.

a)

5	8	1	2
-			
-			
-			
-			
-			

b)

3	3	2	7
-			
-			
-			
-			
-			

c)

6	7	3	1
-			
-			
-			
-			
-			

d)

8	9	8	9
-			
-			
-			
-			
-			

8. In each question below, there are fewer hundreds than the number of groups.

Write a zero in the hundreds position to show that no hundreds can be placed in equal groups. Then perform the division as if the hundreds had automatically been exchanged for tens.

a)

0	4	3
3	4	6
3	2	
	2	6
	2	4
		2

 4 tens can be placed in each group
32 tens have been placed
2 tens are left over

b)

3	2	7

c)

4	2	1

d)

3	4	5

9. In each question below, say how many tens or hundreds can be placed in 5 groups. Underline the place values you will divide by 5.

a) $5 \overline{)315}$ 31 tens

b) $5 \overline{)726}$ 7 hundreds

c) $5 \overline{)623}$ _____

d) $5 \overline{)321}$ _____

e) $5 \overline{)892}$ _____

f) $5 \overline{)240}$ _____

g) $5 \overline{)987}$ _____

h) $5 \overline{)412}$ _____

10. Divide.

a)

1	3	6

b)

2	6	3

c)

5	2	1

d)

4	0	5

e)

1	4	2	3

f)

4	3	8	5

g)

5	2	1	3

h)

9	4	2	1

i) $9 \overline{)684}$ j) $7 \overline{)3512}$ k) $8 \overline{)312}$ l) $6 \overline{)4935}$ m) $2 \overline{)7463}$

n) $3 \overline{)7913}$ o) $5 \overline{)1862}$ p) $5 \overline{)2764}$ q) $4 \overline{)9807}$ r) $4 \overline{)1986}$