Division Algorithm

Example 1

Problem: a dividend is 70. The quotient is 11 and the remainder is 4. What is the divisor?

Solution: this means that if you divide 70 by some number, you get 11, remainder 4.

We could show it like this:
$$\underline{}\begin{array}{r} \underline{\;11\;}\; R4 \\ |\; 70 \end{array}$$

In other words, the number goes into 70 eleven times, leaving a remainder of 4:

$$\_\_\_ \times 11 + 4 = 70$$

So we add 4 to something to get 70. That number is 4 less than 70, right?

$$70 - 4 = 66$$

So we know that ___ x 11 = 66. What number is it? Well, if 2 x 5 = 10, then 10/5 = 2 and 10/2 = 5. So, to get our answer, we can do 66/11 = 6!!

The divisor is 6. Divide 70 by 6, and you will get 11, reminder 4.

Example 2

Problem: a certain dividend is 57; the quotient 7; the remainder, 1: what is the divisor?

Solution: this means that if you divide 57 by some number, you get 7, remainder 1.

We could show it like this:
$$\underline{}\begin{array}{r} \underline{\;7\;}\; R1 \\ |\; 57 \end{array}$$

In other words, the number goes into 57 seven times, leaving a remainder of 1:

$$\_\_\_ \times 7 + 1 = 57$$

So we add 1 to something to get 57. That number is 1 less than 57, right?

$$57 - 1 = 56$$

So we know that ___ x 7 = 56. What number is it? Well, if 2 x 5 = 10, then 10/5 = 2 and 10/2 = 5. So, to get our answer, we can do 56/7 = 8!!

The divisor is 8. Divide 57 by 8, and you will get 7, reminder 1.

Example 3
Problem: a certain dividend is 501; the quotient 41; the remainder, 9: what is the divisor?

Solution: since you understand what we've explained so far, you can go straight to this step:

$$\_\_\_ \times 41 + 9 = 501$$

Or do this first, if you want to:

$$\underline{\quad 41 \quad} R9$$
$$\_\_\_\_ \,|\, 501$$

Then we do the steps like this:

$$501 - 9 = 492$$

$$492/41 = 12.$$

The divisor is 12. Divide 501 by 12, and you will get 41, reminder 9.

Example 4
Problem: a certain dividend is 322; the quotient 19; the remainder, 18: what is the divisor?

Solution: since you understand what we've explained so far, you can go straight to this step:

$$\_\_\_ \times 19 + 18 = 322$$

Or do this first, if you want to:

$$\underline{\quad 19 \quad} R18$$
$$\_\_\_\_ \,|\, 322$$

Then we do the steps like this:

$$322 - 18 = 304$$

$$304/19 = 12.$$

The divisor is 12. Divide 501 by 12, and you will get 19, reminder 18.

Exercises

1. A dividend is 28. The quotient is 8 and the remainder is 4. What is the divisor?

2. A dividend is 37. The quotient is 5 and the remainder is 2. What is the divisor?

3. A dividend is 90. The quotient is 11 and the remainder is 2. What is the divisor?

4. A dividend is 170. The quotient is 25 and the remainder is 20. What is the divisor?

5. A certain dividend is 170; the quotient 19; the remainder, 18: what is the divisor?

6. A certain dividend is 1028; the quotient 57; the remainder, 2: what is the divisor?

7. A certain dividend is 7001; the quotient 203; the remainder, 99: what is the divisor?

8. A dividend is 6253. The quotient is 111 and the remainder is 37. What is the divisor?

9. A dividend is 8917. The quotient is 131 and the remainder is 9. What is the divisor?

10. A certain dividend is 9571; the quotient 304; the remainder, 147: what is the divisor?

Answers

1. The divisor is 3.

2. The divisor is 7.

3. The divisor is 8.

4. The divisor is 6.

5. The divisor is 8.

6. The divisor is 18.

7. The divisor is 34.

8. The divisor is 56.

9. The divisor is 68.

10. The divisor is 31.