

# Zero and One in Division

**Division by 0.** Let's study sharing six bananas.



$6 \div 1 = 6$       "There are 6 bananas and 1 person. The person gets 6 bananas."

$6 \div 2 = 3$       "There are 6 bananas and 2 persons. Each person gets 3 bananas."

$6 \div 6 = 1$       "There are 6 bananas and 6 persons. Each person gets 1 banana."

$6 \div 0 = ??$       "There are 6 bananas and 0 persons. We can't even talk about how many each gets, because there is no one around."

If there are NO people, there is no sense in talking about how many bananas they might get.

You might think that maybe  $6 \div 0 = 0$  or that each person gets zero bananas. Check it with multiplication. You get  $0 \times 0 = 6$ , which is not true! So  $6 \div 0 = 0$  does not work either.

**What about  $0 \div 0$ ?** Couldn't we say  $0 \div 0 = 0$ ?

$0 \div 0$  is hard. The answer could be zero, but actually the answer could be *any* number :

Let's say that  $0 \div 0 = 2$ . Check by multiplying:  $2 \times 0 = 0$ ; OK. So 2 would work.

Let's say that  $0 \div 0 = 0$ . Check by multiplying:  $0 \times 0 = 0$ ; OK. So 0 would work.

Let's say that  $0 \div 0 = 11$ . Check by multiplying:  $11 \times 0 = 0$ ; OK. So 11 would work.

So, we cannot find just ONE answer. We say that the answer cannot be determined.

**Dividing a number by zero does not work.**

**Division with 1** is not a problem:

$7 \div 1 = 7$       "If there are seven bananas and one person, the person gets 7 bananas."

$7 \div 7 = 1$       "If there are seven bananas and seven people, each person gets 1 banana."

1. Divide. CROSS OUT all the problems that are impossible. Think about sharing bananas.

|                                 |                                    |                                  |                                   |                                   |
|---------------------------------|------------------------------------|----------------------------------|-----------------------------------|-----------------------------------|
| a. $4 \div 1 =$<br>$4 \div 0 =$ | b. $14 \div 14 =$<br>$14 \div 0 =$ | c. $15 \div 1 =$<br>$7 \div 0 =$ | d. $5 \div 5 =$<br>$9 \div 0 =$   | e. $0 \div 5 =$<br>$10 \div 10 =$ |
| f. $0 \div 1 =$<br>$0 \div 4 =$ | g. $0 \div 14 =$<br>$14 \div 1 =$  | h. $0 \div 0 =$<br>$0 \div 1 =$  | i. $18 \div 18 =$<br>$1 \div 1 =$ | j. $10 \div 0 =$<br>$10 \div 1 =$ |