

What Do You Do with the Remainders?

Depending on the situation or context of a division problem, remainders affect the solution to the problem in a variety of ways. Consider the following problems involving $44 \div 8$ and the ways that students look at the remainder in each context.

There are 44 people taking a trip in some small vans. Each van holds 8 people. How many vans do they need?

Andrew: There are 5 vans with 4 people left. You can't leave any people behind, and you can't take half a van, so you'd need 6 vans to take everyone.

If 8 people share 44 crackers equally, how many crackers does each person get?

Ramona: Each person can get 5 crackers. Keep 4 crackers for another day. $44 \div 8 = 5$ crackers per person with 4 extras.

Steve: Each person can get $5\frac{1}{2}$ crackers. $44 \div 8 = 5\frac{1}{2}$.

If 8 people share 44 balloons equally, how many balloons does each person get?

Venetta: Each person gets 5 balloons. They can't split the four balloons left over, so they will have to decide what to do with them. Maybe they could give them to their teacher. 44 divided by 8 equals 5 with 4 balloons left over.

There are 44 students going to see a movie. Each row holds 8 people. How many rows do they fill up?

Derek: There are 40 people who will fill up 5 rows. Then 4 people have to sit in row 6. 44 divided by 8 equals 5 rows, with 4 more people in another row.

Noemi: You will fill up 5 rows and half of another row. $44 \div 8 = 5\frac{1}{2}$ or 5.5.

On Sunday, 8 friends earned \$44 by washing people's cars. They want to share the money equally. How much does each person get?

Emaan: First, each person gets \$5. That uses up \$40. Then you can split the \$4 that's left and give each person \$0.50, so each person gets \$5.50.

Each of these problems involves dividing 44 by 8. If the problem is presented numerically, the quotient can be written as 5 R4 or $5\frac{1}{2}$ or 5.5. If the problem is given in a context, however, the context determines the answer. Some division problems require whole number solutions, as in the contexts about vans and balloons. Notice that in the van problem, the whole number answer must be greater than the actual numerical quotient, and in the balloon problem, the whole number answer is less than the numerical quotient. In other contexts, a solution can involve fractions or decimals.

By solving problems such as these, students learn to consider the remainder in the context of the problem and to give a solution that makes sense for that problem.