Problem of the Week
Problem A and Solution
Fair Share

Problem

A class wins a pizza party for reading the most books in September. There are 28 students in the class and each student will get 2 slices of pizza. Each pizza has 6 slices.

A) How many pizzas will the school need to buy so that each student can have 2 slices?
   Show your thinking.

B) Will there be any slices left over? If so, how many?

Solution

A) If each student in the class gets 2 pieces of pizza, then we will need to order:

   28 students $\times$ 2 slices $= 56$ slices of pizza

   Since the pizzas are divided into 6 slices each, we notice

$$6 + 6 + 6 + 6 + 6 + 6 + 6 + 6 + 6 = 54 \ or \ 6 \times 9 = 54$$

$$and$$

$$6 + 6 + 6 + 6 + 6 + 6 + 6 + 6 + 6 + 6 = 60 \ or \ 6 \times 10 = 60.$$

   Therefore, the school will need to order 10 pizzas so that the 28 students can have 2 slices of pizza each.

B) If there are 60 pieces in 10 pizzas and giving each student 2 pieces of pizza means that 56 pieces are eaten, then the number of pieces left over is:

$$60 - 56 = 4.$$

   Therefore, there would be 4 slices of pizza left over.

Teacher's Notes

Here is another way to think about the problem. Since each student wants 2 slices of pizza and there are 28 students in the class they need a total of $2 \times 28 = 56$ slices of pizza. Also, since each pizza has 6 slices, we can calculate the number of pizzas required by dividing $56 \div 6 = 9$ remainder 2. This means that we need 9 full pizzas and 2 extra slices. Since we can only buy full pizzas, we will need to get 10 pizzas in total

The exact result of the division is $9\frac{2}{6}$ or $9\frac{1}{3}$. However the answer that we need is a whole number of pizzas. There are a few different mathematical operations that will convert a number with a fractional part into an integer result. One way is to round off the number to the nearest integer. If we round off $9\frac{1}{3}$ we get 9; if we round off the number 2.71 to the nearest integer we get 3. We can also round up the number to the nearest integer or round down to the nearest integer. The mathematical function that rounds a number up to the nearest integer is called the *ceiling* function. The *floor* function is equivalent to rounding a number down to the nearest integer. These functions are used both in mathematical expressions as well as many programming languages.

In mathematics, we use special notation for these rounding functions. The notation for *floor* looks like this: $\lfloor 2.71 \rfloor = 2$, and the notation for *ceiling* looks like this: $\lceil 2.71 \rceil = 3$.

For this problem, we would want to calculate the *ceiling* of the result we get from the division, since we need to round up. So the number of pizzas required is: $\lceil 56 \div 6 \rceil = \lceil 9\frac{1}{3} \rceil = 10$.

Note that the *floor* and *ceiling* of an integer are equal to each other and to the integer itself. For example, $\lfloor 3 \rfloor = \lceil 3 \rceil = 3$.