



Problem of the Week

Problem A and Solution

Pizza Party

Problem

Last year, April had a pizza party for all 36 students in her class. She expected everyone to eat 4 slices of pizza each. When the party was done, she had a lot of pizza left over. April observed three groups at the party.

- **Group A** made up one-third of the class. Each person in this group ate half the number of slices April predicted everyone would eat.
- **Group B** made up half of the class. They each ate 2 slices. After that, each person shared one more slice with a friend in this group.
- **Group C** made up the remainder of the class. Each person in this group ate 4 slices each, as she expected.

- A) How many people were in **Group A**?
- B) How many pizza slices in total did the people in **Group B** eat?
- C) How many people were in **Group C**?
- D) If a large pizza has 12 slices, how many pizzas should April have ordered for the party to avoid having so much pizza left over? Note that she might still have ended up with a few extra slices.

Solution

- A) Since $\frac{1}{3}$ of the students were in **Group A**, and there were 36 people, that means that there were $36 \div 3 = 12$ students in this group.
- B) **Group B** had $\frac{1}{2}$ of the students in the class, which is equal to $36 \div 2 = 18$ people. Each of these people ate 2 slices, for a total of $18 \times 2 = 36$ slices. Each of these 18 people also split 1 slice. This means that $18 \div 2 = 9$ pairs of students shared a single slice of pizza. In total the people in **Group B** ate: $36 + 9 = 45$ slices of pizza.
- C) Between **Group A** and **Group B** we have accounted for a total of $12 + 18 = 30$ people. The remaining $36 - 30 = 6$ people were in **Group C**, and they ate 4 slices of pizza each.



D) Since each student in **Group A** ate half the number of slices April predicted, this means each one ate $4 \div 2 = 2$ slices. Therefore, the students in **Group A** ate a total of $12 \times 2 = 24$ slices of pizza.

Students in **Group C** ate a total of $6 \times 4 = 24$ slices of pizza.

We calculated that students in **Group B** ate a total of 45 slices of pizza.

So the people at the party ate a total of $24 + 24 + 45 = 93$ slices.

Since a large pizza has 12 slices, we can skip count to see how many pizzas April would have needed to have at least 93 slices. Counting by 12 we get:

12, 24, 36, 48, 60, 72, 84, 96

This means April should have ordered 8 pizzas to feed the people at the party.



Teacher's Notes

Another way to determine how many people were in **Group C** is to work with algebra and fractions. We would not expect students at this level to know much about algebra or adding and subtracting fractions, but they will learn more about these things eventually in later grade levels.

All of the students were in one of the three groups. One-third of the students were in **Group A** and half of the students were in **Group B**.

If we say that x equals the fraction of students that were in **Group C**, then we know:

$$\frac{1}{3} + \frac{1}{2} + x = 1$$

Now we can solve for x :

$$x = 1 - \left(\frac{1}{3} + \frac{1}{2} \right)$$

To do this calculation, we should find a common denominator for the fractions.

In this case we calculate $\frac{1}{3} = \frac{2}{6}$ and $\frac{1}{2} = \frac{3}{6}$, which gives us:

$$x = \frac{6}{6} - \left(\frac{2}{6} + \frac{3}{6} \right)$$

$$x = \frac{6}{6} - \frac{2+3}{6}$$

$$x = \frac{6}{6} - \frac{5}{6}$$

$$x = \frac{6-5}{6}$$

$$x = \frac{1}{6}$$

Now that we know that **Group C** made up $\frac{1}{6}$ of the class, we can calculate that this group had $36 \div 6 = 6$ students.