



## Problem of the Week

### Problem A and Solution

### Jasmine's Loot Bags

#### Problem

Jasmine is making loot bags of candy for 12 friends coming to her birthday party. She buys 60 gooey bears, 93 fluffy peaches and 75 jelly beans.

In order to be fair, Jasmine would like to put the same number of each candy into each of the 12 bags. She wants to give everyone as much candy as possible.

How many of each candy will be in one friend's loot bag?

#### Solution

One possible way to determine the number of candies in each bag is to divide. We calculate the quotient and remainder when we take the number of candies of each type and divide by the number of friends at the party.

Number of gooey bears per bag:

$$60 \div 12 = 5 \text{ remainder } 0.$$

Number of fluffy peaches per bag:

$$93 \div 12 = 7 \text{ remainder } 9.$$

Number of jelly beans per bag:

$$75 \div 12 = 6 \text{ remainder } 3.$$

Another way to calculate these results is to look for the largest multiple of 12 that is less than or equal to the number of candies of each type. This can be done with trial and error, or it can be done with repeated addition.

Number of gooey bears per bag:

$$5 \times 12 = 12 + 12 + 12 + 12 + 12 = 60$$

Number of fluffy peaches per bag:

$$7 \times 12 = 12 + 12 + 12 + 12 + 12 + 12 + 12 = 84 \text{ (with 9 unused)}$$

Number of jelly beans per bag:

$$6 \times 12 = 12 + 12 + 12 + 12 + 12 + 12 = 72 \text{ (with 3 unused)}$$

Either way it is calculated, Jasmine will need to put 5 gooey bears, 7 fluffy peaches, and 6 jelly beans into each loot bag.





## Teacher's Notes

One of the solutions for this problem uses division to determine how many candies each friend receives. When you are dividing whole numbers (or any non-zero integers), the answer can always be calculated precisely. An exact answer can be described with the quotient and remainder. For example,  $93 \div 12$  is exactly 7 with a remainder of 9. This means that we can write:  $(12 \times 7) + 9 = 93$ .

Another way of precisely representing the result of the division is by using a fraction. For example,  $93 \div 12$  is exactly  $7\frac{3}{4}$  or  $\frac{31}{4}$ .

We can show that this is correct by multiplying  $\frac{31}{4} \times 12 = \frac{372}{4} = 93$ .

If the answer is computed using a calculator, the result may not be precise. In the case of  $93 \div 12$ , the calculator will show the answer 7.75. This is an example of a terminating decimal, since there is a finite number of digits after the decimal point. All fractions can be written as terminating or repeating decimals. A repeating decimal has an infinite number of digits after the decimal point, but there is a pattern of one or more digits that repeats.

For example, if you compute  $95 \div 12$  on a calculator, you will see a result like 7.9166666. This answer is not exact. This is a close approximation of the correct answer which is  $7\frac{11}{12}$ . If we wanted to represent the result exactly using a decimal point, then we would need to show that the digit 6 is repeated forever. We can do that by putting a line over the repeated pattern. For example,  $95 \div 12$  is exactly  $7.91\overline{6}$ .

Knowing and keeping the exact answer when possible, and having access to the quotient and remainder when dividing can be useful. Loss of precision when dividing two numbers is something to be considered when using a calculator or a computer. Unfortunately, students often forget how to compute the exact result of division once they use calculators for their computations.

