MATHCOUNTS® Problem of the Week Archive

School Lunch – September 13, 2021

Problems & Solutions

The lunchroom workers at Guffey Middle School can move a total of 600 students through 5 lunch lines in exactly one hour. How many students move through each lunch line per minute?

With 600 students coming through 5 lunch lines in 1 hour, this would be 600 ÷ 5 = 120 students per line per hour. With 60 minutes in an hour, we find that 120 ÷ 60 = ***2 students per minute*** *move through each lunch line.*

Bobby, Juliana and Michael have worked out a bartering system for trading their school lunch snacks. They decided that 10 carrot sticks are equal to 1 apple, 1 apple is equal to 20 potato chips (1/2 of a grab bag) and 1 grab bag of chips is equal to 1 pudding cup. In their system, apples and pudding cups may not be divided into pieces for bartering purposes. Juliana has 15 carrot sticks and 1 apple in her lunch. What must she give Michael in order to get his pudding cup?

We know that 1 pudding cup = 1 bag of chips. We also know that ½ of a bag of chips = 1 apple, so 1 bag of chips = 2 apples. If 1 pudding cup = 2 apples, it also equals 20 carrot sticks, since 10 carrot sticks = 1 apple. Juliana does not have two apples, nor does she have 20 carrot sticks, so she'll have to give Michael a combination of an apple and carrot sticks. If 2 apples equal 1 pudding cup, then 1 apple equals ½ of the pudding cup. If 20 carrot sticks equal 1 pudding cup, then 10 carrot sticks equal the other ½ of the pudding cup. So, Juliana must give Michael her ***1 apple and 10 of her carrot sticks****.*

At Guffey Middle School, lunch can be purchased a la carte. There are 5 main dish options, 6 side item options and 4 drink options. Jennifer will have 1 main dish item, 2 different side items and 1 drink for lunch. How many combinations are possible for Jennifer's lunch?

There are 5 options for Jennifer's main dish. There are $_6C_2 = 6!/[2!(6 – 2)!] = 6!/(2!4!) = (6 \times 5)/(2 \times 1) = 30/2 = 15$ *combinations of 2 different side items for Jennifer's lunch. (Another way of thinking about this is that the first side item can make 5 unique pairs with the other side items, the second item can make 4 unique pairs, the third item can make 3 unique pairs, etc., so 5 + 4 + 3 + 2 + 1 = 15.) There are 4 drink options for Jennifer's lunch. So, there are a total of* $5 \times 15 \times 4 =$ ***300*** *possible combinations for Jennifer's lunch.*

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