MATHCOUNTS® Problem of the Week Archive

Halloween Fun – November 2, 2020

Problems & Solutions

Bridgette wants to be a princess for Halloween. When she gets to the costume store, she realizes there are many options. There are five different princess crowns, eight different princess dresses, and three different pairs of princess shoes. How many possible combinations are there for Bridgette's princess costume consisting of one crown, one dress and one pair of shoes?

*Any of the five crowns can be paired with any of the eight different dresses, so 5 × 8 = 40 combinations of crowns and dresses. Any of these combinations can then be paired with any of the pairs of shoes, so 40 × 3 = **120** combinations of crowns, dresses and shoes.*

Joseph and Dante went trick-or-treating and came back with A LOT of candy. However, when Samantha, Joseph's little sister, gets back, they find that, not only does she have more candy, but she also has better candy than they do. Samantha agrees to trade some of the candy, but they have to follow her trading rules.

3 Smarties packs = 1 fun-size candy bar
2 Tootsie Tops = 1 Skittles pack
15 candy corn = 1 Smarties pack
5 candy corn = 2 Bit-O-Honeys
3 Tootsie Pops = 1 fun-size candy bar

Based on Samantha's rules, what item is the most valuable?

Through logic, we can see that since there are more of the items on the left side of each equals sign, the items on the left must be worth less than the items on the right. This narrows the possibilities for 'most valuable item' down to Bit-O-Honeys, candy bars and Skittles packs. (While Smarties are found on the right side, they are also found on the left side, which means something has a greater value than Smarties.)

Two Tootsie Pops equal 1 Skittles pack, but it takes 3 Tootsie Pops to equal 1 fun-size candy bar, so we know the candy bars are more valuable than the Skittles packs. This narrows the possibilities down to candy bars and Bit-O-Honeys.

*To compare the value of Bit-O-Honeys to the value of fun-size candy bars, we must compare them to the same thing or compare them to each other directly. Since 2 Bit-O-Honeys = 5 candy corn and 15 candy corn = 1 Smarties pack, we know that 6 Bit-O-Honeys = 15 candy corn = 1 Smarties pack. We know that 1 fun-size candy bar = 3 Smarties packs, so we can now say that 1 candy bar = 18 Bit-O-Honeys. Therefore, **fun-size candy bars** are the most valuable items.*

Based on Samantha's exchange rates above, how many of the least valuable item is required to get one of the most valuable item?

Using the same logic as in the previous questions, we know that all of the items on the left side of the equals signs are lesser in value than something else. This narrows the possibilities for 'least valuable

item' down to Tootsie Pops and candy corn. To compare their values, let's look at the equivalent for both types of candy in candy bars. We were given that 3 Tootsie Pops = 1 candy bar. Then, we were given that 15 candy corn = 1 Smarties pack. We also know that 3 Smarties packs = 1 candy bar. This means we need 3 Smarties packs' worth of candy corn to get 1 candy bar, so (15 candy corn per Smarties pack) × (3 Smarties packs per candy bar) = 45 candy corn per candy bar. Therefore, the candy corn are worth the least and it takes ***45*** *candy corn to get 1 candy bar.*

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Based on Samantha's exchange rates above, how many of the least valuable item is required to get one of the most valuable item?