MATHCOUNTS® Problem of the Week Archive

Moving Day – July 16, 2018

Problems & Solutions

The summer months are the most popular time to move to a new home. Janet's family is moving, and she suddenly realizes just how much stuff they have in their current home. Once the moving company finishes packing everything in boxes, they begin the task of numbering them. A sticker is placed on every box and on every item that is too large to fit in a box. Janet notices that stickers in three distinct colors are used. There are blue stickers numbered 239 through 262, green stickers numbered 163 through 178 and yellow stickers numbered 453 through 492. How many total stickers were used by the packers?

If the movers had used stickers numbered from 1 through 262 of the blue stickers, they would have used 262 blue stickers. However, by starting at 239, we know that they did not use the first 238 stickers to number these boxes. Therefore, 262 – 238 = 24 blue stickers were used. Similarly, 178 – 162 = 16 green stickers and 492 – 452 = 40 yellow stickers were used. That is a total of 24 + 16 + 40 = ***80*** *stickers.*

Janet notices that the boxes numbered 238 through 245 contain all her belongings. She is pretty sure her MATHCOUNTS trophies are in the box numbered 242, which is a 12.5 × 12.5 × 17 box (measured in inches). What is the volume of this box, in cubic feet? Express your answer as a decimal to the nearest tenth.

Since 1 foot = 12 inches, it follows that 1 cubic foot = 12 × 12 × 12 = 1728 cubic inches. The box in question is 12.5 × 12.5 × 17 = 2656.25 in^3. Therefore, the box's volume is 2656.25 ÷ 1728 = ***1.5*** *ft^3.*

Part of moving is remembering all the numbers associated with the new house, including a new phone number, new street address and new zip code. Janet can't quite recall her new house number. What she knows for certain is that her new house number consists of three digits. The first digit is odd, the second is even and the third is odd. Janet also knows it is not a palindrome. How many different house numbers have all of these characteristics?

Since Janet's house number begins with an odd number, there are only 5 choices (1, 3, 5, 7 and 9). The second number also has five choices (0, 2, 4, 6 and 8). The last number, however, only has 4 choices because it can't be the same as the first digit since that would make the house number a palindrome. Thus, the number of house numbers with the given characteristics is 5 × 5 × 4 = ***100*** *house numbers.*

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