# MATHCOUNTS® Problem of the Week Archive

## *In With The New – December 23, 2019*

## *Problems & Solutions*

Millions of people will fix their eyes on the ball dropping in Times Square this New Year's Eve to indicate the end of 2019 and the beginning of 2020. The famous ball is six feet in diameter and weighs 1070 pounds. If the weight were distributed evenly throughout the ball, what would be the average number of pounds per cubic foot, to the nearest tenth? (Assume that the ball is a perfect sphere, though its surface is actually made up of 504 small, crystal triangles.)

*If the ball is 6 feet in diameter, that means it has a radius of 3 feet. To find the volume of a sphere, we can use the formula $V = (4/3)\pi r^3$. So, the volume would be $(4/3)\pi(3)^3 = 113.097$ cubic feet. The ball weighs 1070 pounds. Dividing 1070 by 113.097, we get that it weighs an average of* ***9.5 pounds per cubic foot****, rounded to the nearest tenth.*

On New Year's Eve, the Ball will begin its descent down the 77-foot flagpole atop One Times Square at exactly 11:59 PM, and it will reach the numerals 2020 at exactly 12:00 Midnight on New Year's Day. How many inches does the ball fall each second?

*The ball falls 77 feet in 1 minute (or 60 seconds). So, the ball falls 77/60 feet each second, which is equal to 1.28333 feet per second. In inches, we get 1.28333 × 12 =* ***15.4 inches per second****.*

At the end of each year, various publications like to reflect on the year. One interesting survey reported the safest places to live this past year, and Columbia, MD won first place this year. One area of crime that was included in the results was the number of stolen vehicles. Columbia had 131 stolen vehicles, while America's most dangerous city had 25,892 stolen vehicles! In Columbia, that's one stolen car every *x* hours, while in America's most dangerous city, that's one stolen car every *y* minutes. Find the value of *x* and *y*, to the nearest tenth. (Assume these statistics are for the last 365 days.)

*First, we know that 365 days is equal to 365 × 24 = 8760 hours, which is 8760 × 60 = 525,600 minutes. For Columbia, there were 131 stolen vehicles in 8760 hours. If we divide the number of hours by the number of stolen vehicles, 8760 ÷ 131, we find that every 66.9 hours, 1 vehicle was stolen, rounded to the nearest tenth. So,* ***x = 66.9****. To find y, we know that there are 25,892 vehicles stolen in 525,600 minutes. Dividing the number of minutes by the number of vehicles stolen, 525,600 ÷ 25,892, we find that every 20.3 minutes, 1 vehicle was stolen, rounded to the nearest tenth. So,* ***y = 20.3****.*

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