MATHCOUNTS® Problem of the Week Archive

In With The New – December 30, 2024

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 2024 and the beginning of 2025. 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 11:59pm, and it will reach the numerals 2025 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****.*

Tokyo is 9 hours ahead of London, and London is 7 hours ahead of Denver. If Denver is 2 hours behind Washington, DC, what time is it in Washington, DC at the moment 2025 begins in Tokyo?

Each new year begins at midnight (12am) on January 1st. Knowing this, when 2025 begins in Tokyo, it will be 3pm in London (12am – 9hrs = 3pm). When it is 3pm in London, it will be 8am in Denver (3pm – 7hrs = 8am). Finally, when it is 8am in Denver, it will be ***10am*** *in Washington DC (8am + 2hrs = 10am).*

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