MATHCOUNTS® Problem of the Week Archive

Labor Day – September 4, 2017

Problems & Solutions

Labor Day is a product of the American labor movement and is dedicated to the social and economic achievement of American workers. In honor of this day and the American worker, let's solve some Labor Day themed math problems!

At the height of the Industrial Revolution the average worker in the United States was working 12 hours per day, 7 days per week. In 1836, the labor movement started calling for a reduction to 8 hours per day. The Adamson Act, passed in 1916, made the 8 hour work day official and required overtime compensation for anything additional. Now the average worker in the United States works 8 hours per day, 5 days per week. What is the absolute difference between the average number of hours worked over the course of a year, 52 weeks, by a worker during the Industrial Revolution and by a worker today?

*The average worker durning the Industrial Revolution worked 12 hrs/day × 7 days/week × 52 weeks/year = 4368 hrs/year. The average worker today works 8 hrs/day × 5 days/week × 52 weeks/year = 2080 hrs/year. A worker during the Industrial Revolution, therefore, worked an average of 4368 − 2080 = **2288** hours more per year.*

A minimum wage for workers became a federal law in 1938. At the time the wage was set at \$0.25 per hour. Adjusted for inflation, this wage would equal about \$4.13 per hour today. Today the federal minimum wage is \$7.25 per hour. Using the adjusted wage of \$4.13, what is the percent increase in the minimum wage from 1938 to today? Express your answer to the nearest tenth.

*The percent increase in the minimum wage is (\$7.25 − \$4.13) ÷ \$4.13 × 100 = **75.5%**.*

The first Labor Day was celebrated on Tuesday, September 5, 1882. The second celebration of Labor Day was on Wednesday, September 5, 1883. In 1884, a leap year, Labor Day was formally established as the first Monday of September. What was the date of the fifth celebration of Labor Day in 1886?

*A standard calendar year has 365 days and 7 days each week. If we divide 365 days by 7 days, we get 52 weeks with a remainder of 1 day. This tells us that after one full calendar year the same date from the year before will occur a day of the week later than it did the previous year. We see that this occurred between the first and second Labor Day celebrations, observed September 5th, 1882 and September 5th, 1883. In 1882, the 5th was a Tuesday but one year later, in 1883, the 5th was a Wednesday. Another full year later, in 1884, we would expect the 5th to be a Thursday, but we are told that 1884 was a leap year. That means February has 29 days. The 5th of September in 1884 was a Friday. Continuing from here, we know that September 5, 1885 was on a Saturday and the September 5, 1886 was on a Sunday. In 1886, Labor Day was observed on the first Monday of September, which was **September 6, 1886**.*

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A minimum wage for workers became a federal law in 1938. At the time, the wage was set at $0.25 per hour. Adjusted for inflation, this wage would equal about $4.13 per hour today. Today the federal minimum wage is $7.25 per hour. Using the adjusted wage of $4.13, what is the percent increase in the minimum wage from 1938 to today? Express your answer to the nearest tenth.

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