

# MATHCOUNTS<sup>®</sup> Problem of the Week Archive

## *Eight is Enough! – January 13, 2020*

### **Problems & Solutions**

In 1998, Nkem Chukwu gave birth to the first set of surviving octuplets. The eight babies weighed from 11.3 ounces to 28.6 ounces at birth. Leonard Weisman, the Texas Children’s Hospital’s chief of neonatal services, said it was imperative they gain lots of weight before they go home. “For instance, the 500-gram babies are going to have to quadruple their weight [to reach a healthy level],” he said. How many ounces will the heaviest baby have to gain to reach a healthy level?

*There are 454 grams in a pound. Likewise, there are 16 ounces in one pound. Hence, one ounce is  $454/16 = 28.375$  grams. A healthy level is  $4 \times 500 = 2000$  grams, or  $2000/28.375 = 70.5$  ounces. The heaviest of the babies weighed 28.6 ounces at birth, and will have to gain  $70.5 - 28.6 = \mathbf{41.9}$  ounces, an increase of almost 150% its weight at birth.*

The birth of octuplets is no small matter, but Mrs. Fyodor Vassilyev of Shuya, Russia (1707-1782) gave birth to 16 sets of twins, in addition to 7 sets of triplets, and 4 sets of quadruplets. She gave birth to a total of 69 children. (None of these children were conceived with fertility drugs, either.) What is the probability that one of her 69 children, selected at random, was not a twin, triplet or quadruplet?

*The number of children who were twins, triplets or quadruplets is  $(16 \times 2) + (7 \times 3) + (4 \times 4) = 69$ . She had no children born by themselves! So, the probability is **zero (0)**.*

The average length of pregnancy is 39 weeks for a single gestation; 35 weeks for twins; 33 weeks for triplets; and 29 weeks for quadruplets. If this trend in data continues, how long might you expect the length of pregnancy to be for octuplets?

*It’s difficult to estimate these things accurately, so this is mostly an academic exercise! From a single gestation to the length of pregnancy for quadruplets, the decrease is 10 weeks, which is an average decrease of  $10/3 = 3.3$  weeks per additional child. So, it might be reasonable to assume that the length of pregnancy for octuplets is  $39 - 7(3.3) = \mathbf{16}$  weeks (approximately).*

# **MATHCOUNTS<sup>®</sup> Problem of the Week Archive**

## ***Eight is Enough! – January 13, 2020***

### ***Problems***

In 1998, Nkem Chukwu gave birth to the first set of surviving octuplets. The eight babies weighed from 11.3 ounces to 28.6 ounces at birth. Leonard Weisman, the Texas Children’s Hospital’s chief of neonatal services, said it was imperative they gain lots of weight before they go home. “For instance, the 500-gram babies are going to have to quadruple their weight [to reach a healthy level],” he said. How many ounces will the heaviest baby have to gain to reach a healthy level?

The birth of octuplets is no small matter, but Mrs. Fyodor Vassilyev of Shuya, Russia (1707-1782) gave birth to 16 sets of twins, in addition to 7 sets of triplets, and 4 sets of quadruplets. She gave birth to a total of 69 children. (None of these children were conceived with fertility drugs, either.) What is the probability that one of her 69 children, selected at random, was not a twin, triplet or quadruplet?

The average length of pregnancy is 39 weeks for a single gestation; 35 weeks for twins; 33 weeks for triplets; and 29 weeks for quadruplets. If this trend in data continues, how long might you expect the length of pregnancy to be for octuplets?