

β Beta Round

AMSA-MAMS Pi Day Mathematics Tournament

March 10, 2018

1. How many square yards of carpet are required to cover a rectangular floor that is 24 feet long and 18 feet wide?
2. What is $0.\bar{2} + 0.0\bar{2} + 0.00\bar{2}$? Express your answer as a common fraction.
3. After shooting 30 times, a basketball player makes 40% of her shots. What is the minimum number of shots she needs to take to raise her shooting accuracy to 50%?
4. A positive integer n is called *nice* if the number is composed of only the digits 3 and 6. Find the smallest *nice* number divisible by 64.
5. If it takes 10 workers 50 minutes to make 36 toys, how long (in minutes) would it take 15 workers to make 27 toys?
6. A case contains candy. If the candies are equally divided among 7 people, then 4 candies are left over. If the candies are equally divided among 11 people, then 7 candies are left over. Assuming that there are the least amount of candies satisfying both conditions, how many candies are left when equally divided among 17 people?
7. What is the smallest natural number k such that there does not exist a natural number n such that $n!$ (or n factorial) has k zeroes after the last non-zero digit?
8. Aditya is particularly fond of Tom Brady. Because of this, he finds the value of $12!+11!+\dots+2!+1!$. He then finds the sum of the digits of that value. He then finds the sum of the digits of that value. He continues this process until he is left with a single digit number. What number is he left with?
9. If in the expansion of $(1+x)^m(1-x)^n$, the coefficients of x and x^2 are 3 and -6 respectively, calculate the value of $m+n$.
10. A gumball machine contains 150 green, 200 red, 200 blue, and 50 yellow gumballs. Alex takes some number of gumballs from the machine. Now the probability of reaching into the machine and picking a green gumball is $\frac{1}{7}$, and the probability of picking either a green or red gumball is $\frac{2}{5}$. What is the least number of gumballs that Alex could have removed?