Review Game: Combinatorics and Probability

December 10, 2023

The 600 students at King Middle School are divided into three groups of equal size for lunch. Each group has lunch at a different time. A computer randomly assigns each student to one of the three lunch groups. The probability that three friends Al, Bob, and Carol, will be assigned to the same lunch group is approximately: **(1 point)**

(A) $\frac{1}{27}$ (B) $\frac{1}{9}$ (C) $\frac{1}{8}$ (D) $\frac{1}{6}$ (E) $\frac{1}{3}$

Ten balls numbered 1 to 10 are in a jar. Jack reaches into the jar and randomly removes one of the balls. Then Jill reaches into the jar and randomly removes a different ball. The probability that the sum of the two numbers on the balls removed is even is: **(1 point)**

(A) $\frac{4}{9}$ (B) $\frac{9}{19}$ (C) $\frac{1}{2}$ (D) $\frac{10}{19}$ (E) $\frac{5}{9}$

A palindrome is a whole number that reads the same forwards and backwards. If one neglects the colon, certain times displayed on a digital watch are palindromes. Three examples are 1:01, 4:44, and 12:21. How many times during a 12-hour period will be palindromes? **(1 point)**

(A) 57   (B) 60   (C) 63   (D) 90   (E) 93

Every time these two wheels are spun, two numbers are selected by the pointers. What is the probability that the sum of the two selected numbers is even? **(2 points)**
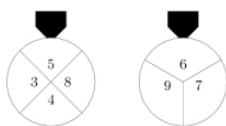
(A) $\frac{1}{6}$ (B) $\frac{3}{7}$ (C) $\frac{1}{2}$ (D) $\frac{2}{3}$ (E) $\frac{5}{7}$

Every time these two wheels are spun, two numbers are selected by the pointers. These two numbers are then multiplied. What is the probability that this product is an even number? **(2 points)**
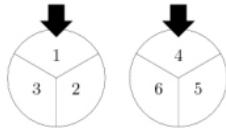
(A) $\frac{1}{6}$ (B) $\frac{3}{7}$ (C) $\frac{1}{2}$ (D) $\frac{2}{3}$ (E) $\frac{5}{7}$

A box contains exactly 5 chips, 3 red and 2 white. Chips are randomly removed 1 at a time without replacement until all the red chips are drawn or all the white chips are drawn. What is the probability that the last chip drawn is white? **(3 points)**

(A) $\frac{3}{10}$ (B) $\frac{2}{5}$ (C) $\frac{1}{2}$ (D) $\frac{3}{5}$ (E) $\frac{7}{10}$

A certain calculator has only two keys: [+1] and [×2]. When you press one of the keys, the calculator automatically displays the result. For example, if the calculator originally displayed "9" and you pressed [+1] it would display "10." If you then pressed [×2], it would display "20." Starting with display "1," what is the fewest number of keystrokes you would need to reach "200"? **(3 points)**

(A) 8   (B) 9   (C) 10   (D) 11   (E) 12