Contest #6 **Bergen County Math League** **2018–2019**

Part I *Time Limit:* 12 minutes **No Calculators**

6–1. The fraction $\frac{90540}{108648}$ can be reduced to $\frac{a}{b}$, where a and b are positive integers, each less than 10. Find $a + b$.

6–2. Ace and Flash toss a fair coin. If it lands heads up, Ace wins \$1. If not, Ace loses \$1. Find the probability that Ace's net winnings after five tosses is exactly \$1.

Part II *Time Limit:* 12 minutes **No Calculators**

6–3. The first 1000 positive integers are written in a row, consecutively. Starting with 1, every 21st number is circled in red and every 15th number is circled in blue. Find the smallest positive difference between a red number and a blue number.

6–4. A game is played by Ace, Flash, and Speedy with the understanding that the loser is to double the money of the other two. After three games, each has lost once and each has \$24. How many dollars did Speedy have at the start, if Speedy began the game with the most money?

Part III *Time Limit:* 12 minutes **No Calculators**

6–5. Find the least positive degree-measure x for which $\tan x = \frac{1+\tan 70^\circ}{1-\tan 70^\circ}$.

6–6. Three mutually externally tangent circles have centers A, B, and C, and radii a, b, and c, respectively. If $AB = 17$, $BC = 23$, and $CA = 12$, find the ordered triple (a, b, c).

Answers

6–1. 11

6–2. $\frac{5}{16}$ or exact equivalent

6–3. 3

6–4. 39 or \$39

6–5. 115 or 115°

6–6. $(3, 14, 9)$