Problem Set - 19 Jan 2024

PROBLEM 1 (2019 AMC 8 #8)

Gilda has a bag of marbles. She gives 20% of them to her friend Pedro. Then Gilda gives 10% of what is left to another friend, Ebony. Finally, Gilda gives 25% of what is now left in the bag to her brother Jimmy. What percentage of her original bag of marbles does Gilda have left for herself?

(A) 20 **(B)** $33\frac{1}{3}$ **(C)** 38 **(D)** 45 **(E)** 54

PROBLEM 2 (2017 AMC 12B #5)

The data set $[6, 19, 33, 33, 39, 41, 41, 43, 51, 57]$ has median $Q_2 = 40$, first quartile $Q_1 = 33$, and third quartile $Q_3 = 43$. An outlier in a data set is a value that is more than 1.5 times the interquartile range below the first quartle (Q_1) or more than 1.5 times the interquartile range above the third quartile (Q_3), where the interquartile range is defined as $Q_3 - Q_1$. How many outliers does this data set have?

(A) 0 **(B)** 1 **(C)** 2 **(D)** 3 **(E)** 4

PROBLEM 3 (2012 AMC 10B #15)

In a round-robin tournament with 6 teams, each team plays one game against each other team, and each game results in one team winning and one team losing. At the end of the tournament, the teams are ranked by the number of games won. What is the maximum number of teams that could be tied for the most wins at the end of the tournament?

(A) 2 **(B)** 3 **(C)** 4 **(D)** 5 **(E)** 6

PROBLEM 4 (2018 AIME II #3)

Find the sum of all positive integers $b < 1000$ such that the base-b integer 36_b is a perfect square and the base-b integer 27_b is a perfect cube.

PROBLEM 5 (2015 AMC 12A #20)

Isosceles triangles T and T' are not congruent but have the same area and the same perimeter. The sides of T have lengths 5, 5, and 8, while those of T' have lengths a, a, and b. Which of the following numbers is closest to b?

(A) 3 **(B)** 4 **(C)** 5 **(D)** 6 **(E)** 8