Problem Set - 19 Jan 2024

PROBLEM 1 (2014 AMC 10B #5)

Doug constructs a square window using 8 equal-size panes of glass, as shown. The ratio of the height to width for each pane is $5:2$, and the borders around and between the panes are 2 inches wide. In inches, what is the side length of the square window?

(A) 26 **(B)** 28 **(C)** 30 **(D)** 32 **(E)** 34

PROBLEM 2 (2019 AMC 12B #13)

A red ball and a green ball are randomly and independently tossed into bins numbered with the positive integers so that for each ball, the probability that it is tossed into bin k is 2^{-k} for $k = 1, 2, 3....$ What is the probability that the red ball is tossed into a higher-numbered bin than the green ball?

(A) $\frac{1}{4}$ **(B)** $\frac{2}{7}$ **(C)** $\frac{1}{3}$ **(D)** $\frac{3}{8}$ **(E)** $\frac{3}{7}$

PROBLEM 3 (2017 AMC 12A #13)

Driving at a constant speed, Sharon usually takes 180 minutes to drive from her house to her mother's house. One day Sharon begins the drive at her usual speed, but after driving $\frac{1}{3}$ of the way, she hits a bad snowstorm and reduces her speed by 20 miles per hour. This time the trip takes her a total of 276 minutes. How many miles is the drive from Sharon's house to her mother's house?

(A) 132 **(B)** 135 **(C)** 138 **(D)** 141 **(E)** 144

PROBLEM 4 (2011 AMC 12A #16)

Each vertex of convex pentagon $ABCDE$ is to be assigned a color. There are 6 colors to choose from, and the ends of each diagonal must have different colors. How many different colorings are possible?

(A) 2520 **(B)** 2880 **(C)** 3120 **(D)** 3250 **(E)** 3750

PROBLEM 5 (2011 UNCO MATH CONTEST II #6)

What is the remainder when $1! + 2! + 3! + \cdots + 2011!$ is divided by 18?
