

INTEGIRLS Houston: 2022 Fall Math Contest

High School Relay Round 1

1. Farah has a bag of 200 marbles with 35 blue marbles, 43 purple marbles, and an assortment of green and yellow marbles. Without replacement, what is the highest amount of marbles she can draw from the bag *before* getting a purple one?
2. Let $T = TNYWR$ (The Number You Will Receive). On a snow day, Alex is forced to stay in their home and is really bored. They decide to steal some printer paper and start making paper airplanes. Time flies and they have already made T airplanes. They start placing them in groups of 2, 4, 6, \dots , continuing the pattern of adding two more airplanes than in the previous group for each new group until they cannot continue the pattern and throw the rest of the airplanes out of the window. How many paper airplanes will Alex throw out the window?
3. Let $T = TNYWR$ (The Number You Will Receive). There is a regular hexagon $ABCDEF$ and triangle ABG such that $\angle GBA = 90^\circ$ and G is on the extension of \overline{AF} . If the distance from B to the midpoint of AG is $4T$ and $GD = a\sqrt{b}$ in simplest form, what is $a + b$?
4. Let $T = TNYWR$ (The Number You Will Receive). After combining all of your candy in a big pile, you and your friends see that the pile has exactly T pink starbursts. If Casey wants at most 3, Danny wants at least 4, you want at least 2, and Erika is fine with any number of pink starbursts, how many ways can you all divide up the pink starbursts?