Team Round

45 minutes

Please put all answers on the provided answer sheet, units are not required.

1) The number of dogs Taylor Swift dyes key lime green each year can be modeled by an arithmetic sequence. An arithmetic sequence is when the difference between any consecutive terms is constant. For some integer k, the number of dogs Taylor Swift dyed the first year was *2k-1*. During the 2nd year, she dyed *k+5* dogs and during the 3rd year, she dyed *4k+3* dogs. How many dogs will Taylor Swift dye key lime green on the 13th year? (1 point)

    a) Taylor Swift is building an isosceles triangle-shaped fenced garden for a rose garden filled with thorns. The fence has side lengths $5x + 20$, $3x + 76$ and $x + 196$. What is the least possible perimeter for her fence? (2 points)

2) Taylor Swift Corporation (TSC) and Kanye West Industry (KWI) produce red scarves. TSC produces 60% of all red scarves and KWI produces 40% of all red scarves. 20% of scarves made by TSC are defective and 80% of scarves made by KWI are defective. If Olivia Rodrigo was shipped a random defective scarf, what is the probability the scarf came from TSC (Write your answer as a fraction in simplest terms)? (1 point)

3) Abigail, Bonnie, Clyde, and Dorothea are racing in getaway cars. In how many different ways can the 4 finish if it is possible for two or more participants to finish in a tie? For example, one way the race could finish would be Abigail and Clyde tie for first, Bonnie comes in third, and Dorothea comes in fourth. (2 points)

4) Marjorie is firing a cannon at a yacht. She has a 25% chance of hitting the yacht on each fire. If she fires the cannon 4 times, what is the probability she'll hit the yacht exactly twice? Answer in a fraction in simplest form. (2 points)

5) During a gold rush, Taylor Swift picked up 13 nuggets. She knows that 12 of the nuggets are gold and one of them is counterfeit. The counterfeit nugget has a slightly lighter weight than the other 12 nuggets. Using a balance scale, what is the minimum number of weighings necessary to guarantee that the counterfeit nugget will be detected? (1 point)

(problems continue on back)

6) Betty's castle crumbled overnight, and in order to rebuild her castle she had to stack bricks. It took Betty a total of 7 days to rebuild her castle. The first 5 days she averaged stacking 86 bricks. The last 2 days she averaged stacking 95 bricks. How many bricks in total did Betty stack when rebuilding her castle? (1 point)

7) Inez is lying on the cold hard ground. The ground is 40 feet by 20 feet, and consists of 800 one foot by one foot tiles. The perimeter tiles are red and all the other tiles are gold. What is the ratio of red to gold tiles? Answer in simplest form. (1 point)

8) Taylor has a bin of shoes which hold two types of shoes: normal shoes and organic shoes. Taylor randomly selects a shoe, hoping to pick out an organic shoe. To increase her chances of grabbing an Organic shoe, she buys 5 more organic shoes and adds them to her bin of shoes. This increases her chances by 20%. Now her chances of picking an organic shoe is 60%. How many organic shoes were in the bin originally? (1 point)

9) Jake has 7 car keys numbered 1-7. He randomly tosses Taylor 3 car keys. What is the probability that the numbers on the car keys tossed are consecutive and in ascending order? (2 points)