Team attack 11/09/2022

1. $\dfrac{9}{37}$ is changed to a decimal. What digit lies in the 2022^{th} place to the right of the decimal point?

2. Emily has 21 dimes. She placed then in three piles, with an odd number of dimes in each pile. In how many different ways can she accomplish this? [*Consider piles of 1, 1, 19 dimes, for example, to be equivalent to piles 1, 19, and 1 dimes.*]

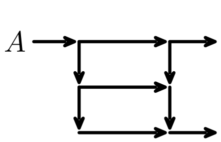
3. Suppose $\dfrac{2}{N}$, $\dfrac{3}{N}$, and $\dfrac{5}{N}$ are three fractions in lowest terms. Find a sum of all the possible composite whole number values for N between 20 and 80?

4. The Mathematical Olympiad began in the prime year 1979. Find the product of the fractions below in a simplest form:
$$\left(1-\frac{1}{1980}\right)\times\left(1-\frac{1}{1981}\right)\times\ldots\times\left(1-\frac{1}{2022}\right).$$

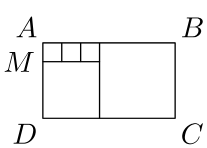
5. In this street map, all traffic enters at A and exits at either B or C. All traffic flows either south or east. At each intersection where there is a choice of direction, 70% of the traffic goes east and 30% goes south. What percent of the traffic exists at C?

6. Rectangle $ABCD$ is partitioned into five squares as shown. The length, in centimeters, of $\overline{AM}$ is a whole number. The area of rectangle $ABCD$ is greater than 100 sq cm. Find the smallest possible area of rectangle $ABCD$, in sq cm.

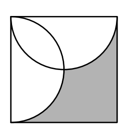
7. Two semicircles are inscribed in a square with side 8 meters as shown. Approximate the area of the shaded region to the nearest tenth of a square meter. Use the approximation 3.14 for π.



Problem 5



Problem 6



Problem 7

Team attack 11/09/2022

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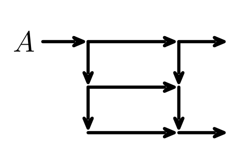
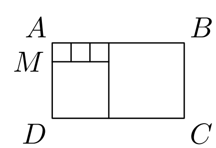
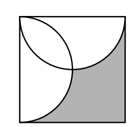


Problem 5



Problem 6



Problem 7