Bergen County Math League

Calculators Permitted

Good Luck to You  **Good Luck to All**

Contest #3 **2022-2023** **12 minutes** **Questions 1 & 2**

3-1. Squares $ABCD$ and $EFGH$ are congruent. The center of $ABCD$ is E. Point D is on $\overline{EF}$ and point C is on $\overline{EH}$. If $AB = 12$, find the area of $DFGHC$.

3-2. One hour after leaving a station, a train broke down and had to continue its trip at $\frac{3}{5}$ of its original speed. The train arrived at the next station 2 hours late. If the mishap had occurred 50 miles further on, the train would have arrived 40 minutes sooner. How many miles per hour was the train originally travelling?

Bergen County Math League

Calculators Permitted

Good Luck to You 

Good Luck to All

Contest #3 **2022-2023** **12 minutes** **Questions 3 & 4**

3-3. To the nearest integer, what is the diameter of a regular hexagon that has the same area as a circle with a diameter of 18?

3-4. A train, travelling at constant speed, takes 20 seconds from the time it first enters a tunnel that is 300 meters long until it completely emerges from the tunnel. One of the stationary ceiling lights in the tunnel is directly above the train for 10 seconds. Find the length of the train (in meters).

Bergen County Math League

Calculators Permitted

Good Luck to You  **Good Luck to All**

Contest #3 **2022-2023** **12 minutes** **Questions 5 & 6**

3-5. A, B, C and D are four different weights. When placed on a balance scale, the following observations are made:

- A and B exactly balance C and D
- A and C together outweigh B and D together
- C is lighter than D

Arrange the four weights in order, with the heaviest first.

3-6. Find all triples of real numbers (x, y, z) which simultaneously satisfy $\begin{cases} yz + xz = 13 \\ xz + xy = 25 \\ xy + yz = 20 \end{cases}$